amateur radio

VOL. 45, No. 1 JANUARY 1977

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COVER PHOTO

Pictured is Alf Chandler VK3LC. Alf is well known for his work as the WIA Federal Intruder Watch Co-ordinator since 1972. He is also the IARU Region 3 Monitoring Service Co-ordinator since 1975. Alf was first licensed in 1925 as OA3WH then later as VK3WH. In 1955 he became VK3LC. His long and varied interest in Amateur Radio includes: Sec. Moorabbin and District Radio Club, 1960-61; AR Committee and Circulation Manager, 1963-70; Mag Pubs Manager, 1970-72.

Photograph by Reg Gouge.

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amateur radio

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The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason

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QSP THE NOVICE THEORY EXAM

It is now some time since the announcement of the introduction of the Novice grade of licence.

After many delays we have now reached the stage where two examinations have been held. It is therefore rather disappointing to note from many reports now received that the standard of these examinations appears to have been set at a level not much below that of the AOCP theory exam.

If the concept of the Novice grade is to succeed, and we want it to succeed, the examination standard must be set at such a level to be achievable by those for whom we believed the grade was intended and not just for near-miss AOCP candidates.

The Executive is pursuing this matter.

D. A. WARDLAW, VK3ADW
Federal President. ■

QSP

DENTAL PROBES
Dentists use numerous "dental probes" for probing around patients' mouths. If an end breaks off they are usually discarded. Being made of strong stainless steel they are particularly useful for lifting components from PCB's or around tube sockets when the solder is molten.

VK3ASC

HEIGHT RESTRICTIONS ON TOWERS — USA
The comment printed on page 4 of AR Aug '76 as extracted from Worldradio News of April has brought out a comment from ARRL that there is in effect no restriction, under FCC Rules and Regulations, on the height of amateur antennas, except for those which would exceed 200 feet above average terrain, or those which are close to airports. In the latter case it would be necessary to file special papers.

DIVISIONAL BROADCASTS
Please amend your list on page 3 of Nov AR in respect of VK1 Division to read —
Time. 10.00 h UTC.

VK2 VHF FIELD DAY
A reminder — The VK2 VHF Group's mid-summer field day will be held from 12.00h ESST Sat 29th January to 14.00h ESST on Mon 31st Jan. Write to WIC, 14 Atchison Street, Crows Nest, NSW 2065, for details and enclose s.a.s.e.

1977 FEDERAL CONVENTION
Now is the time to prepare and submit to your Divisional Council agenda items for the 1977 Federal Convention to be held in Melbourne from 23rd to 25th April.

EDUCATION COMMITTEE
The Committee would welcome comments, criticisms (documented) and constructive advice regarding the Novice examination papers set for the November examinations in Theory, Regulations and Morse.

A syllabus for the Novice Theory examination has been prepared and will be published as early as possible after submission to the RFMD.

MALAYSIA REPEATER
The Sept issue of the MARTS newsletter has the news that their Frequency Assignment Committee has approved the use of frequencies 147.9 MHz output and 147.3 MHz input for the proposed repeater at Ulu Kali, max power 50W, emission 18F3. The same newsletter also carried information that Malaysian amateurs may now use RTTY.

PREFIXES
Radio Communication Nov '76 reports that the ITU has allocated the callsign series S7A to S7Z to the Republic of the Seychelles as from its date of independence.

1977 SUBSCRIPTION RATES
The following are the known subscription rates approved by Divisions for 1977. Items marked * were still to be confirmed when this was written.

Members are reminded to read their subscription notices and to send the amounts direct to the Executive office, PO Box 150, Toorak Vic 3142, as soon as possible to avoid the automatic stoppage of AR owing to becoming unfinancial and the consequences which will arise in the listing for the 1977 Call Book. **Please do not wait until a Final Notice has to be mailed to you.** Sending out Final Notices has become a considerable extra expense to the Institute in both time and money. In a membership society this could be construed as unthoughtful and unfair to the many, many members who do pay in good time.

1977 RATES

	$	
VK1	21.00	All grades
VK2	20.00	FC
	18.00	AT
	15.00	Students (on proof)
	10.00	Pensioners (proven)
	10.00	Family (no AR)
VK3	23.00	FC
	20.00	AT
	14.00	Students (on proof)
	13.00	Pensioners
	15.80	F or C family (no AR)
	12.80	A or T family (no AR)
VK4	20.00	F
	20.00	A
	18.50	C
	18.50	T
	13.00	Pensioners
	7.50	Students (on proof)
VK5	20.50	F
	19.00	ACT
	9.00	Pensioners and Students
	2.00*	Junior Students (no AR)
VK6	20.00	FC
	19.00	AT
	12.00	Pensioners and Students
VK7	17.00	FACT
	10.00	Pensioners and Students

New members, joining fees VK2—$2.00, VK7—$1.00.

Federal dues included in the above rates are:— EXEC $7.50, IARU $0.30, AR $7.20

Explanation of Symbols:
F = Full member (city)
A = Associate member (city)
C = Full member (country)
T = Associate member (country)
G = Pensioners
S = Students
X = Sundries, no AR.

END OF ANOTHER ERA

Due to other commitments, Bill Roper VK3ARZ has reluctantly found it necessary to resign from the position of Editor of Amateur Radio magazine as from 1.12.1976.

Bill has been associated with AR for many years, more particularly as Editor since February, 1972.

His guidance and knowledge will be greatly missed by the Publications Committee and Editorial Staff.

In grateful appreciation of his tireless efforts, the Executive and everyone associated with the production of AR wish Bill all the best for the future.

WIANEWS

A great number of different matters were discussed at the Executive Meeting in November.

Here are some of the items so as to give you a glimpse of what went on —

1977 Call Book progress.
Input of non-members to EDP for the Call Book.
Task priorities — EDP and subscriptions processing.
Review of recruiting position.
Need for revision of membership proposal forms vis-a-vis Div. Constitutions.
Car stickers — Slogans
Badges
WICEN
WICEN armbands.
Services personnel, amateur restrictions.
Reminders to RFMD.
Financial review.
Establishment of staff superannuation fund.
Club subscription rates.
Students' subscription rates.
1977 subscription rates.
Approval of accounts.

These items are merely those listed under matters arising from previous minutes and financial matters. This is not at all an unusual array of items.

NOVICE EXAMINATION

Complaints had arrived about the unnecessarily high level of the November Novice Theory examination. Since no copy of the paper was available for inspection it was not possible, only a few days after the event, to arrive at any conclusions.

One correspondent did however write to say that on the information available to him many of the questions were those which were supplied by the Institute to RFMD back in September. As reported in WIANEWS in Nov. AR page 4 the multi-choice questions submitted by the Institute related to the AOCP Theory paper. This was at the request of the RFMD.

Sample Novice theory questions were not submitted because there had been no request for these.

Preparation of a syllabus for the Novice theory examination is well advanced.

POSTAL MOTIONS

The Executive approved the issue of the following motions for voting by the Federal Council:—

"76.20.02. That this Institute, at this time, does not support the concept of an amateur service licence or permit of a level below that of the Novice grade" and
"76.20.03. That the Institute adopts the below-listed frequencies as WICEN net frequencies as may be required from time to time and requests all amateurs to keep these frequencies clear for all properly identified WICEN communications purposes:—

Primary — 3600, 7050 and 14100 kHz.
Secondary — for CW 3575, 7025, 14075 kHz
phone 3625, 7075, 14124 kHz.

WICEN

The Federal WICEN Co-ordinator suggested that a Co-ordinators' meeting now appeared desirable. Executive made a number of recommendations on this matter to the Divisions.

The Federal President is making arrangements to visit the Sydney/Gosford areas on an official visit over the week-end of 19th/20th February next. He will take with him the videotape of the G6CJ aerial circus. Many members would be interested in viewing this. ■

ALL JAPAN HAMVENTION

JARL 50th ANNIVERSARY

The Japan Amateur Radio League celebrated its 50th anniversary from 23rd to 26th September, 1976.

Michael Owen VK3K1, the immediate Past President of the W.I.A., and a director of the IARU Region 3 Association, represented the Association and the W.I.A.

Here he is shown presenting an opal rock, shaped in the map of Australia and mounted on a plaque, to the President of JARL, Shoza Hara, JA1AN.

The presentation took place on the 23rd September at Chinzan-so, Tokyo, and was followed by a dinner attended by their Imperial Highnesses, Prince Yoshihito Mikasa and Princess Hitachi.

ADDRESS BY MICHAEL OWEN, VK3KI AT THE COMMEMORATIVE DINNER PARTY AT CHINZAN-SO, TOKYO, JAPAN ON FRIDAY, 24th SEPTEMBER, 1976

"In celebrating its 50th Anniversary the Japan Amateur Radio League has, quite naturally, paid special attention to the past.

But in celebrating the past 50 years may I suggest that we should also look to the next 50 years.

In 1979 in Geneva the representatives of all of the countries of the world will meet and will review the bands allocated to each Service, including the Amateur Service.

There are two very important things that we should, I suggest, remember.

The first is that each country has only one vote. Japan has one vote. So has Australia. But so also has Tonga and Nauru.

The second thing that we should remember is that there are over 300,000 Amateurs in your country. The next largest amateur population in our Region is in Australia where there are only 6,000 licensed Amateurs.

Perhaps we should also remember that our Region, which has 37 votes at the conference in 1979, extends from Iran to Tonga — half the globe.

Our future is not secure. The Amateurs of the world are not the only people seeking to preserve and indeed expand their bands. We must justify our position. We face particular difficulties in our Region — we must remember that there are some countries where there are few Amateurs and other countries where, perhaps for security reasons, Amateur Radio is not permitted. Indeed, in some countries it is treated with the greatest suspicion.

I meet with you on my return from Geneva. There an International Working Group called together by the President of the International Amateur Radio Union, VE3CJ, has been attempting to formulate an IARU paper that we hope will help to guide the smaller Amateur Societies that we must rely on to present the case for Amateur Radio to their countries.

What do we say is the reason why the Amateur Service has valid and justified requirements for bands?

We suggest that we, the Amateurs of our part of the world, can put our case this way —

The Amateur Service is global; the needs of Amateurs cannot be judged by any country looking only at the narrow confines of that country. The unique contribution of the Amateur Service to international goodwill, training and education is at the heart of its contribution to both the national and international interest.

Your League has recognised the challenge of the conference in 1979. It has generously supported the Region 3 Association. Your President, Shozo Hara, JA1AN, was present at the World Conference in Miami, Florida. Your Society publishes, on behalf of the Region 3 Association, the Bulletin of our Association. We all remember with pleasure the second conference of the Association held in Tokyo.

By this support there is a strong regional organization of national societies.

The IARU and the regional organizations cannot ordinarily approach the government officials of any country directly for to do so could amount to an outside interference with the affairs of that country and could be counterproductive.

The Amateurs of the world must speak with one voice. Through the International Amateur Radio Union and through the three regional societies of the members of the International Amateur Radio Union, I believe we can achieve that common voice.

In our Region, Region 3, we have unique and special problems. With the support of JARL and the other Societies in our Region we can, I believe, effectively present our case.

On behalf of the Directors of the IARU Region 3 Association and the Secretary, David Rankin, and I am sure on behalf of all of the member societies, may I express our most sincere congratulations on your 50th Anniversary and with your support look forward to the next 50 years of our great international understanding."

TRANSCRIPT OF ADDRESS BY MICHAEL OWEN ON SUNDAY, 26th SEPTEMBER, 1976, AT THE ALL JAPAN HAMVENTION AT GREEN PARK, ASAGIRI HEIGHTS, JAPAN

"Your Imperial Highness,

Mr. Hara,

President of the All Japan Hamvention and the Japanese Amateur Radio League,

Ladies and Gentlemen,

The presence of Your Imperial Highness is a very great honour for amateur Radio and highlights the importance of this occasion.

Overseas visitors from the United States of America, the United Kingdom, New Zealand, Thailand, Korea, France, Germany, Sri Lanka and Australia have been honoured to share in the celebrations of the 50th Anniversary of JARL.

I cannot find words to express our gratitude for your kindness to us. I am sure that the last few days will be an experience that none of us will ever forget.

We have thought of the past, talked of the future and enjoyed ourselves. What could be better or more appropriate?

To all of you who have been so good to us and to you, Mr. Hara, on behalf of the visitors from overseas, I thank you, and to all of the amateurs of Japan, I assure you we look forward to the next exciting 50 years of amateur radio in your country." ■

PHOTO No. 1

PHOTO No. 1

Mock up of the shield presented to JARL in Tokyo by Michael Owen VK3KI on behalf of the WIA.

PHOTO No. 2

PHOTO No. 2

VK3KI presenting the shield to JARL President Shozo Hara JA1AN at Chinzon-so, Tokyo on 23rd September, 1976.

PHOTO No. 3

PHOTO No. 3

H.I.H. Prince Yoshihito Mikasa being welcomed by VK3KI on arriving at the Japan Hamvention at Green Park, Asagiri Heights.

DICK SMITH FOR ALL AMATEUR RADIO EQUIPMENT..

HF EQUIPMENT

Cat D-2520	Kenwood TS520D transceiver, 80 – 10m, SSB/CW. 240V & 12V operation.	$699.00
Cat D-5201	Kenwood VFO-520 remote VFO for TS520 transceiver.	$120.00
Cat D-5202	Kenwood SP-520 remote speaker for TS520 transceiver. (Also for TS820 - see below)	$42.00
Cat D-2110	Kenwood TS820 transceiver, 160 – 10m, SSB/CW/FSK.	$990.00
Cat D-2111	Kenwood VFO-820 remote VFO for TS820 transceiver.	$164.00
Cat D-2112	Kenwood DG1 digital display (option for the TS820 transceiver)	$185.00
Cat D-2530	Atlas 210 transceiver, 80 – 10m, 200W input, SSB & CW.	$599.00
Cat D-4306	Hy-gain TH3MK3 antenna, 3 el. beam, 20, 15 & 10 m. 8.5dB gain, 1kW rating.	$195.00
Cat D-4301	Hy-gain 18AVT antenna, 24ft all band vertical (80 – 10) Robust construction.	$93.00
Cat D-4300	Hy-gain 14AVQ antenna, 40, 20, 15 & 10m. 19 ft vertical.	$78.00
Cat D-4705	RAK 5BQN antenna, dipole for 80, 40, 20, 15 & 10m. SWR 1.2:1, 2kW rating.	$47.50
Cat D-4704	RAK AL80/40DX antenna, loaded dipole for 80 & 40m, 52 ohms. Max legal power.	$69.00
Cat D-4150	Hustler 4BTV antenna, 40 – 10m vertical. Max SWR 1.6:1, 21.5 ft high.	$110.00
Cat D-4152	Hustler MO-1 mobile mast, suits all RM - series resonators.	$28.50
Cat D-4154	Hustler MO-2 mobile mast, as above but bumper mounting.	$28.00
Cat D-4156	Hustler RM80 resonator for 80 metres, suits MO-1 or MO-2 (see above)	$29.50
Cat D-4158	Hustler RM40 resonator for 40m	$28.50
Cat D-4160	Hustler RM20 resonator for 20m	$24.50
Cat D-4162	Hustler RM15 resonator for 15m	$23.50
Cat D-4164	Hustler RM11 resonator for 11m	$19.00
Cat D-4166	Hustler RM10 resonator for 10m	$19.00
Cat D-4170	Hustler SSM2 antenna mount (mobile) inc. 180° adj. stainless steel ball.	$25.50
Cat D-4180	Hustler MM1 cowl mount, includes 180° ball and SO-239 skt. Accepts PL259 plug.	$10.50
Cat D-7010	Dummy load, 50 ohms, rated 100W cont. (int. would be far higher)	$23.75
Cat D-7080	Shinwa 1005 TVI filter, low pass 30MHz, 52 ohms, loss 0.7dB, max. attn. 50dB.	$23.75
Cat D-7190	MC-701 microphone compressor, 25dB max, fully variable, internal batteries.	$47.50
Cat D-5500	HC-500 antenna coupler. Tunes any antenna for 1:1 SWR, 3.5 – 30MHz. 52 ohms input.	$166.50
Cat D-7200	6KD6 transmitting valve	$8.55
Cat D-7201	6SJ6 transmitting valve	$8.25
Cat D-7202	6146 transmitting valve	$9.00
Cat D-7203	6LQ6 transmitting valve	$12.00

NOVICE EQUIPMENT

Cat D-1700	Midland 13-892 transceiver, SSB/AM, 11m, 23 channels. RF gain controls, etc.	$279.50
Cat D-1436	Midland 13-882C transceiver, AM, 11m, 23 channel, delta tune, ant. warning light.	$159.50
Cat D-1430	Midland 13-830 transceiver. 11m, AM for budget minded. 23 channels, 5W input.	$125.00
Cat D-4142	Mobile 1 Helical antenna. 11 metres, covered in durable plastic. B/Lee base.	$20.00
Cat K-3134	Novice Transvertor Kit. Build yourself. 27MHz to 3.5MHz novice channels. Max. output.	$99.50

VHF EQUIPMENT

Cat D-3100	Kenwood TS700A transceiver, 2m, SSB, FM, CW, & AM. AC/DC, 22 channels. Special:	$750.00
Cat D-3007	Multi 7 2m transceiver, 23 channel capacity (one channel fitted) FM.	$189.00
Cat D-3010	Multi 2000A transceiver, SSB/CW/FM, 2m 144 – 148MHz in 10kHz steps. AC/DC.	$550.00
Cat D-3500	Europa B transvertor, 28-30MHz to 144-146 MHz. Capable of any mode trans. uses.	$239.00
Cat D-3502	Kenwood TV-502 transvertor, suits TS520 transceiver, ouput 144 – 146MHz.	$289.00
Cat D-3040	Icom IC202 transceiver, 2M, SSB & CW. Covers 144 – 145MHz, comp. portable.	$219.50
Cat D-4620	Green GA6020 antenna, 5/8 144MHz; 1/4 50MHz. S/steel whip, 1.3m long.	$22.50
Cat D-4200	Hustler G6 144A colinear base antenna, shunt fed, SWR 1.2:1. Stands 100mph wind.	$88.50
Cat D-4600	3Y2D antenna, 3 element beam for 144 MHz, gain of 5dB, knocks down for portable use.	$16.50
Cat D-4610	RAK 42S antenna, 1/4 wave 144MHz, s/steel whip, standard PL259 plug base.	$8.50
Cat D-4611	RAK 82S antenna, 5/8 wave 144MHz, s/steel, 1.25m whip, PL259 base.	$11.50
Cat D-4650	Antenna element bracket, takes 3/8in rod for making beam antennas. Insulated type.	$0.55
Cat D-2561	NAG50XL linear amplifier for 6m band, 10W driver for 100W out, inbuilt supply.	$379.00
Cat D-2560	NAG144XL linear amp for 2m band, same specs as above unit.	$379.00
Cat D-2807	Daiwa SR9 receiver, 2m, FM, 11 channel plus VFO 146 – 152MHz. 12V DC.	$118.00
Cat D-3806	Ham Prods ERB6 RF amplifier, 6m, 20–30dB gain for rec. 9 – 12V DC @ 15mA.	$25.90
Cat D-3802	Ham Prods ERB2 RF amplifier, 2m, same specs as above.	$25.90
Cat D-3832	Ham Prods. EXC2 converter, 2m, for 52-54 MHz, IF output on 28–30MHz.	$35.50
Cat D-3836	Ham Prods. EXC6 converter, 6m, for 144-146MHz, IF output 28–30MHz.	$35.50

SWL EQUIPMENT

Cat D-2850	Yaesu Musen FRG-7 receiver. 550kHz-30MHz, Wadley Loop. 240/12V, 0.25uV sensitivity.	$325.00
Cat D-2866	Kenwood QR-666 receiver. 170kHz-30MHz. All modes (FM optional), band spread, ANL.	$230.00
Cat D-2801	Drake SSR-1 receiver. 550kHz-30MHz, Wadley Loop. 5kHz dial accuracy, 3 way power.	$343.00
Cat D-4701	RAK listener 1 'V' antenna. 3 – 30MHz, with trap. Comp. assembled. Ideal for DX work.	$22.50
Cat D-4703	RAK Listener 3. Long wire dipole, supplied with balun & all accessories, 3 – 30MHz. Ultimate!	$51.00

ACCESSORIES

Cat D-7104	Hi-mound morse key. Double ball pivot rollers and adj spring. Contacts for break-in keying.	$23.75
Cat Q-1340	Osker Bloc SWR200 SWR & power meter. 3–30MHz, Pwr 0–2kW; SWR 1:1 – infinity.	$67.50
Cat Q-1360	FS5 SWR/power meter. 3 – 30MHz, dual imp. Pwr 0–100W; SWR 1:1 – 1:3.	$34.50
Cat D-5310	RAK BL50A balun, 52 ohms unbal/52 ohms bal. T shape, use as centre support for dipoles.	$20.75
Cat D-4508	TOO7 Antenna quick release (mobile) Take the antenna off to avoid vandalism & damage.	$7.90
Cat D-2875	SS727 Slow Scan TV. Receives both SSTV & ordinary TV. 240V AC operated.	$598.00
Cat D-5204	Apollo 3 position co-axial switch. Low insert. loss, standard PL259 connectors.	$22.50

DICK SMITH ELECTRONICS GROUP

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RADIO TELETYPE

Jostein Gjerde, LA7MC

PART ONE

INTRODUCTION TO RTTY

We present the first of eight excellent articles on the subject of RTTY covering theory and practice. These articles were first published in consecutive issues of "Amateur Radio" the official publication of the Norwegian Radio Relay League. The first article was published in the NRRL AR number 5, 1972. These articles were translated by VK3ZPA's XYL. Her efforts are gratefully acknowledged.

THE TELEPRINTER

The Teleprinter is like an electric typewriter in appearance. It is mostly used in the Telex and similar services. The machines are connected in a current loop and communicate by means of a serial digital code. Generation and reception of letters and symbols depends on the way the loop current is broken. If only two machines are in circuit they are connected in series with a voltage source and a current limiting resistor. As the machines are series connected via two wires, the operating current flows through a loop, hence the term "current loop".

There are two types of information, current (mark) and no current (space). Each letter or symbol is composed of 5 pieces of information which are either marks or spaces and each combination represents a particular letter or symbol. Besides these 5 combinations, a complete symbol also contains a start pulse and a stop pulse.

When a signal is sent from the transmitter, the 7 different pulses are sent in order. The start pulse begins a decoding of the 7 pulses at the receiver end, and thus decoding must naturally be done at the same speed as the transmitter generates the pulses, if the combination shall be correctly read. It is therefore very important that teleprinters connected to the same network, work at the same speed.

The speed used by amateurs is normally described as 45 baud. The description "baud" means current pulses or "bits" of code per second. Fig 1 shows how a teleprinter signal works when this system is used. As you can see, the start pulse and the 5 identification pulses are each 22 millisecond duration. When you wish to find the speed given in baud, take the reciprocal of the shortest pulse in the signal 1/0.022 = 45.45 baud.

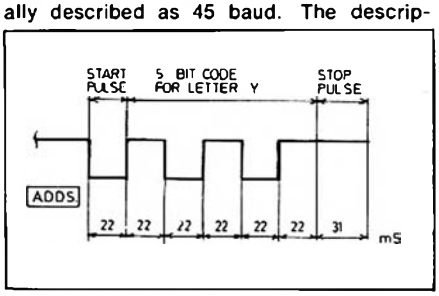


FIG. 1 EXAMPLE OF TELEPRINTER CODE

Fig 2 shows a comparison of the different Teletype systems existing and some of these you can also hear as teletype signals on the short wave bands.

BAUD	WORD MIN	PULSE LENGTH	STOP PULSE	DESCRIPTION
45.5	65	22mS	22mS	WESTERN UNION STANDARD
"	62.5	"	28mS	
"	61.3	"	31mS	AMERICAN AMATEUR STANDARD
"	57.2	"	43mS	U.S. GOVERNMENT STANDARD
50	66.6	20mS	30mS	INTERNATION. STANDARD
"	62.5	"	40mS	
56.9	75	18mS	25mS	
74.2	100	13.5mS	19mS	

FIG. 2

TRANSMISSION OF TELEPRINTER SIGNALS BY RADIO (RTTY)

In transmission of teleprinter signals by radio, frequency-shift-modulation or F1 is used. We make the transmission frequency jump to and fro to correspond with 'Mark' and 'Space'. The size of this frequency jump is what is called the shift. The shift most often used previously was 850 Hz, but in recent times there has been increasing use of a small shift i.e. 170 Hz. This has many advantages e.g. one uses a smaller portion of your allotted frequency band and somebody receiving can use a small bandwidth on the receiver and thereby get a better signal/noise ratio.

Where commercial stations are concerned, there are many different shifts (including 850 Hz) but the one most commercially used is 425 Hz.

When you wish to key the transmission frequency it can be done in two different ways:—

1. You can act upon the oscillator in the transmitter with the teletype signal such that the transmitted signal jumps in time with 'Mark' and 'Space'. This is called high frequency shift keying (HFSK). Vari-cap diodes are a popular means of achieving HFSK.

2. If you have a single-sideband-transmitter modulated with a single 2125 Hz tone, this will result in the transmitter giving out a single high frequency wave which lies, for example, 2125 Hz below the suppressed carrier wave if you use the lower sideband, or 2125 Hz above the suppressed carrier wave if you use the upper sideband. If you now vary the modulation tone frequency, this will make it appear that the transmitted "carrier wave" changes its frequency. This is called audio frequency shift keying or AFSK.

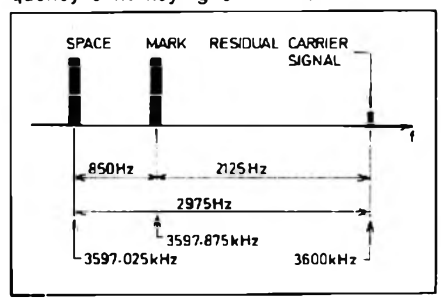


FIG. 3 MODULATION FREQUENCIES

Fig 3 shows how the 'Mark' and 'Space' would be if you modulated with tones of 2125 Hz and 2975 Hz on a carrier wave (suppressed) of 3.6 MHz, using the lower sideband. We see that the 'Mark' signal lies at a higher frequency than the 'Space' signal.

It is recommended that you use the two tones given in the example. There are, however, difficulties with such high modulation frequencies with most single-sideband transmitters.

The usual SSB filters will not let through a tone of 2975 Hz during transmission, and if you have a similar filter on the receiver (such as you have in a transceiver) you will not receive the tone.

You can then procure an extra carrier crystal which lies about 1 kHz higher and the problem is solved both for transmission and receiving. (This new crystal is naturally unsuitable for telephony).

Another solution, which is much used, is to use lower modulation and receiving tones, e.g. 1050 and 1900 Hz, but the solution is not recommended by experts and you will, in any case, get into difficulties if you later want to change over to use one or other ready-built converters e.g. ST-6.

(to be continued) ■

WILLY WILLY'S WONDER
AN ANTENNA COUPLING UNIT FOR THE EXPERIMENTER

M. N. O'Burtill VK3WW
3 Maxwell St., Lalor, Vic. 3075

This is a project without complications that is useful in any shack, easy and cheap to build, and above all completely lacking in the frustrations of modern electronics caused by our fetish for 3, 8, 14 etc. legged fuses!

Use as much heat as you like — weld it if you want, any damage to a component can be seen a yard away (without glasses).

This is an Aerial Coupling Unit (ACU) that has been in use in my shack for many years. The details have been given to quite a few other amateurs and all have met with success.

The circuit is simple (Fig. 1). I have deliberately not marked values on the circuit because they are quite flexible.

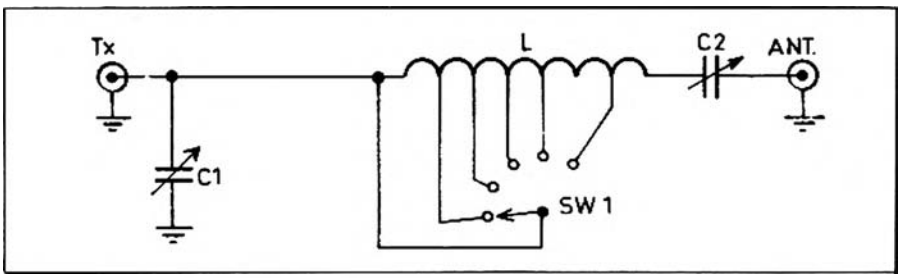


FIG. 1

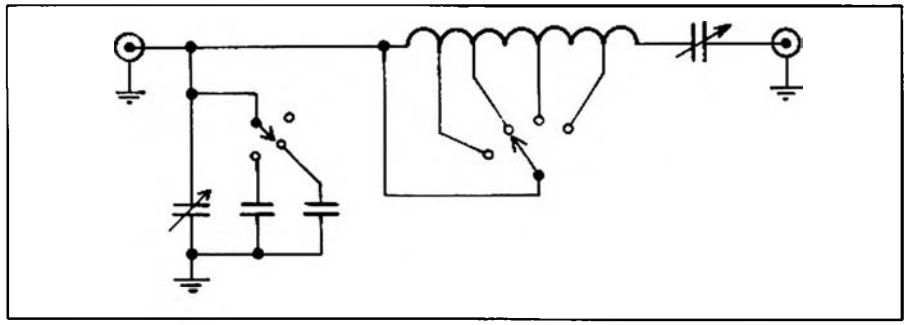


FIG. 2

When I first built this unit I used components from my old AM rig, so C_1 was the plate tuning capacitor, L was a Geloso pi coupler coil complete with switch and C_2 was a broadcast 3 gang capacitor.

At this stage let me say that application of this unit can become complicated, so first decide just what you want to do with it. For a home station you may want to match 3 or 4 different antennas on all HF bands and achieve an SWR of 1:1 or thereabouts. For mobile or portable use, a one band one antenna set up may be all you need.

COMPONENTS

The components can be varied quite a lot.

C_1 is usually 150-200 pF full mesh and in some cases fixed C is switched in parallel to give the desired result. (Fig 2).

Coil L can be a duplicate of the Geloso coil: others have used variations such as

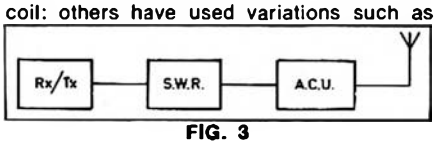


FIG. 3

2" diam. 4" long, 3" diam. 5" long and so on.

C_2 in my ACU is a 3 gang BC with gangs in parallel. A single gang, for most applications, would have been sufficient.

L and C_2 are in series with your antenna line, so varying one will cause a variation in setting of the other. Switch S1 should be a ceramic switch with a progressively shorting contact. These are pretty hard to get these days so an ordinary 5 or 6 position Oak switch will do the job and with full power input should last two or three years. When it goes you will hear and smell it quickly!

OPERATION

Let's now look at Fig 3 and start to use this ACU to our benefit.

First put C1 in full mesh and L on Tap 1. Tune in a signal on the band and then sweep C2 through its range and look for an increase in signal strength. If there is no improvement switch to the next L tap and sweep C2 from full to minimum mesh once again. Repeat this until you have reasonable signal received.

Now tune up your transmitter into a dummy load of the same impedance as you hope your antenna will show. For this operation take the ACU out of circuit (Fig 4). Naturally if the dummy load is any good the SWR will be 1:1. Connect your antenna in place of the dummy load and note the SWR without touching the transmitter.

Now back to the set up in Fig 3. Check the SWR with the ACU set up for receive, then transmit and tune C2 for a dip in reflected power. This dip should be quite sharp. Tune C1 to improve this dip in reflected power. The SWR should be very close to that obtained with your dummy load. Remember on HF you can accept up to 2:1 without damage to your final tubes or serious loss of power, unless using one of the solid state untuned final circuits with infinite SWR protection. Then you will do no damage but will lose a lot of power.

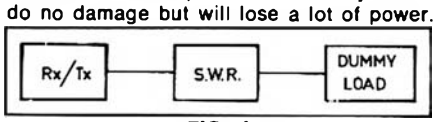


FIG. 4

If no sharp dip can be obtained with C2 try another coil tap. If no combination of C2, L, and C1 will give you the above results, your antenna is just not capable of resonating within the band or your ACU components are way, way off. This last would surprise me as I have seen such a variety of coils and capacitors used successfully.

CONSTRUCTION HINTS

Building the unit is easy. Use solid wire 20 gauge or heavier. Don't forget C2 is in

series so will need good insulation from surrounding metal work and particularly good insulation for the tuning knob. An insulated coupling to the shaft is the best for the latter.

VARIATIONS

Now a few ideas for the adventurous. Adding parallel C to C1 has already been mentioned; the number and complexity of the switching is up to you.

How many taps on L? If you can get a suitable switch a dozen or more taps can be used; you could even use two switches and treat L as two coils in series. A roller inductance is a good idea if you have one available.

Changes in C2 are a little harder due to insulation problems but fixed C high voltage types can be used in some cases with suitable switches (Fig 5).

MOBILE

For mobile/portable work let's try for a coupler that will change bands by using only one switch with no capacitor tuning at all. The trick here is to use small spaced trimmers combined with high voltage fixed capacitors. I have not yet tried this but feel the best method would be to improvise an ACU using the coil you intend to use in the finished unit and calibrated variables for C1 and C2.

Suppose we are using a helical on 80m. Tune up and note settings of C1 and C2 and the tap on L. Now replace C1 and C2 with trimmers and fixed C such that the trimmers give the same capacity as the original settings when set at half mesh. (In some cases you won't need any fixed capacitors.) Retune and you should be able to obtain the same results as before, but now the size of the unit is determined mainly by the coil. A word of warning — you can experience "flash over" in C1 or C2 if using full power and close spaced plates on the trimmers. Lower powered rigs such as the FT75B should work with small trimmers.

For C1 and C2 in the test rig any reasonable variable capacitors will do. Try a 200 pF in C1 and a two gang BC type for C2. Calibrating them is time-consuming using a GDO but quite accurate enough. If you have access to good measuring equipment I suggest you fit the two gang capacitor with a dial and calibrate it accurately. Such a capacitor is a very handy thing to have in the shack if you are inclined to experiment. Fig 6 shows the circuit. The only complication is the switching. The benefit is a one switch band change and your ACU is set for the band in use.

HOME STATION

Further additions may be made to home station units by using co-axial switches. Suppose you have a G5RV for all bands, a dipole on 40m and a tri-band beam for 20, 15 and 10m.

You want to use the coupler with the G5RV and the beam but not with the dipole. The use of two co-ax switches gives you a quick method of selecting the correct combination. Naturally this facility puts cost into the system as co-ax switches are not cheap.

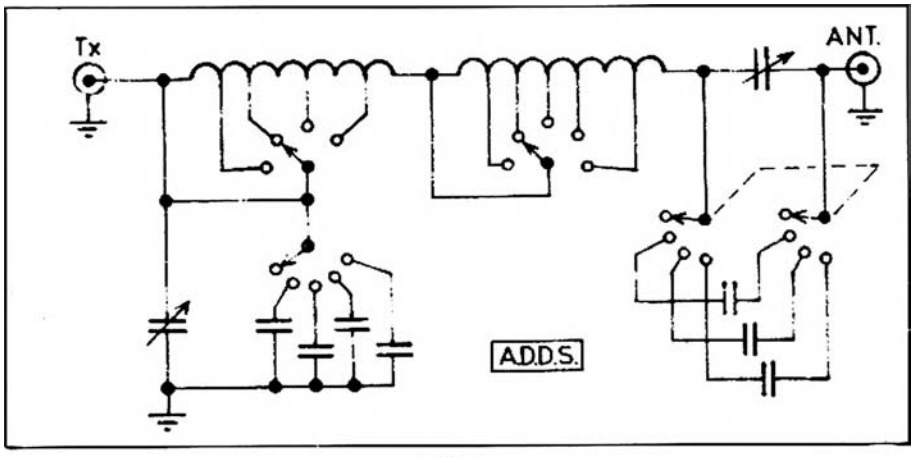


FIG. 5

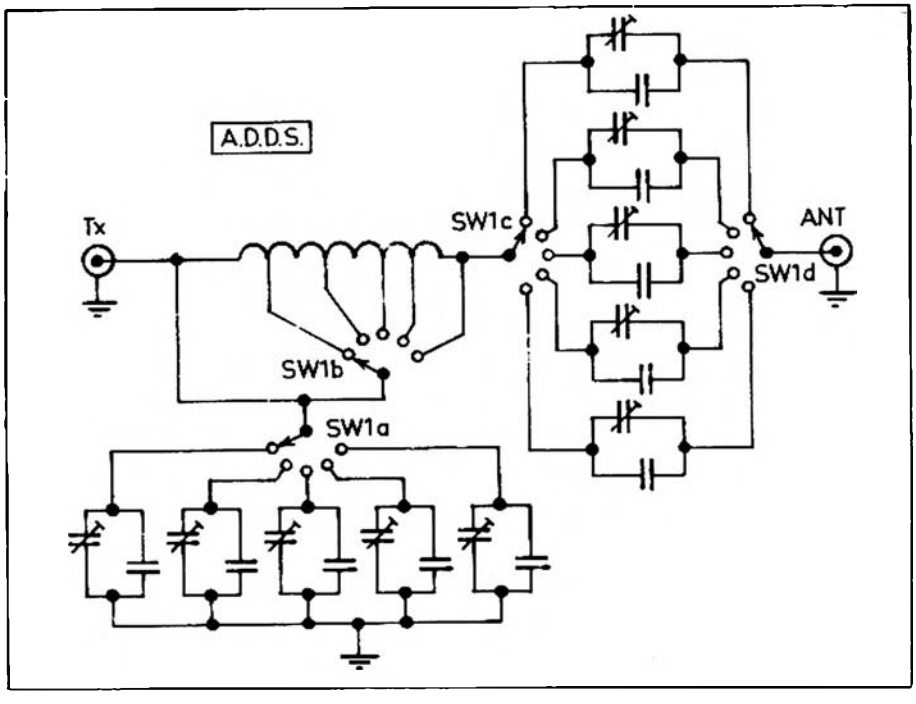


FIG. 6

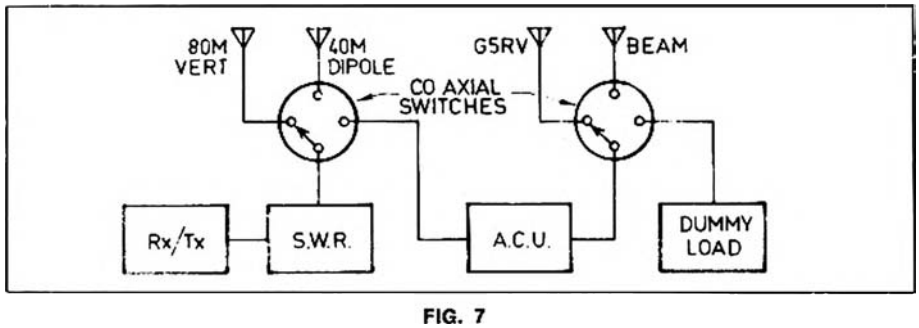


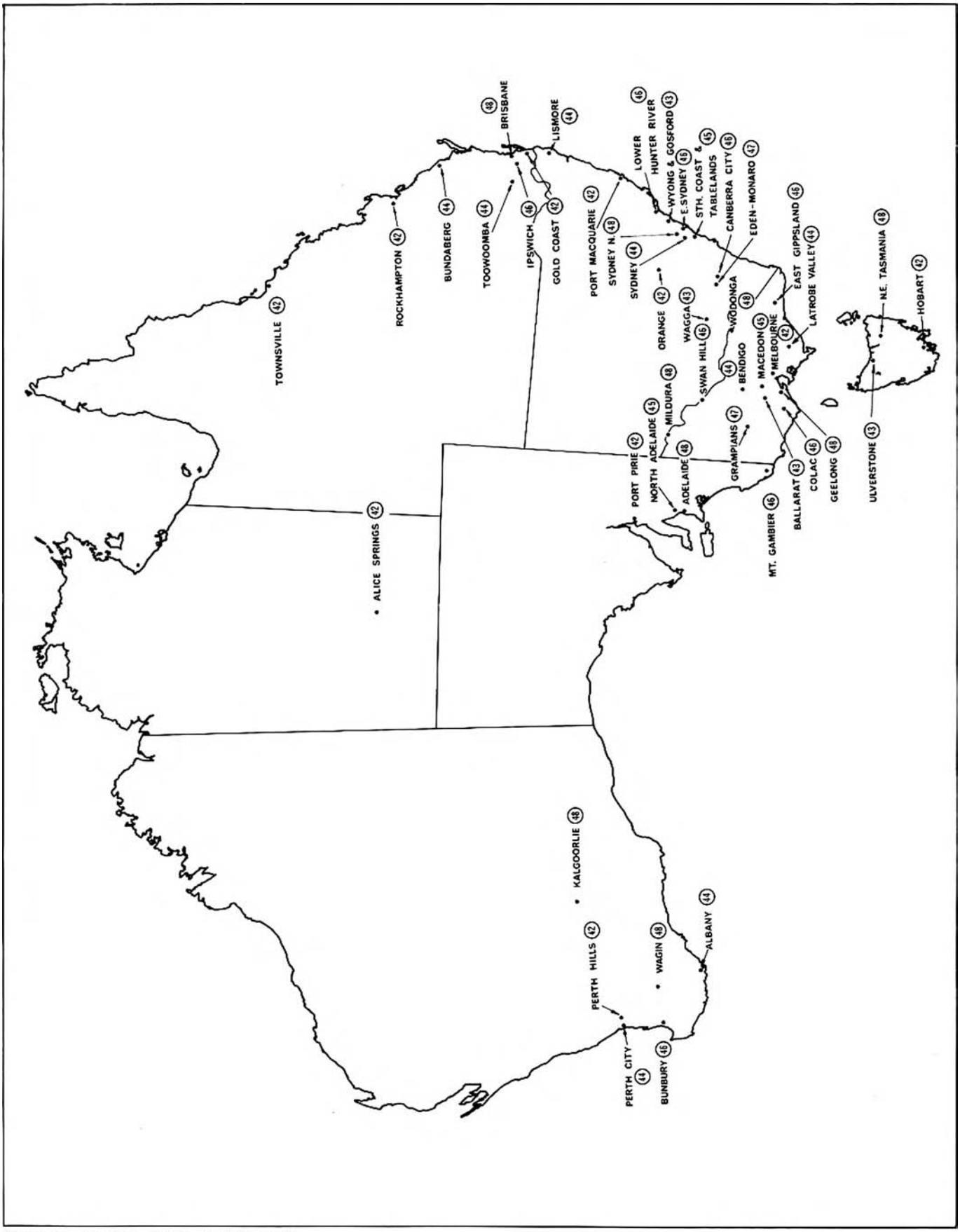
FIG. 7

Fig 7 shows a home station coupler which is very versatile and not too complicated to build or use. On air tests with this ACU have proved conclusively that its use can give a few extra watts to your antenna and thus a few more microvolts at the receiving end where it is needed.

Should any reader wish to discuss any particular details I will be happy to arrange a sked one evening.

A final warning — this ACU will not perform miracles. Your antenna must be capable of resonating in the required band. The ACU puts the final polish on it. ■

2m REPEATER LOCATIONS & CHANNEL NUMBERS



Area	Call Sign	Ch.	Time Out (Min)	Ident Mode	Power Watts	Mobile Range (km)	Height ASL (m)	Site	Sponsor	Status
AUST. CAPITAL TERRITORY										
Canberra City	VK1RAC	46	4	MCW	10	100	887	Mt. Majura	ACT WIA	Operational
Eden-Monaro	VK1RGI	47	4	MCW	40	325	914	Mt. Ginini	ACT WIA	Operational
NEW SOUTH WALES										
Pt. Macquarie		42	3	MCW	20	65		Transit Hill	Oxley Reg. RC	Operational
Western Plains	VK2RAO	42	3	MCW	50	160	1400	Mt. Canobolos	Orange District RC	Operational
Wagga	VK2RWG	43	4.5	MCW	10	85	550	Mt. Flackney	Wagga District RC	Operational
Wyong and Gosford	VK2RAG	43	3	MCW	30	60	170	Karriong	Cent. Coast ARC	Operational
Lismore	VK2RIC	44	4	MCW		80		Parrots Nest	Summerland RC	Planning
Sydney S. Suburbs	VK2RLE	44	4	MCW	30	80	150	Engadine	St. George ARC	Operational
S. Coast and T/lands	VK2RAW	45	4	MCW	70	120	760	Mt. Murray	Illawarra ARS	Operational
Lower Hunter River	VK2RAN	46	4	MCW	30	140	402	Gt. Sugarloaf	Hunter Br. WIA	Operational
Sydney Eastern Suburbs	VK2RBV	46	4.5	MCW	30	100	100	Waverly	Waverly ARC	Operational
Sydney Northern Suburbs	VK2RAS	48	3	MCW	40	80	228	Dural	NSW WIA	Operational
VICTORIA										
Melbourne	VK3RML	42	2.5	MCW	50	130	600	Mt. Dandenong	Vic. WIA	Operational
Ballarat	VK3RBA	43	3	MCW	15	20	70	Mt. Bunningyong	Vic. WIA	Operational
Bendigo	VK3RAM	44	2.5	FSK	40	100	740	Mt. Alexander	Midlands Zone WIA	Operational
Latrobe Valley	VK3RLV	44	2.5	MCW	40	120	730	Mt. Tassie	E. Zone WIA	Operational
Mt. Macedon	VK3RMM	45	2.5	MCW	25			Mt. Macedon	Vic. WIA	Testing
Swan Hill	VK3RSH	46	2.5	MCW	40	50	63	Swan Hill	Swan Hill ARC	Operational
East Gippsland	VK3REG	46	4.5	MCW	25	100	900	Mt. Sugarloaf	E. Zone WIA	Operational
Colac	VK3RSW	46	3	MCW	25			Otway Ranges	Vic. WIA	Planning
Grampians	VK3RWZ	47	2.5	MCW	25	130	1170	Mt. William	W. Zone WIA	Operational
Mildura	VK3RMA	48	4	MCW	100	55	51	Mildura Airport	N.W. Zone WIA	Operational
Geelong	VK3RGL	48	3	MCW	25	120	340	Mt. Anakie	Vic. WIA	Operational
Wodonga	VK3RNE	48	3	MCW	25			Mt. Big Ben	N.E. Zone WIA	Operational
QUEENSLAND										
Gold Coast	VK4RGC	42	4.5	MCW	50	60	500	Mt. Tamborine	Gold Coast RC	Operational
Townsville	VK4RAT	42	4.5	MCW	10	75	740	Mt. Stuart	Townsville ARC	Operational
Rockhampton	VK4RAR	42		MCW	20	80		Mt. Archer	Central WIA	Operational
Toowoomba	VK4RDD	44	4.5	MCW	10	80	636	S.E. Toowoomba	Darling Downs RC	Operational
Bundaberg	VK4RGU	44		MCW	20			Mt. Goomamemah	Bundaberg RC	Planning
Ipswich	VK4RAI	46	4.5	MCW	20	60	400	Denmark Hill	Ipswich ARC	Operational
Brisbane	VK4RBN	48	5	MCW	50	80	632	Mt. Glorious	Brisbane WIA	Operational
SOUTH AUSTRALIA										
Port Pirie	VK5RMN	42	5	MCW	10		730	The Bluff	S. Australia WIA	Operational
North Adelaide	VK5RHO	45	2.5	MCW	25	80		Houghton	S. Australia WIA	Operational
Mt. Gambier	VK5RMG	46	5	MCW	25	80	100	SES-8 Studios	S. Eastern RC	Operational
Adelaide	VK5RAD	48	9	MCW	15	80	610	Croffters	S. Australia WIA	Operational
WESTERN AUSTRALIA										
Perth (Hills)	VK6RAP	42	5	FSK	25	160	360	Roleystone	W. Australia WIA	Operational
Perth (City)	VK6RAH	44	5		25	60	90	Wireless Hill	Perth Rep. Group	
Albany	VK6RAA	44	5	MCW	40	100	430	Mt. Barker	South. Electrical Gp.	Operational
Bunbury	VK6RBY	46						Mt. William	W.A. Rep. Group	Planning
Wagin	VK6RAW	48	5	MCW	12	70	395	Mt. Latham	W. Australia WIA	Operational
Kalgoorlie		48								Operational
TASMANIA										
Hobart	VK7RHT	42		MCW	70			ABT2 Tower	S. Branch WIA	Operational
Ulverstone	VK7RNW	43	4.5	MCW	30	60	70	Mt. Leona	N.W. Branch WIA	Operational
North-East Tasmania	VK7RAA	48	5	MCW	60	190	1400	Mt. Barrow	N. Branch WIA	Operational
NORTHERN TERRITORY										
Alice Springs		42								Operational

REPEATER CHANNEL NUMBERS AND FREQUENCIES

Repeater Ch. No.	INPUT		OUTPUT		Repeater Ch. No.	INPUT		OUTPUT	
	Ch. No.	Freq. MHz	Ch. No.	Freq. MHz		Ch. No.	Freq. MHz	Ch. No.	Freq. MHz
41	41	146.05	53	146.65	45	45	146.25	57	146.85
42	42	146.10	54	146.70	46	46	146.30	58	146.90
43	43	146.15	55	146.75	47	47	146.35	59	146.95
44	44	146.20	56	146.80	48	48	146.40	60	147.0

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

Dec. 11/ Jan.	16	ROSS HULL VHF MEMORIAL CONTEST.
	8/9	YU 80 Metre Contest.
	15/16	"Hunting Lions" Party.
	15/16	DL QRP CW Contest.
	28/30	CQ WW DX 160 Contest.
	29/30	French CW Contest.
	29/30	Classic Radio Exchange.
	29/31	VHF Mid-Summer Field Day Contest.
Feb.	5/6	ARRL DX Phone Contest.
	12/13	JOHN MOYLE MEMORIAL NATIONAL FIELD DAY.
	19/20	ARRL DX CW Contest.
	19/20	YL - OM Phone Contest.
	26/27	French Phone Contest
Mar.	5/6	ARRL DX Phone Contest.
	5/6	YL - OM CW Contest.
	19/20	ARRL DX CW Contest.
	26/27	CQ WW WPX SSB Contest.

YU 80 METRE CONTEST

GMT Jan. 8 to 2100 GMT Jan. 9.

Exchange RST and QSO number. Score 1 point for contacts between stations in same country, 2 points with other countries on same continent, countries on other continents 5 points. YU stations count for 10 points. Multiplier is one for each DXCC country and each YU prefix worked. Certificates to top scorers in each country with 2nd and 3rd place awards where justified. All VK call areas considered separately for awards. There are also trophies for continental leaders. Logs to reach YU DX Club of SRJ, P.O. Box 48, 11001, Belgrade, Yugoslavia, by March 1st, 1977.

"HUNTING LIONS" QSO PARTY

1200GMT Jan. 15 to 1200 GMT Jan. 16, 1977.

This activity is sponsored by Lions International, and co-ordinated by the Lions Club of Rio de Janeiro, Brazil. This activity is between Lions and non-Lions. Exchange Name, QTH, QSO No. and the time. Lions will add their Club name. Score 1 point per contact, 2 points if it is with another country. VK's can claim 2 bonus points for working the Arpoador or Marumbi Clubs of Brazil. Frequencies used are the top 25 kHz of 40, 20, 15 and 10 metre phone and CW bands. There are awards for both Phone and CW. Send logs within 30 days to: Lions Club of Rio de Janeiro (Arpoador), Rua Souza Lima n. 310 — Apartmento 802, Rio de Janeiro — 20.000 ZC 37, Brazil.

CW WW DX 160 CONTEST

GMT Jan. 28 to 1600 GMT Jan. 30.

Rules are the same as previous years. This is a CW only contest. Send RST and serial number. Claim 2 points per QSO within same country, 5 points with other countries. W/VE/VO count 10 points. Multipliers are 1 for each US state, VE province and DX country worked. Final score is total QSO points times the sum of the multiplier. Send logs to CQ 160 Contest, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050, by Feb. 28, 1977.

FRENCH DX CONTEST

CW 0000 GMT Jan. 29 to 2400 GMT Jan. 30, 1977. Phone 0000 GMT Feb. 26 to 2400 GMT Feb. 27, 1977

Contest exchange includes continental France, DUF countries and the following prefixes: ON, HB, LX, VE2, OD, HH, 3B, 9U, 9Q, 9X, French stations will give RS(T) and 2 figures identifying their department. Others give RS(T) and QSO number. HB and ON may give 2 letter abbreviation for Canton or Province. Each QSO 3 points. Contacts with F6REF and F8REF are worth 10 points. Multiplier is one point for each French Department (95), Swiss Canton (22), Belgium Province (10), and each DUF country. Plus LX, VE2, OD, HA, 3B, 9U/O/K. Final scores is total QSO points times sum of multiplier from all bands. Logs to REF Traffic Manager, Lucien Aubry, F8TM, due Marceau 53 — 91120 Palaiseau, France.

VHF MID-SUMMER FIELD DAY

1200 ESST 29th Jan. to 1400 ESST 31st Jan., 1977.

This field day is conducted by the VHF and TV group of NSW, over the Australia Day long weekend. All bands above 52 MHz may be used. Each station may be worked once per band per clock hour. The minimum contact distance is 1 kilometre. Crossband, HF and repeater may be used to set up contacts, but not for scoring. Oscar 6 and 7 are not classified as repeaters for this contest. There are 3 sections — Field stations, Mobile stations, and Home stations. The best consecutive 6 clock hours and the best overall score in each of the above sections.

Entries must give the call sign and **TOTAL** points claimed for each station worked; there is no need to submit complete log extracts. Include a cover sheet and a signed declaration. Entries go to the VHF and TV group, 14 Atchison Street, Crows Nest, NSW 2065, before March 14th, 1977.

SCORING TABLE

km	6M Net	Tune	2M Net	Tune	70 cm	ATV	50 cm up
1-50	2	3	1	3	4	20	10
51-100	4	6	2	6	10	50	50
101-150	10	15	5	15	30	150	100
151-300	20	30	10	30	50	250	200
301-500	50	75	15	45	100	500	500
501-800	40	60	25	75	200	1000	600
801-1200	30	45	35	105	400	2000	700
1201-2000	20	30	75	225	500	2500	800
2001 up	50	75	125	375	600	3000	1000

Oscar 2-10 translator 20 VK/ZL, 50 other countries.
7-2 translator 50 VK/ZL, 100 other countries.
ATV serial numbers must be exchanged on vision and sound. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN September
The Browning-Drake Receiver; Profile of a Radio Pioneer; Ralph Slade; Vari-Cap VFO.

CQ MAGAZINE June
A Canoe, A PM2B, es QNI QTC QRPp 9/0; Review: Heathkit HW-2021; 1975 WW CQ DX-Contest, Phone Results; Making IC Projects Work; Antennas.

HAM RADIO August
High Frequency Receiver Design; Multiband HF Converter; Microwave Amplifier Design; Two Channel VHF FM Receiver; Four Band VHF Converter; Up-dating Tube Type FM Receivers.

October
High Performance VHF FM Transmitter; RTTY Demodulator; Application and use of the Hand Held Calculator; Syllabic VOX System for Drake Equipment; Derivation of Electrical Units; IF and Detector Module, Digital Television Scan Converters; Coaxial Dipole Antennas: Facts and Fallacies; Differential Keying Circuit; TTL IC Tester; VHF Bandpass Filter; Microprocessors.

QST July
A Few Publick-Spirited Hammes; His Eminence — The Receiver; Understanding Modern Oscilloscopes; The Herring-Aid Five; The Maunder Minimum; A Wide Range Crystal-Controlled Frequency Standard; Enhance the Performance of Your Accu-Memory; RFI Packet Up-date.

September
Meet the Microprocessor; The Mini-Miser's Dream Receiver; VHF FM Receiver Trouble-shooting; The Tower Shield; Hot and Cold Resistors as UHF Noise Sources; RFI Grows Up; Oscars Help Dedicate New Air and Space Museum; California to Hawaii on 2 Metres; A Fist from the Sky; Morse Decoded; Radio Scouting at NORDJAMB-75.

RADIO COMMUNICATION September
Practical Polyphase: A Fourth Generation CW Keyer Using CMOS IC's; The IP Quad; Tunable Gunn Oscillators.

RADIO ZS May to September
Direction Finding; Some Ideas on Filters; Convert Your AM Rig to DSB; Looking at the LM 373.
TV Masthead Amplifiers and Their Problems to the Amateur; Hamming it Up on the Rio Yacht Race; An Active CW Filter; Build a Two Metre Transverter.
Historic IARU Region 1 Conference-Gaberone; A Quick and Simple 160 Metre Transverter.
How to Build a Digital Read-Out for Your Argonaut; A Stable VFO.
A Medium Power Two-Metre Linear Amplifier.

SHORT WAVE MAGAZINE August
QRO Linear for Multi-Band Working; Clipper for the Liner-2; Two-Metre Transistor Converter; Sideband/CW Adapter for BC Receivers; CC BFO for SSB. ■

20 YEARS AGO

Ron Fisher, VK3OM

JANUARY, 1957

To mark the 1956 Olympic games held in Melbourne, VK3WI co-operated with VK7WI in receiving a message of greetings from the Greek Radio Amateurs. The message was transmitted from Mount Olympus in Greece to VK7WI operating portable from Mount Olympus in Tasmania, and was later passed on to VK3WI and then handed to the Chief Executive Officer, Olympic Games Committee in Melbourne.

Transistors were mysterious objects to most of us in 1956 (they still are to many old-timers), but Hans Albrecht VK3AHH threw some light on the subject of audio amplifier design in the January, 1957 issue of AR.

Diagnosis of TVI, a reprint from the RSGB Bulletin, was one of those articles that did not actually tell you how to cure your TVI but rather how to diagnose the cause. Frank Fowler VK2APF described his "Simple Mobile Whip for 40-80 metres". Basically a centre loaded whip with a slider on the coil to change bands, Frank claimed to have worked ZL's on both bands with 4 to 8 watts input.

Improving receiver sensitivity was always an interesting pastime. When new tubes became available, they were always tried to see if they outperformed the old. D. G. Hawthorne VK3ZCD described the improvement he got by substituting a 6BY7 for a 6AG5 in his CR 100 receiver.

A popular AR column twenty years ago was the SWL section. In those days it was compiled by Ian Hunt L3007, now better known as VK5QX. Many of the "Junior" members mentioned from time to time are now well known amateurs.

Included in the VHF notes was a description of a television set built by Keith VK3HK. Just to stir your memory, here is a description of the set-up. A Loran CRO with a 5CP1 was the basis with the turret and IF strip from a Rebecca R1045 radar transceiver. The sync separator used a VR65a as did the frame oscillator. It was often amazing the picture quality that could be obtained from such a set-up. ■

AROUND THE TRADE

DAICOM HAS MOVED

Well known ACT amateur, Andrew Davis VK1DA, the Managing Director of DAICOM, has expanded his interests and has taken over the local business of Custom Scientific.

The new location is now at 29 Colbee Court, Phillip, ACT. Phone (062) 82 3581.

Daicom caters for all amateur requirements, and specialises in the sale of components, etc., for the professional market, and the servicing of equipment. ■

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea*	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

SIX METRES

Naturally at this time of the year we all talk about six metres. And there is certainly plenty to talk about. The longer type of openings appear to have come a little later this year, and may well mean a later finish, and hopefully some excellent openings . . . a la 1963, etc. . . . during the period between Christmas and New Year, a period which has been somewhat shy of really good openings for several years.

All VK call areas except VK0 and VK9 have been available consistently since the middle of November, with mostly extremely strong signals. ZL stations have been readily available as well, with ZL1, ZL2, ZL3 and ZL4 being worked here. One pleasing contact was with Paul ZL1OI running 6 watts with signals peaking to S6.

Of particular interest to many six metre operators has been Ken YJ8KM in Vila, New Hebrides. First news of this station came from VK4ZSH who worked him on 1/11/76 with signals S9 — 40, and opened a new chapter being the first VK to YJ8 contact. Ken uses an FT101E to an FTV650 transverter and a 5 element beam at 40 feet. He has been beaming to VK every day between 0030 and 0230Z on 52.050, and reports having observed signals from TV stations on Channels 0, 1, 2, and 3 in Brisbane, Melbourne and Adelaide.

Stephen VK4ZSH goes on further to report that Ken YJ8KM will shortly be using a pair of 11 element yagis on 2 metres FM with 130 watts looking for repeater and Channel 50 contacts.

Further interesting news from VK4ZSH advises of the JA opening to Brisbane on 24/10 (reported last month's AR) and also the reception of unusual garbled signals on 144.100 while VK4ZBV reported hearing a JH signal just above 144.100. VK4ZCL and VK4ZKL both reported hearing French language telephone conversations on 144.360 on several occasions during October (possibly New Caledonia?). As a result of this, six metres is booming in Brisbane, with unheard of calls for years coming on the band.

It is noted also that 2 metres SSB is very active in Brisbane area with some 60 stations now on, with 1 to 2 newcomers each week. Dozens of 4CX250B linears for both 6 and 2 metres are under construction, and it is anticipated Brisbane will soon have more high power 2 metre SSB stations per head than most other places in Australia . . . Well that's really good news and it is to be hoped good use will be made of them. Thanks for the letter, Stephen, and look forward to hearing from you again.

AROUND THE BANDS

A new 2 metre SSB station near Nhill is Alan VK3ZFJ, and he has been worked in VK5 by the usual few stations keeping a watch on 2 metres. John VK5ZJP at Rose Park, a suburb of Adelaide, has worked Alan quite successfully, and one would hope a few more of the local 2 metre gang will become more active. There must be dozens of stations in Adelaide with 144 MHz SSB capability, most additions needed to the many small 3 watt rigs would be a solid state or similar 30 to 50 watt linear and a good horizontal antenna, e.g. 10 el. yagi, and you would be in business. It seems a pity more use is not made of 144 MHz SSB in VK5. We seem now to be the least active State, with a very mistaken impression VK3 cannot be worked from Adelaide. Heavens above, if I can work interstate 2 metre DX from my relatively poor location, surrounded by hills, then there are very many lost opportunities by Adelaide operators.

Ron VK3AKC complains of lack of contacts with VK5 so here are a few details of his schedules. Ron operates CW on 144.003 at 0900Z daily, and about the same period or soon after calls and listens in the Adelaide direction on 144.070. Ron has a good location at Geelong, with suitable antenna and power capability. He suggests also that those operators in Adelaide and elsewhere who operate on 144.100 MHz, the 2 metre calling frequency, with a view to making DX contacts, should allow a three second break between overs, as Ron is consistently hearing VK5 stations from Adelaide but cannot break in because each over is commenced too quickly and with weak signals he cannot be heard. So bear this in mind.

David VK5KK, who keeps an ear on VHF, was rewarded on 15/11 by working YJ8KM in the New Hebrides. Together with father, Keith VK5SV, this team is very active in keeping VHF alive in this State. I form another side to the triangle, and the few interested operators in Adelaide complete the circuit.

Reg VK1MP advises there are now 16 stations in VK1 with 2 metres SSB, and four on 432 MHz, so here is another area with suitable possibilities for VK3 and VK5 . . . Tony VK6BV in Kalgoorlie received a Father's Day gift of an IC22 so is now looking towards building a linear with two 4CX250B's to give him an opportunity of working distant 2 metre SSB stations.

Mike P29MJ is now VK7MC, having forsaken the jungle and heat of the tropics for the jungle and cold of Tasmania, and has a very strong 6 metre SSB signal into VK5 at the moment. Joe VK7JG, ex VK7ZGJ, reports ZL3QK was very strong on 6 metres for more than three hours on 21/11, and on this day he also worked YJ8KM, plus VK8ZCU and VK8ZTW for good measure. While still in Tasmania mention should be made that the 432.475 MHz beacon down there runs 15 watts to a tripler and is beamed through Launceston to Mt. Gambier, and believe it or not, that path is not too far off Adelaide, or me for that matter!

Some people move down from the tropics, others go up there. Mark VK5ZZZ and Barry VK5WB (Woolly Bear) are both going to Cairns and by all accounts will be doing what they can to direct signals back this way on both 6 and 2 metres SSB plus working through Oscar. These two, together with the already increased activity in the north of Queensland, could help to interest others up there.

John VK2BHO reports a strong lightning bolt got into the south coast repeater recently and did considerable damage, but the repeater should be back on the air now. Personally I never trust lightning, so when any storms are imminent I disconnect all antennae from my various pieces of equipment. Living in the hills we are subjected to rather violent storms when they come. So far I have had no trouble.

A very roundabout message came to me recently from Lindsay, VK4ALM, ex VK4AAL, at Rockhampton, stating he had received a message from Geoff VK3AMK who in turn had received a message from Neil VK8ZCU to the effect that Neil had been hearing, but not necessarily working, the following call areas on 6 metres from Darwin during October: VU, VS6, KH6, UA, ZL, JA, JR, HL9, P29 as well as VK. That's not a bad coverage of the northern areas, may their signals reach further south.

Mike VK2AM (worked here on 6 metres) mentions considerable 2 metre activity on SSB in Sydney, and with Kerry ex-VK5SU now residing at Moree in northern N.S.W. hammering away at them on VHF there is a possibility some Sydney aerials may be turned north to work Kerry and Barry VK2ZAY at Bogabri, and in so doing meet head on with some of those similar signals emanating from Brisbane. It's only a matter of time boys!

The ZL boys also will be pleased to know their six metre beacon is being heard consistently in VK5, so it does cover some country. Noticed also recently during a long ZL opening on 6 metres that Bill ZL3QK was getting a rather rough time from the hordes of VK stations all wanting to work him; he seemed to be sitting about 52.050 for hours!

Noticed my old friend Col VK7LZ on 6 metres recently. Col writes the HF notes for "Q.R.M." and judging by the formidable list of stations he contacts he must be very busy on HF. However, when the DX comes along on 6 we are always happy to welcome Col back to our ranks. Still an excellent signal from you Col.

Daniel VK7ZDA is still looking for wind operated equipment for his new location, so he must be well up in the clouds. Noted also from "Q.R.M." that Daniel has now resurrected his 432 MHz transverter, after dropping a hammer upon it, is now able to get into Oscar with 1 watt. In Hobart we note VK7AZ and VK7AK have purchased 432 MHz rigs, mainly to work through Oscar.

Further upsurges in VHF activity are reported in the "Geelong Amateur Radio and TV Club Newsletter" with Peter VK3AWY and Dennis VK3ZKH having 6 and 2 metre transverters; Charlie VK3ZSG uses his FT200 to drive a 2 metre transverter, with full power to a YL1060. Also active is Mike VK3ASQ with a YL1060 for both 6 and 2 metres, while Alan VK3LW has purchased one of those "handbag radios", an IC202; so has Trevor VK3AZR. With all this going on in Geelong, surely there has to be a total upsurge in 2 metre contacts across the continent before long.

The "West Australian VHF Group Bulletin" mentions an increase in activity in Kalgoorlie, with the repeater on channel 8 with a range up to 25 miles. VK6ZQR, VK6OI and VK6BV are all on 6 metres. Lew VK6ZSG is working on a 432 MHz transmitter which is nearly completed.

It is probably relevant to bring to your notice some lines from the "Eastern Zone News from VK3 Bulletin" under the heading of SAFETY. I quote: "Several towers have come down of their own accord around the eastern zone lately. Two wind-up towers have unwound themselves and another collapsed three days after erection, luckily no serious damage was sustained. Perhaps it is time careful consideration was given to all aspects of aerial installation. An aerial with a gain of 25 dB at 60 feet only has a fraction of this gain when bent into a U shape at ground level. Fittings exposed to the weather for long periods inevitably deteriorate without regular maintenance and galvanised wire does not last forever. Pay careful attention to the winch on your wind-up tower. Do not assume that the pawl is engaged because it clicks away merrily while the tower is being wound up. Ease off the winch handle slowly to make sure that it is engaged, and preferably use some additional means of locking the winch before letting the handle go." Very good advice, and may I add a couple more things. Always use thimbles for attaching your guy wires to the mast, these do not wear away like the wires do when tied directly at the anchor point. If using turnbuckles always run a piece of plain wire through the closed section to prevent it from unwinding, which it will certainly do long before it rusts up. To prevent turnbuckles, various nuts and bolts and other mounting hardware from rusting, I coat all such items with cold galvanising paint before hoisting in the air. Years afterwards you can undo every nut and bolt as this paint properly applied has a life of 20 years or more. Do the job properly, and that means do the painting before the rust sets in. And despite what the purists might say, araldite is still a good compound for sealing off the ends of your foam and other types of coaxial cable to prevent the ingress of water. I use it even at

432 MHz and I can't notice any loss in performance, but I do know my coax isn't worried by the entry of water, and is mechanically strengthened at the same time.

EME REPORT

From Lyle VK2ALU through "The Propogator". He reports no EME test schedule was received for October, possibly delayed in post.

"The eclipse of the sun on 23/10 provided a unique opportunity for VK2AMW to carry out experiments to obtain information on:

(i) the diameter of the 'radio' sun at 70 cm.

(ii) the proportion of its energy at 70 cm radiated from the corona.

(iii) effects of the eclipse on properties of the ionosphere, specifically related to rotation of polarisation of signals.

"Preliminary results of experiments indicate that (1) the 'radio' sun at 70 cm is appreciably greater in diameter than the 'optical' sun, and (2) the corona generates a considerable percentage of the RF energy emanating from the sun at 70 cm.

"A chart record and numerical results were obtained and are being evaluated. They may modify our antenna beamwidth pattern, obtained by using the sun as a ½ degree diameter noise source.

"The most unusual part of the experiments was in obtaining echoes of our transmitted signal back from the moon when it was directly in front of the sun. Rotation of the polarisation of the reflected signal during its passage through the ionosphere was not significantly affected by the eclipse at this location, possibly due to the effect of the residual solar energy from the 6% of the disc still visible and from the corona.

"Club members VK2ZVX, VK2ZHU and VK2APG assisted VK2ALU during the experiments. Two visitors, including Japanese amateur JA3SVG (MM operator) were also present."

I would like to add a word to that above and say that, as mentioned last month, I was able to observe the total eclipse in the south-east of S.A., and even with the merest chink of the sun visible before total eclipse, the earth is still bathed in ample quantities of sunlight. The great shadow cast by the moon raced across the earth at supersonic speed, and when totality occurred, it was just like turning off the light switch to provide a twilight situation. The same occurred when the sun emerged from totality. The merest chink again bathed the earth in bright sunlight, indicating the enormous power of this radiating body. On this basis, the effect on the rotation of polarisation mentioned by Lyle above, would not be greatly affected because there is still a vast amount of light and energy being radiated from a minute part of the sun's surface.

VK2 VHF FIELD DAY

Athol VK2BAD, VHF and TV Group President in VK2, has sent me a copy of the rules and scoring for the VK2 Mid-Summer Field Day Contest to be held on the Australia Day long weekend, starting 0100Z on Saturday, 29/1/77, and finishing 0300Z on Monday, 31/1/77. For further information you are referred to the "Contests" section of this issue.

While on the subject of Field Days, I sometimes wonder whether people really want others to know that they are holding a VHF Field Day. Scheduled for 4th and 5th December (these notes are prepared in November) are contests and field days in New Zealand and VK5. I see also from the VK6 VHF Group News Bulletin that one is scheduled in VK6 for the same period. Now, prior advice of this to me would have ensured publicity for it. The opportunity is available to publicity officers of the various Clubs to advise me in time, and you can be sure of a mention in these columns, but do remember, copy needs to be in my hands by 25th of the month, e.g. if you want something to appear in, say, the March, 1977, issue of AR, then I need to have the copy no later than 25th January, and so on. The delay is unavoidable, as preparation and printing takes a lot of time, and remember, most of AR is done on a voluntary basis.

Back on to contests once again for a moment. I note in September issue of "Break In" that the New Zealanders are also having a DX Field Day weekend on the same days as the VK2 Field Day. All VHF and UHF bands are to be used, the periods of operation being 29/1/77 0400 to 1000Z, and 1800 to 2400Z. If you can work into ZL on any bands above 1300 MHz you could earn yourself 500 points too!!

When you read this it will be 1977. May it be a happy and prosperous year for you all, despite the inevitable strikes. Closing with the thought for the month: "Fun is like life insurance; the older you get, the more it costs."

73. The Voice in the Hills. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

LET'S HAVE AN OFFICIAL WIA POLICY ON CB LEGISLATION

The Editor,
Dear Sir,

The topic of CB licencing or legalisation in Australia is becoming a little monotonous and nauseating to amateurs like myself. I believe that this subject must have provoked the greatest amount of public interest and controversy for many years. To the average amateur and CB'er, the issues are a great deal more important than deciding which Medibank cover is best . . . or whether daylight saving should be retained. A subject as colourful as CB radio has captured the imagination of most members of the thinking public, due almost entirely to a media that obviously has a leaning towards the "under-dog" CB-er.

Full marks must go to the public relations boys of CB. No matter how they have achieved it, they have done a terrific job, to the point that the general public envisages the Licenced Amateur (Ham . . . shudder) as the protagonist who is bent on depriving the public of the much needed facility of CB radio. What a devastating situation to have let develop right under our noses!

The battle for legalisation of CB has been continuously depicted as a two-sided one, the contestants being on one side the goodies, CB operators, pursuing their innocent, almost angelic public service hobby, whilst on the other side we have a combined effort by the Amateurs and the Telecommunications and Licencing Branch (PMG). What an unpopular running mate we have. No wonder, with the biased media the Amateurs are loosing public support.

Surely it's time that we the Licenced Amateurs, through the WIA, came out in the public press with our policy. This policy should be made quite clear and with no ambiguous or half statements. It should be made very clear that our policy, whatever it may be, is not influenced by either public demand or duty-bound allegiance to our "running mate", the PMG. It is most important that we have a mind of our own . . . and the public must be made aware of it, even if it costs us hard cash in paid announcements.

APART FROM ONE OR TWO VERY SMALL REFERENCES, I PERSONALLY HAVE NEITHER READ NOR SEEN **ANY** CASE IN THE MEDIA TO HELP THE PUBLIC IN MAKING A FAIR ASSESSMENT OF THE CB SITUATION.

I won't bother to compare this meagre Amateur effort to the tonnage of pro-CB articles that are appearing like mushrooms. Most thinking amateurs have their own opinions regarding licencing CB.

Whilst the thought of hordes of mostly non-technical operators being allowed on the air without the need of any form of examination does irk me, I do feel we are only kidding ourselves if we believe CB will go away if it is not licenced. Whether we like it or not we have knowingly let the situation worsen by not pushing hard enough to have stopped the import of potentially illegal equipment into Australia. We are now stuck with the problem and have to cope, with the same logic as exists with other unsavoury products of modern technological living. As in the case of pollution, traffic congestion, and chimney stacks, we have to learn to live with them and try to minimise the bad by-products by sensible control.

In my opinion sensible control (licencing) of CB radio falls into the same category. Let's push to have legislation approved, collect licence fees, and at least know that there is some form of control.

Let's make a noise — not on the air but in the media.

Sid Ward VK2SW.

The Editor,
Amateur Radio,
Dear Sir,

I would like to comment on an article in October AR called "Fixed Wire Beams".

In the article, the feed point impedance is quoted as 75 ohms, when in actual fact it is 300 ohms (as in a folded dipole).

As a suggestion for low power, 300 ohm TV ribbon serves as a folded dipole, and can be terminated in the usual way with a quarter wavelength of TV ribbon.

I hope these observations may be of some help.

Harry VK3PX.

The Editor,
Dear Sir,

I was perturbed, but not really surprised, to read in the "WIANEWS" section of November AR that there had been a proposal that the VK/ZL/O DX Contest should be "terminated because of the lack of interest in it".

The apparent "lack of interest", if this is judged on the number of local logs submitted, is mainly due to the unwieldy scoring system used. It normally takes almost as long to work out the score as it does to compete in the contest. If a simple multiplier scheme (which is good enough for the other major DX contests) were adopted for local entrants, and the serial numbering started at 001 on each band, then I am sure the number of locally submitted logs would increase. Also, if the amount of publicity and credit given to the contest in AR was similar to that given to the RD and other local "minor league" contests, then the local log submissions would show a different picture.

Is the "lack of interest in it" on the part of the possible contestants or the WIA?

Yours sincerely,

Tubby Vale VK5NO.

The Editor,
Dear Sir,

I am enclosing a copy of an Award which I received recently. Seeing that it is a special ONE-OFF, I thought it would be of interest for publication in AR. (The original is red and blue embossed on white parchment.)

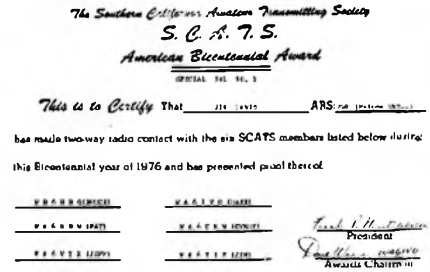
As you can see, it is an award by SCATS to any Ham who makes two-way radio contact with any six of their members. Recently, I was fortunate enough to receive signals on 14 MHz from six of their members and I took the opportunity of sending them a detailed report on their transmissions, plus some pictures of my vintage radio gear. Unfortunately, because I haven't got my "ticket" as yet, I couldn't "hit the switch" and go back to them, so I did the next best thing. I've got a lot of very modern equipment on which I do hours of listening and I also assist the local "Intruder Watch" officer.

Fortunately I've got time to spare to do this, and I am pleased to report that I have now made a positive identification of one Intruder in the middle of the 40m band. This is "Radio Tirana" situated in Belgrade, and operates on 7.065 MHz. I've got an English language session nicely on tape with station identification, anthem and so on.

The report has now been handed on to the authorities.

Hoping the Award is of interest. How many full call hams have got one?

Jim Davis, 163 Gilbert St., Latrobe Tas. 7307.


The Southern California Amateur Transmitting Society
S. C. A. T. S.
American Bicentennial Award
This is to Certify That ... ARS: ... has made two-way radio contact with the six SCATS members listed below during this Bicentennial year of 1976 and has presented proof thereof.
President
Awards Chairman

JOHN MOYLE NATIONAL FIELD DAY CONTEST RULES — 1977

Amateur operators and Short Wave Listeners are invited to make this contest, held in memory of the late John Moyle, a huge success.

Contestants may participate either as individuals or as part of a group. There are two Divisions in this contest. The first one is for 24 hours continuous operation and the second for any continuous period of six hours. Either period must be within the 26 hours available.

CONTEST PERIOD

From 0600 GMT, Feb. 12 to 0800 GMT, Feb. 13, 1977.

OBJECTS

The operators of portable field stations or mobile stations within the VK call areas will endeavour to contact other portable, mobile or fixed stations in VK, ZL, and foreign call areas on all bands.

RULES

1. In each division there are 8 sections.
(a) Portable field station, transmitting phone.
(b) Portable field station, transmitting CW.
(c) Portable field station, transmitting open.
(d) Portable field station, transmitting phone, multiple operation.
(e) Portable field station, transmitting open, multiple operation.
(f) VHF portable field station or mobile station, transmitting.
(g) "Home" transmitting stations.
(h) Receiving portable and mobile stations.

2. In each Division, 24 or 6 hour, the operating period must be continuous.

3. Contestants must operate within the terms of their licence.

4. A portable field station must operate from a power supply which is independent of any permanent installation. The power source must be fully portable, i.e. batteries, motor generators, solar panels, etc.

5. No apparatus may be set up on site more than 24 hours before the contest.

6. All amateur bands may be used, but cross band operation is not permitted.

7. Cross mode is permitted, but note rule 21.

8. All operators of a multi-operator station must be located within approximately an 800 metre diameter circle.

9. Each multi-op transmitter should maintain a separate log for each band. 2 FM rig may be separate from 2 AM or SSB rig, but note rule 11. A separate QSO number series is required for each band.

10. All multi-op logs should be submitted under one callsign.

11. Only one multi-op transmitter may operate on a band at any one time.

12. RS or RST reports should be followed by serial numbers beginning at 001 and increasing by one for each successive contact.

13. **SCORING FOR PORTABLE FIELD STATIONS AND MOBILES.**

Portable field stations and mobiles, outside entrant's call area — 15 points.

Portable field stations and mobiles, within entrant's call area — 10 points.

Home Stations outside entrant's call area — 5 points.

Home stations within entrant's call area — 2 points.

14. **SCORING FOR "HOME" STATIONS.**

Portable field stations and mobiles outside entrants' call area — 15 points.

Portable field stations and mobiles within entrant's call area — 10 points.

15. Portable field stations may contact any other portable field station twice on each band and mode (10-160) during the period of the contest provided that at least 4 hours elapse after the previous contact with that station on that band and mode.

16. Stations may be worked repeatedly on 52 MHz and above providing 2 hours have elapsed since the previous contact on that band and mode. Note that FM, AM, SSB and any other voice modes are grouped together as PHONE.

17. Operation via active repealers or translators is not acceptable for scoring.

18. All logs shall be set out under headings of Date-time in GMT, Band, Emission, Call sign, RST sent, RST received, and Points claimed. List contacts in correct sequence. There must be a front sheet to show — Name, address, division, section, call sign, or call signs of other operators, location, points claimed, equipment used, and power supply. You must also certify that you have operated in accordance with the rules and spirit of the contest.

19. Certificates will be awarded to the highest scorer of each section of the 6 hour and 24 hour divisions. The 6 hour certificates cannot be won by the 24 hour entrants. Additional certificates will be awarded for excellent performance.

20. Entrants in sections a, b, c, d, e, and f must state how power for transmitting is derived.

21. All CW-CW contacts count double. Cross mode contacts do not count double.

22. Entries must be forwarded in time to reach the Contest Manager by 18th March, 1977. The address is — Federal Contest Manager, Box 67, East Melbourne, 3002.

RECEIVING SECTION

This section is open to all short wave listeners in VK call areas. Rules are as for transmitting stations, but logs do not have to show report and serial number of the second station, or station called. Logs must show the call sign of the portable or mobile station heard, the report and serial number sent by that station, and the call sign of the station called. Scoring is as shown in rule 14 for home stations. A station calling CQ does not count. Portable and mobile stations, which must be listed in the left-hand call sign column of your log, alone count for scoring. Stations in the right-hand column may be any station contacted. A certificate will be awarded to the highest scorer of each of the 6 hour and 24 hour divisions, individual or multi-operator entries. Certificates will be issued for excellent performane. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

AUSTRALIAN DXCC TOP LISTINGS AS AT 23.11.76:

Phone:			
VK6RU	320/352	VK2APK	300/313
VK4KS	320/339	VK4FJ	297/324
VK5MS	313/343	VK4PX	397/304
VK6MK	310$337	VK3JW	294/301
VK3AHO	304$326	VK4AB	291/314
VK4UC	310/306	VK6LK	290/295
CW:			
VK2EO	317/346	VK3XB	280/300
VK3AHQ	308/331	VK3NC	268/297
VK2QL	306/335	VK6RU	267/296
VK3YL	298/321	VK3YD	258/281
VK4FJ	297/329	VK4KX	256/261
VK2APK	291/304	VK3TL	248/260
Open:			
VK4KS	321/345	VK4PX	304/315
VK6RU	320/352	VK4UC	304/310
VK4SD	315/336	VK2SG	301/311
VK2APK	311/329	VK3JW	295/302
VK6MK	310/337	VK3XB	286/306
VK4FJ	309/341	VK4RF	286/303

DXCC NEW MEMBERS SINCE 14.3.76:

Phone:	
VK3WT	Tally 109
VK7CL	156
VK4VU	227
VK3DF	109
VK1AOP	113
CW:	
VK2YB	Tally 112
Open:	
VK3AUL	Tally 101
VK4AK	261
VK2AFG	103
VK1AOP	117

ALTERATIONS TO SCORES (EXCLUDING TOP 12 AND NEW MEMBERS:

	Phone	CW	Open
VK8CW	220/224		
VK5RX	143/143	213/226	238/251
VK6HE	132/134		
VK20W	145/145	149/159	214/224
VK4EZ			120/124
VK4CZ	254/258		
VK4DO	254/271	201/223	262/286

OVERSEAS MAGAZINE SUBSCRIPTIONS

As the result of devaluation of the Australian dollar the following are the provisional rates effective at once for overseas subscriptions orders processed on behalf of WIA members —

$A.	1 yr.	2 yrs.	3 yrs.
OST	9.60	19.60	29.40
73	10.00	—	19.40
CQ	8.00	13.80	—
Ham Radio	9.70	—	20.00
Radio Communication*	12.30	—	—
CQ-TV*	4.50	—	—
Break-In	7.00	—	—
VHF Communications	6.00 (Air Mail 8.00)		

MAGPUBS

A Service to members
P.O. Box 150, Toorak, Vic., 3142

CHESS VIA AMATEUR RADIO

Albert (Simon) Templar VK1AF
C/- BPC, Ocean Island

Last June a chess tournament was held between four players on Ocean Island and four players on Christmas Island and below is a brief account of the whole setup.

The idea was originally brought up by Kevin VK9XK during a regular sked. During the discussion that followed a number of points were brought up:—

Method of Notation
Time of Moves
No. of Games
Propagation

It was decided that Ocean Island would play White in the 1st and 3rd games, with 4 games played simultaneously being the maximum we thought we could handle.

The time for moves was decided at 5 mins. 12 moves per hour approximately.

Propagation was checked over a few Sundays and found that 0530 to 0800 GMT gave us a good workable Signal.

NOTATION

A look through a chess book showed two methods used. The universal method is the one that we used.

The matter of players came up next and Kevin VK9XK had no problems, there was in fact too many players who answered the call to arms, broadcast over the local radio station.

On Ocean Island I had not so much luck, there being only about 8-9 people who knew how to play chess, some were just going on leave and to boil it down, the final list of 4 players changed 3 times before the Big Day.

With the final check on propagation the Big Day was set for Sunday the 13-6-76 and the following arrangements were made at Ocean Island.

4 surrounds were made from white wrapping paper to place under Chess Boards for easy reference of Notation. i.e. D2 — D4, etc.

A check sheet was made up for each game.

GAME No. 1

Moves No.	Ocean Island (White) Russell Harding	Xmas Island (Black) Meg Turkin
1		
2		
3		
etc.		

At Ocean the contestants were set up in what is called a "Maneaba" (a native meeting house), which is basically a thatch roof of pandanus leaves, supported by uprights (no walls), with a small card table, chess set, stubby holder (of course), and a pen with check sheet.

The Maneaba belonged to Dr Ron Plachy, one of the Ocean Island contestants and neighbour to VR1AF.

The final teams were:

	Ocean		Christmas
Game 1	Russell Harding	v	Meg Turkin
Game 2	Ron Plachy	v	Stuart Wills
Game 3	Jim Allen	v	Jeff Deale
Game 4	Nick Wardrop	v	Gareth Thomas

Also the services of 4 youngsters to run the check sheet between the Maneaba and the radio shack was sought.

Both my XYL Joan and also Betty Plachy offered to provide refreshments and snacks during the Tournament.

At Christmas Island the Tournament was to be held at the Amateur Radio Club Station VK9XI followed by a bar-b-que.

At Zero hour, everything went smoothly

for the first few moves, and it was realized that notation numbering was not as should be, 15 minutes of sorting out solved the problem, and from then on all was plain sailing.

The first game went to Ron Plachy on Ocean Island in 12 moves, a very fine effort. The next to Russell Harding in 22 moves, both players having a short chat with their opponents between move information for the continuing 2 games Nos. 3, 4.

At 1030Z, the band became unusable with games 3 and 4 still running, but a very good afternoon was had by all.

A quick exchange of information organized continuance of the remaining games in a week hence.

On the 20-6-76 at 0530 GMT contact was quickly established but the evening was uneventful with both games still running and was terminated at 0900 with the band closing down. Once again we were to continue the following week.

Contact was not established until 0600Z, and it was decided by all that this was to be the last day, and that five minute rules would have to be enforced.

This made a noticeable difference to the play and at 0740 Jim Allen stalemated with Jeff Deale and spent a few words discussing it on air.

The game had taken 51 moves to stalemate. The 4th game finished at 0800Z with Nick Wardrop victorious in 54 moves.

The end result was 3 wins to Ocean and 1 draw.

In conclusion, a good time was had by all, but it was felt that 3 days was too long, and that shorter move times and one session would be more enjoyable.

A comment to add here may be appropriate as put forward by Don Reed VK2ADR, "Was this an Amateur Radio first?" — Chess between the Indian and Pacific Oceans, via Amateur Radio — I wonder!!

P.S. There is also a Pacific D.X. Net. normally on Tues. and Fridays 0600 GMT 14.265. ■

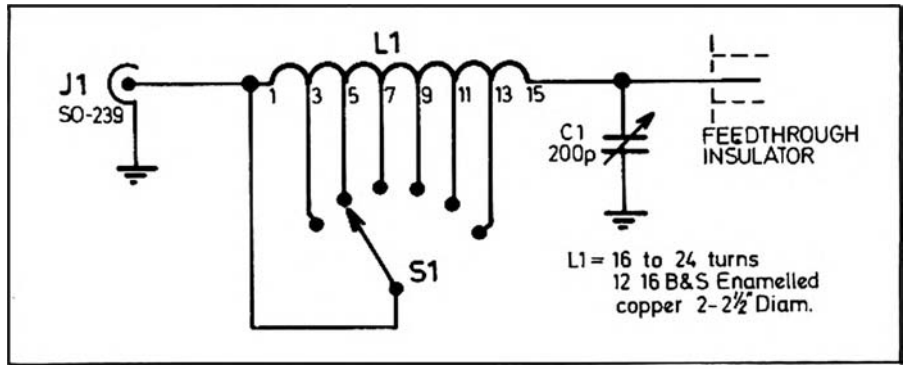
NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG
David Down, VK5HP

A TUNING UNIT FOR RANDOM LENGTH WIRE ANTENNAS

This simple tuner will cover 80 thru 10 metres and depending on the spacing between the capacitor plates, up to 300 watts will be catered for. The tuner therefore lends itself for Novice and high power transmissions over the HF spectrum.

The tuner is housed in a metal box, about 6 x 5 x 4 inches. C1 and S1 are mounted 1¼ inches above the bottom of the box. Ensure that C1 is adequately supported front and rear. To have large components front-mounted only, is a bad constructional practice to adopt, and in other types of equipment, such as VFOs, can lead to mechanical instability.



L1 is wound with every alternate turn indented. Position L1 so the indentations face up and to the front. L1 is mounted ½ inch from the rear and bottom of the box and is supported by its own leads — one to J1 and the other to the feedthrough insulator.

S1 is a rotary shorting switch and should be mounted so the 3 contacts closest to the front panel face C1. The wiper contact should face the bottom of the box. Connect the lugs on S1 to C1 and J1 *prior* to wiring to L1.

When wiring to the taps on L1, start at the end nearest C1 to minimise the hazard of shorting.

Use 18 SWG wire and solder to the taps, beginning at the 15th *raised* tap, then working back to the 3rd *raised* tap. After all necessary drilling is done and positioning of components is checked, one or two coats of spray enamel (your colour choice) and 4 rubber feet glued to the base of the box will greatly enhance its appearance.

S1 and C1 may be carefully labelled at the front panel, freehand with ink, with Dymotape or with Letraset (depending on your financial resources) to round off a nice finish.

C1 minimum capacitance is marked 0, and S1 is marked 0 where all contacts are shorted (full anti-clockwise). With C1 and L1 set to 0 (L1 via S1) the transmitter will see the antenna as if the tuner did not exist.

For optimum results, your antenna should be a multiple of wavelength or quarter wavelength (see Newcomers Notebook July 1975). Connect the transmitter output to J1. Set C1 and L1 to 0 and tune the transmitter. Adjust S1 for maximum RF output, then C1 for peak output. After C1 is adjusted, try the next S1 position — usually a couple of tries will be sufficient. Mark the settings for each band on a card, and attach this neatly to the front panel for ready reference. This will save time in bandchanging later.

Best of luck to all those undertaking the various courses around the country, and we hope you are all soon successful at an examination so you can *legally* start producing RF from the shack.

73 till next month,

Rodney VK3UG and David VK5HP/QRP. ■

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

Unfortunately I have not been able to complete my proposed changes to the Realistic AX-190, so these will have to be carried over to next month. However the work so far completed looks promising. Don't forget if you have any ideas on modifications that you have either carried out or intend to carry out, please let me know. For this month we return to the FT101 but this time the "E" model. Daryl Manley VK3AMJ discovered the cure to a built-in fault in his 101E.

The transceiver had operated for the last twelve months both mobile and in the shack, and I had been very pleased with its performance; so it came as a surprise when a report of hum on the signal was received. Tests carried out with a local station confirmed the problem. The hum, which was at approximately 100 Hz, appeared to decrease when modulating the transceiver and built up after I stopped speaking.

My first reaction was to suspect a problem in the power supply, but a check of all the filter components proved nothing. Tracing the problem further, it appeared that the hum was getting into the balanced modulator and producing output from this stage. This seemed logical as the hum was noticed more by local stations than by distant ones.

It was felt that the fault was associated with the microphone amplifier or balanced modulator stage. A quick way to prove this was to replace the plug in modules with others from another 101, however the trouble continued. The next step was to disconnect the audio stage from the balanced modulator. This was easily achieved by disconnecting the link between pin 8 of the MIC amplifier board and pin 9 of the modulator/oscillator board.

Using a separate monitor receiver in the shack, further tests confirmed that with the MIC stage disconnected there was no hum on the monitor receiver. On reconnecting this stage it was found that the hum level altered with the setting of the MIC GAIN control but in reverse proportion to the setting of the control. At this point it

became obvious that the hum was being produced by an earth loop around the MIC stage. The MIC amplifier stage is earthed In two places, pin 1 and pin 6. They are earthed at the connectors with a short piece of wire directly to the chassis. But also from pin 1 is a connection to earth at the final cage. Removing this extra earth lead cleared up practically all the hum proving the earth loop theory. A further reduction in the small amount of remaining hum was achieved by joining the two earth rails in as many places as possible on the board and by insulating the top mounting screw from the earth on the board.

Following these modifications, reports indicate no hum on the transmission. Daryl's work in tracking down this hum should be of interest to all of those who are fussy about the quality of the signal they put out. I think that this same trouble occurs in many other types of transceivers perhaps to a similar extent. Maybe the method of tracking the problem down could be applied to your rig. Check with a local and see if your signal is clean. ■

WICEN IN ACTION

The Wagga WICEN Group are now drying out and recuperating after mounting a major communications operation during the recent serious floods which threatenend to Inundate the City of Wagga Wagga and the town of Narrandera.

Regional WICEN Co-ordinator Sid Ward VK2SW and Deputy Co-ordinator Doug Menneke VK2ZMP alerted WICEN on Sunday, 17th October, 1976, and became operational on Monday, 18th.

Three self-contained 2-man WICEN teams were stationed at selected gauging stations well up river from Wagga from Monday morning continuously until Thursday afternoon and another team was stationed about 15 miles downstream.

Regular hourly and half-hourly readings and other data was passed via the Channel 3 Wagga Repeater direct into a WICEN station in the Divisional headquarters of the State Emergency Services in Wagga.

This continuously available data permitted accurate estimates of the maximum river height, which contributed to the peace of mind of the City's inhabitants and were of great value to the workforce constructing sandbag levees.

In addition the Wagga WICEN Group provided mobile and flood boat 2 metre Simplex communications for the Police Volunteer Rescue Group and from the flooded areas of the City back to another WICEN station at SES Divisional headquarters.

Simultaneoulsy, at Narrandera some 65 miles downstream, Harry Cuthbert VK2AEC was monitoring the Wagga river heights on the Wagga Repeater and relaying to the Narrandera SES authorities and passing direct to Wagga the river height data from Narrandera.

At the time of writing the flood peak was approaching Narrandera and Harry still had several days of hard work ahead of him. The Wagga WICEN Group were very fully supported by every member of the Wagga Wagga Radio Club who could assist, plus many of the YL's and XYL's, and Harry was backed by a number of the Narrandera Amateurs and very ably by Mrs. Cuthbert.

The Wagga and Narrandera WICEN-ers provided a 100% emergency communications service of which they can be proud and they can also take pride in the reliability of their Repeater, which never missed a beat throughout the whole operation.

Congratulations to them and thanks for a job well done and it is trusted that the statutory bodies who benefited so greatly will express their appreciation and thanks when compiling their official reports.

Howard Freeman VK2NL,
VK2 State WICEN Co-ordinator. ■

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

1976 comes to a conclusion on a very uncertain note. It appears we have still not reached rock bottom of Cycle 20 and there is no positive indication that Cycle 21 is really getting into gear. There was evidence of the new Cycle activity during the past twelve months but not enough to sustain activity beyond a few days.

The experts are still cautious with their predictions and all scientific evidence still appears to be based on declining Cycle 20 material. The appearance of the new cycle spots and their resultant higher activity level are providing the devotees of their own exclusive bands, plenty of DX, particularly on 21 and 28 MHz. There has been ample evidence of just slightly higher than average solar flux figures, of increased propagation quality. Incidentally WWV at 18 minutes past the hour are still giving Solar Flux and A index readings for the previous GMT day, along with the K index for the current GMT day at a nominated hour. Despite many arguments this K index and the state of the geomagnetic field provide valuable information if you are prepared to keep records daily.

The two indices available currently show the sunspot running smoothed number tending to even out early in 1977. Predicted numbers at Sept 30th, 1976, are Oct 76 — 9, Nov 76 — 7, Dec 76 — 6, Jan 77 — 5, Feb 77 — 5, Mar 77 — 5.

The average predicted minimum was 5. Dare we hold our breath and hope that mid 1977 will see the long awaited climb towards the next maxima.

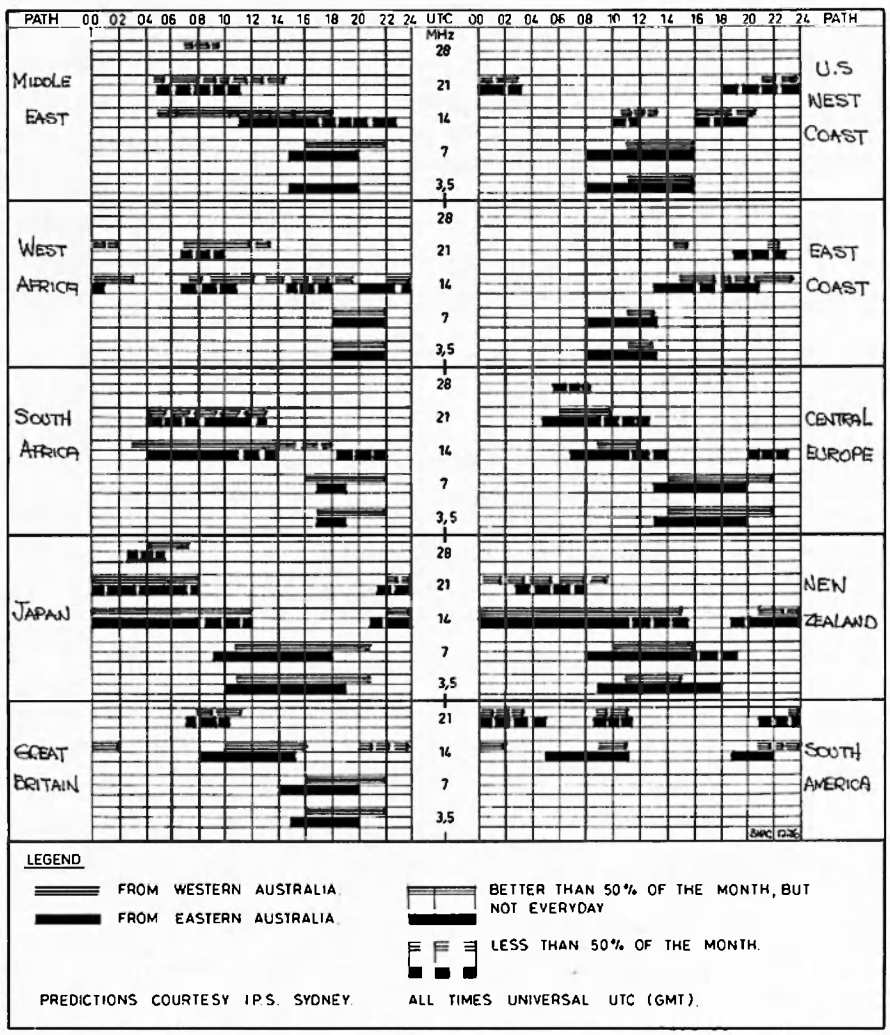
Looking across to the Solar Flux predictions, the latest available forecasts show —

Dec 76 — 87, Jan 77 — 97, Feb 77 — 105, Mar 77 — 111, Apr 77 — 116, May 77 — 122.

Predictions for Nov 76 of 78 look like reaching this figure at the time of writing (late Nov). For Dec 76 it is quoted as 87. These of course are monthly means and the daily figures vary with solar activity.

Other parameters exercise considerable influence over our Ionosphere and the average amateur is not in the position to correlate available data with any speed. With the ionosphere varying at all times, 100% accurate predictions are difficult — if not impossible to make. Probably the best predictors are amateurs, using their bands at all times. Not just listening to noises, but making noises. It's marvellous how a two-way QSO across town can open an otherwise dead band.

Using the charts as a guide to path openings call CQ and test the propagation — try long and short path. Often you will be surprised, sometimes from the only one on the band and VKs are often in short supply. Remember receivers never worked DX.



When Oscar 8 orbits, we probably will not require prediction charts — only orbit times — just think of the QRM? 73's. Best DX for 1977.

VK3ZGP/3NAC. ■

IARU NEWS

As quoted in the "editorial" in QST for Sept 1976, Ambassador Armin Meyer, W3ACE, had this to say about his month's safari in the Middle East:

"In Cairo, dining on the banks of the Nile with one of our fellow amateurs, I learned that the greatest barrier to more widespread amateur activity in Egypt is the shortage of foreign exchange which is necessary to purchase the equipment so readily available to Americans and other amateurs. In Saudi Arabia and Iran, money is not a problem, but there remain certain psychological barriers which tend to restrict the number of licences issued, expatriates often being considered safer than local nationals.

Totally unrecognised is the tremendous capability which amateur radio has for training the technicians so critically required to man the vast development programs being launched by those countries.

The same is true in Iraq, where I was emphatically told that amateur radio is strictly and unequivocably forbidden. Particularly tragic is the situation in Lebanon. Torn by unbelievable civil strife, the very survival of the country is at stake. Amateur radio, which once thrived in what was considered to be the Switzerland of the Middle East, is among the casualties."

It might perhaps be added here that the shortage of foreign exchange also affects several countries in Region 3, particularly India.

But there are other national considerations which also inhibit the development of amateur radio in many of the poorer countries. One, of course, is the cost of amateur equipment coupled with lack of exposure to the art and pre-occupation with simpler and more readily accessible forms of activity such as football and various tribal or group events. Even the simple act of listening to the local broadcast station is beyond the reach of many except on a communal basis.

REGION 3 ASSOCIATION

The Directors of R3 and the Secretary met in Singapore on 11th/12th September last to discuss the activities of the Association since the 3rd Regional Conference held in Tokyo in March, 1975, and to plan ahead for the 4th Conference and WARC 79. The financial position was strong thanks largely to the very generous and practical support of JARL which had also undertaken the burden of producing the regular editions of the Region III News.

The principal item on the agenda was consideration of the content and format of model position papers for the use of Societies in approaching their own Administrations. The results would be distributed to Societies and other interested parties as early as possible.

Another item discussed was an update of the rules and regulations of the Association for circulation to member Societies for comments.

The Directors decided to budget to send two people from the Association to Geneva during WARC 79 with the intention that they form part of the IARU team. The meeting noted with disappointment the lack of response to Intruder Watch in the Region.

The Directors attending the meeting were Dr. Samy Saito, JH3PJE, Mr. Michael Owen, VK3KI, Mr. Tom C'arkson, ZL2AZ, and Mr. Tan Lian Huat, 9V1OD, with Mr. David Rankin, 9V1RH/VK3QV, as Secretary. Observers joined the executive group from time to time including Mr. Frank Aw, 9V10K, and Brig Ramchai Chotikul, HS1WR. ■

INTRUDER WATCH

Alf Chandler, VK3LC

1536 High Street, Glen Iris, 3146

An article in the "Age" of Friday, 19th November, 1976, entitled "Triumph of Terrorism", by the Hon. Don Chipp, seems to me to be relevant to Amateur Radio in view of the forthcoming World Administrative Radio Conference in 1979.

He says, and I quote — "With the naivete that peculiarly belongs to the stupid, I keenly anticipated the Madrid meeting. I was bitterly disappointed . . . For three days I sat there and heard an unimaginable series of platitudes, hypocrisies and drivel . . . In any International Conference today the Afro-Asian-Arab Bloc can virtually control the agenda and the resolutions . . . This new majority is now using its muscle in the world's international forums ruthlessly and vigorously. The incongruity is that by destroying the efficacy of the system they will suffer most." — Unquote.

How apt this will be if something isn't done to educate and persuade this same "Afro-Asian-Arab Bloc" to recognize and foster Amateur Radio!! One way is to keep observing infringements of Commercials into our bands, and reporting them to the Intruder Watch Co-ordinators. As the bands open up again you can be assured that there will be many more intrusions than at present. Happy New Year. ■

HAMADS

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- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Clegg FM 27 145-147, fully tunable with mobile mount, mike, manual. Recently serviced by distributor. $200. VK2BOA, QTHR. Ph. (049) 61-1580.

Handheld Tempo KP202 (same as Ken) with repeater channel 2, 6, 8 and two US Simplex channels. Nicad charger, short antenna and manual. $100. VK2BOA, QTHR. Ph. (049) 61-1580.

Uniden 2020. $510. Matching ext. VFO $75, spkr. unit $30, the lot $585. Atlas 210X with Shure 404C mic. $585; KP12A RF Speech Processor $80; Asahi centre eloaded HF mobile antenna set and bumper mount $100; AL48DXN trap dipole with RAIC balun $38. All above as new, little used. VK3ARZ, 769 High St. Road, Glen Waverley, 232 9492 A.H.

Drake Rx Model SPR-4 Communications and Amateur crystals for AM-USB-LSB-CW, double conversion, dual voltage; excellent condition. Half-price ($450). Jim Dunne, 99 Studley Park Road, Kew 3101. Ph. (03) 86 8641.

FT2FB, FM, 2m, transceiver. Ch. 40, 50, 2, 3, 4, 5, 6, 7 and 8. Two mobile mounts, mic., handbook, all in good order. $140. VK2BJK, QTHR. Ph. (02) 449 1598.

FT220 2M SSB, FM and CW transceiver. As new, had very little use. With extra crystal for repeaters, 240 AC 12V DC. $435. VK3BH, 35 Ropley Ave., Balwyn. Ph. (03) 80 1204.

FT200 with Yaesu AC power supply/speaker, 18 months old, in mint condition; just completely checked over and in A1 going order. Operated on CW only, no SSB unit required. $350, O.N.O VK4AUT, QTHR. Ph. (02) 76 9143.

BS50 Base station, fitted channels for 2m RTTY, 40, 50, Rpt. 2, 4 and 8; Mod. 15 Teleprinter; TMC solid state terminal unit and AWA demodulator. $350. HRO C/W all coil boxes — best offer. VK3YJI. Ph. (051) 56 8311.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. L. H. DUNCAN	**VK5AX**
Mr. F. H. BULL	**VK2AJM**
Mr. D. E. VAUGHAN	**VK2FY**
Mr. R. J. EVERINGHAM	**VK6BO**
Mr. N. MARTINSON	**VK6NM**

From Estate of the late F. Bull VK2AJM. Univeka multimeter, 52 ranges, $70. Oskerbloc SWR 200 power meter, $40. Omega T noise bridge, model TE7-01, $20. VK2AJL, QTHR. Ph. (02) 41 7729.

Swan 240 transceiver 80-40-20 m. C/W matching power supply, mike and instruction book, unit in immaculate condition and works perfectly, $200 firm. VK2MR, QTHR. Ph. (02) 529 5857.

SSTV Monitor Robot model 70A, as new, in box, $390, or swap FTDX400, FTDX560 or FTDX401. VK2ZHF, 17 Orange St., Pendle Hill 2145. Ph. (02) 631 1269.

Kenwood TS510 Transceiver and power supply in excellent condition, still as original with no mods, has just been retubed and realigned and gives excellent performance and has particularly good Rx characteristics under strong adjacent signal interference. Updating to TS820 and desire quick sale for $275. VK3CDX, QTHR. Ph. (03) 877 1135.

Uniden 2020 Transceiver 80-10 m. with AC/DC power supply, phase-locked loop, etc. Am off air at this location so virtually unused, re-checked O.K. by agents. Any reasonable offer. VK2KR, QTHR. Ph. (02) 449 4524.

2 metre 5-element beam with mast and tilt-over top for horizontal/vertical polarisation, $20; 10 m to 160 m vertical, portable with nylon guys as per AR Oct. 1971, $40; Pye Ranger, 1 original and 1 converted to 2 m. 5 ch. $40 each. A. G. Holden, 25 Warrick St., Ascot Vale 3032.

Trio All Band SSB transceiver TS510, ex. condition, ex VK3MM, $300. New electronic workshop practical exercise kit, new components for novice Tx and other useful items, $75. Ph. (03) 844 3222.

Urgent Shack Cleanout (moving QTH): Hy-Gain 204BA with BN86 balun, $145; AR2X Ringo 2 Mx vertical, $30; Ken KP202, charger, heli whip and steel ¼ wave, 2 sets nicads, repts 2 and 8, simplex 40, 50, $150; FT75B TXCR 80-10 Mx, AC and DC PSU's, FV50C VFO (3 xtals 80, 40, choice of 7 for 20 Mx, 1 each on 15 and 10), $350. All above gear in excellent condition. Enquiries B. Bathols, VK3UV, 6 Ann Court, Aspendale. Ph. (03) 90 6424 A.H.

WANTED

Keen Students; Amateur and Novice courses Box Hill Technical College start Feb., 1977. . . . 89 0231 now and register your name with Grame VK3ZR or Ken Dobson.

FV401 External VFO Unit for FTDX401. VK4RF, QTHR.

2m Linear Suit EME. VK3YJI. Ph. (051) 56 8311.

Series 60 coaxial relay, 48 volt, Type N. Two wanted. VK3KW, 3 Rose St., Essendon. Ph. (03) 379 1152.

Type 3, Mk. II and/or Type A, Mk. 3 equipment, complete. VK7ZW, 2 Drew St., Devonport East. Ph. (004) 27 8808.

National HRO or AWA AMR100 (not A27) receivers, complete, or parts for restoration project, dials, tuning capacitors, coils, meters, etc. VK2PW, QTHR. Ph. (02) 807 6725.

Power Transformer or complete P.S. suit 2 x 813 linear. Price and particulars J. Moyle VK4ZT, QTHR.

2m FM Rx, solid state physically small size. VK3AFI, QTHR. Ph. (052) 21 3658 A.H.

Yaesu FTV650B, FTV250B, FT101E. Bob. Ph. (02) 646 0426 Bus., (02) 46 3727 A.H.

STOLEN EQUIPMENT

Multi-7 2m transceiver, serial No. 68075, has broken microphone case. Taken from car parked at Beecroft. VK2BLB, QTHR. Ph. (02) 84 2405.

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THE MAGAZINE FOR THE COMPUTER PROFESSIONAL AND HOBBYIST,

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JANUARY 1977
Vol. 45, No. 1

Sideband Electronics Sales

HF TRANSCEIVERS

ASTRO—200 digital solid state 200 W PEP

ATLAS models 210-x 80 to 10 M transceiver inclusive factory installed noise blanker

YAESU MUSEN model FT-101-E AC-DC transceivers 10 to 160 M with speech processor

TRIO KENWOOD model TS-520 AC-DC transceivers 10 to 80 M

TRIO KENWOOD model TS-820—expected shortly.

HF RECEIVERS

DRAKE SSR-1 continuous coverage receiver

YAUSU MUSEN FR6-7. Uses Wadley loop principal

VHF TRANSCEIVERS

ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz

ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz

TRIO KENWOOD model TS-700-A FM-AM-CW-SSB transceivers. Full 144-148 MHz coverage, 10-Watt output, VFO controlled, self-contained, AC-DC operation

KYOKUTO 2 M FM 15 W output transceivers with digital read-out and crystal synthesized PLL circuitry now with 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144-148 MHz, receive to 149 MHz. No more crystals to buy. Includes simplex, repeater and anti-repeater operation

NOVICE TRANSCEIVERS 27 MHz

TRAM XL5 super 15-Watt PEP 23 channels AM-SSB with effective noise blanker

PAL 69 AM, SSB 15-Watt PEP 23 channels

SWR METERS

SINGLE METER
SINGLE METER with power scale 10-100 W
TWIN METER, SWR up to 200 MHz
CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals
PTT DYNAMIC MICROPHONES, 50 K or 600 ohms. With 4-pin plug fitted

CRYSTALS

For KP-202
Large number for all popular channels to clear

FERRITE-CORE BALUN. Japanese product

HY-GAIN ANTENNAS

14-AVQ 10-40 M verticals 19′ tall
18-AVT-WB 10-80 M verticals 23′ tall
TH3JR 10-15-20 M 3-element Yagi 12′ boom
TH3MK3 10-15-20 M 3-element Yagi 14′ boom
TH6DXX 10-15-20 M 6-element Yagi 24′ boom
TIGER ARRAY 204 BA 20 M 4-element 26′ boom
BN-86 balun

ASAHI MOBILE ANTENNAS

AS-2-DW-E ¼ wave 2 M mobile whip
AS-WW ⅝ wave 2 M mobile whip
AS-GM gutter clip mount with cable and connectors
M-Ring body mount and cap

CUSH CRAFT ANTENNAS

AR-2X Ringo Ranger double ⅝ vertical for 2 M
A147-11 11-element 2 M Yagi
A147-20 combination horizontal vertical 2 M
A144-20 combination Yagi with matching harness for circular polarization

ANTENNA ROTATORS

Model CDR Ham-II for all hf beams except 40 M
Model CDR AR-22 L junior rotator for small beams
KEN model KR-400 for all medium-size hf beams with internal disc brake
KEN model KR-500 for vertical elevation control of satellite tracking
All models rotators come complete with 230-volt AC indicator-control units.
6-conductor cable for KR-400-500
6-conductor cable, smaller size
10-conductor heavy cable for Ham-II

COAX CABLE CONNECTORS

Coax connectors, RG-8 and RG-58 type. Male to male and female joiners
Angle and T connectors
RCA to P1-259 adaptors
Please add cutting and handling cost—$1.
DRAKE W-4 SWR Watt-meter, 0-200 and 0-2000 Watt scales
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PETER SCHULZ, VK2ZXL.

amateur radio

VOL. 45, No. 2 FEBRUARY, 1977

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COVER PHOTO

WIA Executive Member Surgeon Rear Admiral Jim Lloyd VK3CDR at his compact station (see page 5).

Photo by Reg Gouge

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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amateur radio

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QSP THIRD PARTY TRAFFIC

At this time of the year our thoughts turn to the John Moyle Memorial Field Day. A contest which, over the years, has enabled amateurs throughout Australia to test their ability to operate radio equipment in remote locations completely independent of commercial power sources.

This ability of radio amateurs to maintain communications under extremely adverse conditions, carrying out makeshift repairs where necessary, is the attribute which makes WICEN so versatile.

Ever since the early days of radio, radio amateurs have rendered assistance during emergencies aided in no small way by their ubiquitous distribution and unique ability.

The WIA, through the Divisions, has close liaison with individual State emergency organisations and more recently, through the Federal WICEN Co-ordinator, with the NDO.

The fact that Australian radio amateurs are prohibited from communications on behalf of third parties has been a complication in the operation of WICEN nets. Although permission has been readily granted for special training exercises it still means very rigid scheduling of them. Also, in many minor emergencies the situation could have been resolved with a minimum of "red tape".

The ITU, although making a general prohibition of international amateur third party traffic, realises that some Administrations favour third party privileges for their amateur service and make provision for agreements to be concluded between the administrations concerned to permit third party traffic.

It is therefore apparent that the simple matter of allowing Australian radio amateurs third party traffic concessions could ease a large number of problems in the utilisation of radio amateurs in emergencies and also in their training so necessary for efficiency.

Members will therefore be aware that the question of third party traffic is one that is still in mind.

(Sgd.) D. A. WARDLAW, VK3ADW,
Federal President. ■

QSP

WHY NINE PLUS?

The editorial by W1DTY in Ham Radio Nov '76 looks very familiar — ". . . Interference on the amateur bands is something that most of us have learned to live with, at least to a certain extent, but in recent months I have noticed an increasing number of bad operating practices cropping up on our bands. Apparently other amateurs have been troubled, too, because I have received a number of letters on the subject. None of these practices is new, but they're more offensive because the bands are much more crowded than they used to be. Deliberate interference, tuning up on net frequencies, playing music, calling CQ without listening first, offensive language, incorrect identification (or no identification at all), using a kilowatt when 100 watts is adequate, talking cross-town on 20 metres instead of using VHF-FM — the list could go on and on."

He goes on to enjoin good operating practices and makes the point that whilst net operations are not for everyone, at least those engaged in the nets are not elsewhere on the bands creating more QRM. And why, he asks, the big penchant for S9 signal reports (by unnecessary use of linears) when perfectly adequate QSOs can be maintained with S6 or 7?

INTERFERENCE POSSIBILITIES

"A French manufacturer is selling and installing equipment known as 'Syeldis". This is a radio-navigation system intended for use on trawlers. Centred on 438.05 MHz, the system has a bandwidth of ± 2.5 MHz, the mode is FM and the power is 100 W. Syeldis uses three beacons and the interference created extends over a considerable distance..' "Radio Communication," Dec. '76.

NOTES FROM IARU

There are now 152 member countries of the ITU. There is an IARU affiliated amateur radio society in 83 of those countries; 9 are in Region 3 and 24 in Region 2. This means there are 69 countries which do not possess an amateur radio society as a member of IARU. Numbered among these countries in Region 3 are Afghanistan (amateur radio banned), Bangladesh, China (no amateur radio), Fiji, Indonesia (active society; preparing to join IARU), Iran, Khmer Republic, Korea North, Laos, Maldives, Nepal, Nauru, PNG (society under formation) and Vietnam. There are IARU societies in Hong Kong and W. Samoa but neither country is an ITU member. The President of Bolivia is an amateur, call sign CP1CL and also their Minister of Transportation, CP1HF. Amateurs in Bolivia can send QSL cards at one-half the regular postage rate. Region 2 News Nov '76.

WWV AND WWVH CLOSE-DOWN

As from February 1 1977 the National Bureau of Standards (USA) will discontinue transmissions on 2.5, 20 and 25 MHz from WWV, Colorado, and 20 MHz from WWVH, Hawaii. WWV and WWVH transmissions will continue as at present on 5, 10 and 15 MHz and also on 2.5 MHz from WWVH only.

WWV has operated for over 50 years and WWVH for over 25 years, however rising power bills and salary costs have forced the services to be reduced. In 1974 the power bill alone for WWVH was $100,000. Within the next decade time and frequency dissemination via sattelites may supersede WWV and WWVH entirely.

IMPORTANT NOTICE TO ALL CLUB SECRETARIES

The 1977 Amateur Call Book is currently on the drawing board and the editorial staff require a complete list of all radio clubs, etc., for inclusion therein.

We earnestly request that club secretaries send details NOW, as soon as you have read this, to the Editor, Amateur Radio, P.O. Box 2611W, G.P.O., Melbourne 3001.

The following information is required:—
Meeting times and days.
Address of club.
Secretary's name and phone No.
Club call sign (if any).

Details of times, etc., for any educational information.

Miscellaneous general items which is considered useful for publication.

Please note that it is hoped to publish the Call Book during May 1977, therefore all material for inclusion MUST be in the Editor's hands NO LATER THAN 31st March 1977.

Material received after that date WILL NOT be included in the 1977 Call Book.
VK3UV Editor. ■

WIANEWS

Reminders to the RFMD on a range of outstanding matters elicited a telex reply during December referenced RB4/11/35.

RTTY

The Department agrees to the use of the eight unit (start-stop) American Standard Code for Information Interchange (ASCII) and such other international codes as are recognised by the ITU. Further submissions from the Institute are required to support the request to increase the maximum frequency shift from 850 Hz to 1650 Hz.

Agreement in principle was given to the conditions relating to the method of identification when using RTTY but the Department themselves will be re-writing paragraph 112 of the Handbook. This means that on bands below 52 MHz identification can be in the mode in use or by morse code or telephony according to the type of mode actually used (reference should be made to your Divisional Council if any doubts exist about the correct mode of ident).

GHz BANDS

The Department does not envisage the allocation for any specific use prior to WARC 79 of any of the bands requested for use by the amateur (and amateur satellite) service above 24 GHz. However consideration will be given to applications from individual amateurs wishing to conduct experiments in these bands. The bands concerned are 40-50 GHz, 71-76, 165-170 (now amended to read 155-160 because of moisture vapour absorption characteristics), 216-220, 240-250 and all above 275 GHz.

ATV REPEATERS

Approval in principle was given for ATV repeaters with input frequencies in the 70 cm band and output frequencies in the 576-585 MHz band subject to no re-transmission of any other signals.

A wide range of other items either were not approved or were not specifically mentioned except the new call book contract — please see below.

The requests for (a) 4 amateur examinations (all classes) per annum; (b) use of CW by limited licensees in all bands above 144 MHz on passing a 5 w.p.m. exam and (c) "Parity" in maximum power levels for A1 vis-a-vis A3J stations were not approved.

Similarly turned down were various requests to amend the conditions applicable to amateur repeaters and the submission that identification periods for amateur stations be increased from 5 minute to 10 minute intervals. The latter was refused for regulatory purposes. Also refused at the present time were requests for extensions to the 80, 40 and 6 metre bands because, they say, the WARC 79 outcome must be awaited. Present privileges granted for WIA broadcasts also would not be altered.

Other matters which will require further discussions with Central Office are (a) the acceptance procedures for activating amateur stations for emergencies as set out in paragraph 94 of the Handbook, and (b) the apparent refusal to licence beacons, repeat beacons, in bands below 52 MHz. The WIA band plan for the 430 to 440 MHz portion of the 70 cm band has been noted (including repeater frequency and simplex channels, etc.) and any amendments thereto will require submission.

Dialogue with the Department will continue in a variety of items not included in their telex such as numerous examination matters, various repeater considerations, interference procedures, etc.

1977 CALL BOOK

Early in January a letter was received from the Australian Government Publishing Service enclosing a contract for the 10 year period from 1977 for publishing the WIA Call Book. Many of the conditions are a re-hash of those imposed in the 1970 contract but a number will require closer examination in relation to present day conditions and procedures. If this contract is signed the first call book must be published not later than 1st May, 1977. Copyright of the contents of the entire book will vest in the Government. The whole question is currently under consideration.

POSTAL MOTIONS

Both the postal motions listed in WIANEWS of January 77 AR have been passed by the Federal Council.

EXAMINATIONS SYLLABUSES

The Federal Education Co-ordinator had produced a syllabus for the Novice theory examination. This is currently the subject of intensive study in many locations and it is hoped that a finally-agreed draft can be prepared for submission to Central Office in the near future. Many of those concerned with its preparation have urged caution and have suggested a good syllabus is better than one hastily prepared. A draft AOCP level theory syllabus has also been prepared and should be in circulation by the time this appears in AR. Any comments of a general nature would be welcomed.

The Federal President, Dr. D. A. Wardlaw, VK3ADW is scheduled to visit Sydney from the evening of February 18th and will be attending the Central Coast Field Day activities in Gosford before returning to Melbourne on Sunday evening the 20th.

A reminder. Agenda Items for the 1977 Federal Convention are due; correspond with your Division. The Convention is due to be held in Melbourne from 23rd to 25th April inclusive. ■

QSP—continued

MOBILE OPERATION — IMPORTANT ADVICE

Because of the current "CB" activity on 27 MHz, the State Police have been empowered, by arrangement with the District Radio Inspector and Telecom, to stop and search any vehicle "suspected" of carrying or operating illegal 27 MHz equipment.

All amateurs operating mobile are therefore advised to carry with them their licence or a photostat copy for proof of the legality of the equipment installed in their vehicle. It is also required that the licence renewal certificate and a log book be carried.

It is also advisable that if the amateur himself is not using the vehicle, all equipment should be removed so that the XYL on her shopping trip is not booked for illegally being in possession of transmitting equipment.

From Illawarra ARS Newsletter December 1976.

GHz BANDS

Reporting on the IARU R1 VHF Managers' meeting in Amsterdam last October, G3RPE, in his Microwaves column in January '77 Radio Communication, said — "It was also suggested that deliberate efforts should be made to catalyse at least some activity at frequencies above 40 GHz since this was now the pioneering part of the radio spectrum, and any activity by amateurs in this region would be expected to have a great impact." In the UK microwave records it was observed that 521 km was the record on 10 GHz and 154 km on 24 GHz. A world record on 3.4 GHz was recorded as 383 km between two ZL stations in 1975.

LIGHTNING RISKS

In his T.T. column in January '77 Radio Communication, Pat Hawker devotes two columns to techniques to minimise the effects of lightning strikes on both persons and equipment. The simple precaution for people caught outdoors indicate that a squatting position away from other objects (and people) reduces the risk of being struck. In regard to aerials and lines it seems the best policy first to shunt, then to isolate. In other words, having made the shunt paths to ground as attractive as possible, the route into the equipment should be made unattractive by adding isolation, in the form of impedance. For people the best shelters appear to be in an all-metal vehicle or in a building, but out in a boat proper bonding of the mast and rigging to a metal keel seems the best preventive. It is wiser to get wet than hold an umbrella upright.

OCEAN MISHAP

From the "Amver Bulletin" of the US Coastguard June/July '76 kindly forwarded by Dave Jeanes VK2BSJ/MM on the m.v. Darwin Trader, comes a story of the sloop "Sorcery" en route from Tokyo to Los Angeles with a crew of 11 persons. The 61 foot sloop was caught in a heavy storm on 8th May about 1000 miles SW of Kodiak, Alaska, and rolled over in raging seas losing her mast, lifeboat and rudder. The only communications still operating was a small amateur radio station aboard, which, with the assistance of a piece of wire running across the deck, enabled communications to be opened with radio amateurs in San Diego, Midway and Hawaii. The crew were rescued the following day on the diversion of the CG cutter Mellon after being pinpointed by a rescue aircraft from Kodiak dropping supplies and the m.v. Camara standing by after the sighting. Dave also mentioned meeting Al Fox VP2LOX/MM3 on his yacht "Foxtrot" during a call at Darwin in October. Al and his XYL have already circumnavigated the world once and this was their second time round en route to USA via Bali, Singapore and Cape of Good Hope. ■

SEE FRONT COVER PHOTO

PROFILE OF VK3CDR, SURGEON REAR-ADMIRAL JIM LLOYD, QHS

Jim was first licensed as G3DKI in 1948 exchanging this for VK3AST in 1952 and VK2BST in 1966. In 1969 he was issued with the first "interstate" call sign — VK3CDR.

Two metre FM operators will have heard VK3CDR operating portable, mobile or marine-mobile. When time permits Jim also appears on 3.5, 7 and 14 MHz CW or SSB using home-brew equipment.

Amater Radio is not Jim's only hobby. Photography, sailing, home-brewing (the real stuff), wine-making and bee-keeping all help to fill Jim's leisure hours. Not that there are many of those as since joining the RSGB in 1946 and the WIA in 1952 he has served on the VK3 Divisional Council as Federal Councillor and State President and is currently a member of the Federal Executive.

On the professional side Jim commenced his career as a medical officer in the RAN, specialising in Nuclear Defence and radiological protection. His current posting is Director-General of Naval Health Services. ■

RADIO TELETYPE

PART TWO

Josteln Gjerde, LA7MC

HOW THE TELEPRINTER OPERATES

We continue with the series. The teleprinter described below is different in some aspects from the common (in VK) model 7 Creed, however the basic principles are the same.

TRANSMITTER MECHANISM

The transmitter mechanism has a keyboard as on a typewriter. Under the type-bars, there are 6 steel bars or rails on edge, and these can move in the longitudinal direction (Fig 1). 5 of the bars are selectors, the 6th is called the release bar. The 5 selectors have sloping cutouts such that they be moved to right or left, depending on which character key is pressed. With 5 selectors you can get up to 32 different combinations.

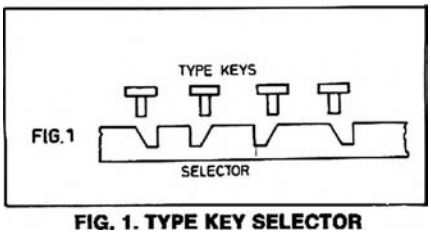


FIG. 1. TYPE KEY SELECTOR

The 5 selectors operate a contact head which is connected to a DC supply, and to the transmission roller (Fig 4).

The transmission roller is in principle represented as a ring with 6 conductive segments. A brush arm makes one revolution when the catch is raised by the release bar. The release bar moves to the left, whichever letter is pressed. When letter A is pressed, bars 1 and 2 move to the left and the 3 others to the right (see Fig 2). The release bar also moves to the left and releases the brush arm which is driven by 1 rev. by a motor with a clutch coupling.

The following impulses are transmitted.

1. Current break = Space. The start pulse. This starts the receiving roller.
2. Current = Mark.
3. Current = Mark.
4. Break = Space.
5. Break = Space.
6. Break = Space.
7. Current = Mark (stop pulse).

The 5 letter pulses depend on which letter is transmitted (here letter A).

When the transmitted arm stops because of the catch, the DC supply is coupled to the line. This stops the receiving cylinder.

RECEIVER MECHANISM

The Receiver roller has a brush arm with a catch. The catch is held fast by an electromagnet which receives current from

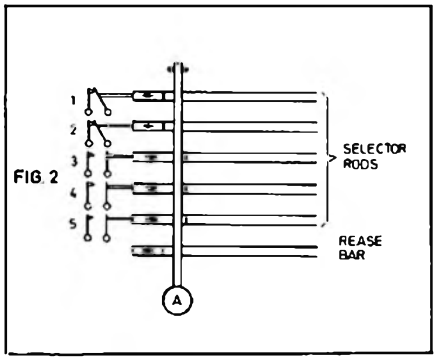


FIG. 2. POSITIONING OF THE SELECTOR RODS FOR THE LETTER A.

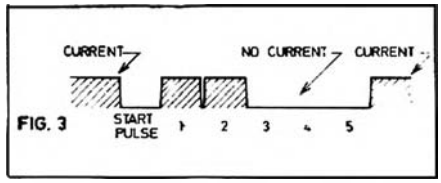


FIG. 3. CURRENT PULSES REPRESENTING THE LETTER A AS GENERATED BY THE KEYBOARD MECHANISM.

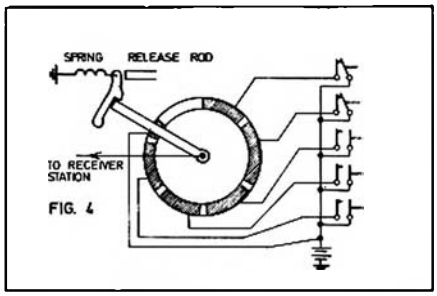


FIG. 4. COMMUTATING MECHANISM FOR PRODUCING CODED PULSES FOR TRANSMISSION.

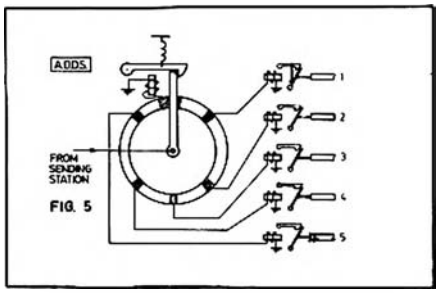


FIG. 5. COMMUTATING MECHANISM FOR DECODING RECEIVED PULSES.

the other station via the line. The receiver's brush arm must have the same rotary speed as the transmitters. On the receiving roller, the conductive segments are small, and on the transmitter roller, wide. Therefore, there is some room for a small difference in rotary speed. The brush arm stops after one revolution and starts again, each time a new signal is sent.

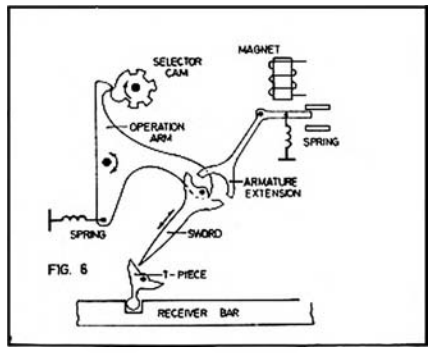


FIG. 6. SELECTOR MAGNET OPERATION OF RECEIVER RODS.

The receiver relay armature positions depend indirectly on 5 receiver bars. The indirect relation is necessary because interpretation can begin when the last impulse is received. In the meantime, a new character can be on its way.

The receiver mechanism has usually only one selector magnet and one group of 6 rotary cams placed in such a w on the axle that each cam operates at the instant the corresponding signal is transmitted.

Fig 6 shows the mechanical arrangement to convert the operation of the selector magnet to the positioning of the receiver bars to correspond with the received signal. When a space pulse is received, the armature releases. This operates a latch and thus allows the cam axle to make one revolution. The distance between the cams on the axle is such that when the first of the 5 pulses is received, the first cam will move the operation arm of the first receiver bar, and swing it a little clockwise. If the first received pulse is a Mark pulse, the armature will close and the movement of the operation arm will lift the 'Sword' and cause the right arm on the 'sword' to knock the right arm of

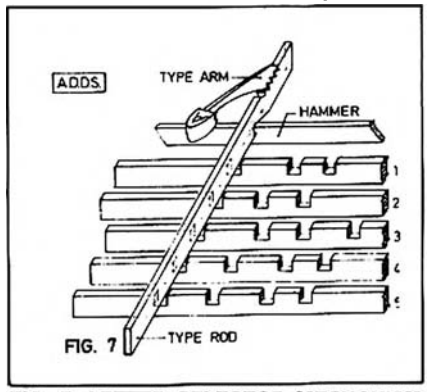


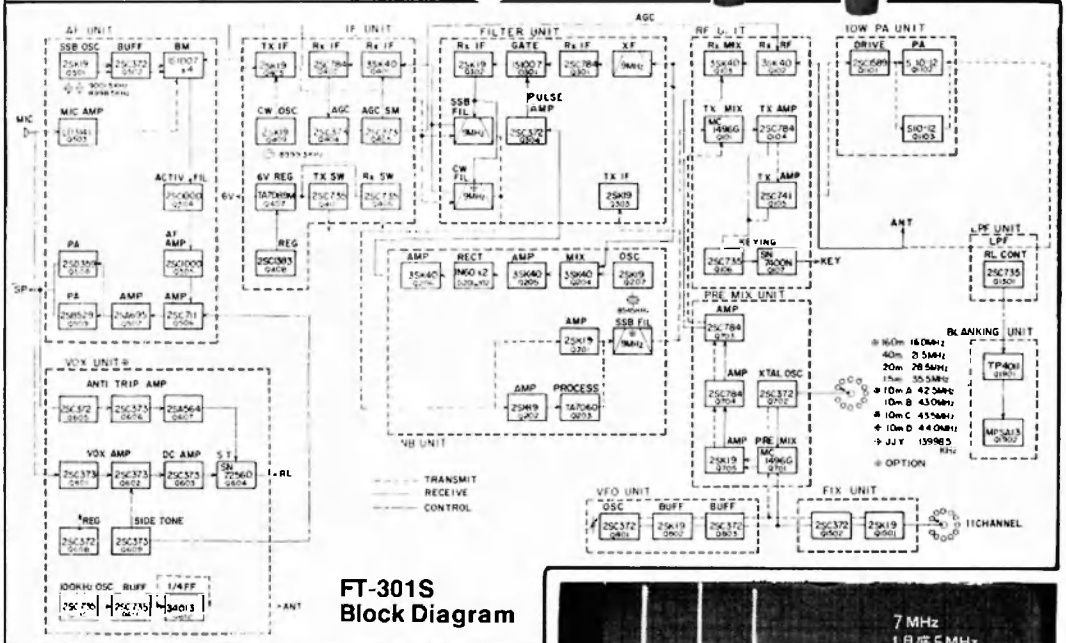
FIG. 7. LETTER SELECTOR MECHANISM.

YAESU

Latest addition to the YAESU line —

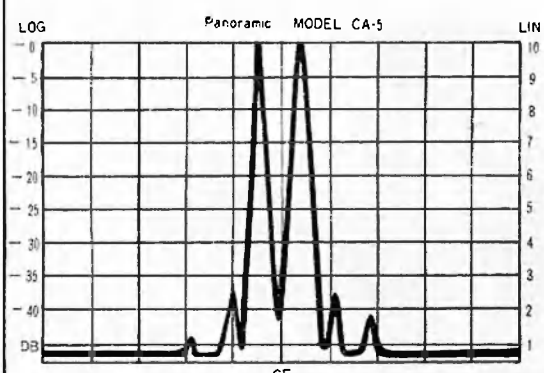
FT-301S ALL SOLID STATE HF TRANSCEIVER

The FT-301S is an advanced fully solid state H.F. SSB and CW transceiver covering 160 mx thru 10 mx, including one auxiliary band and WWV. It has all the outstanding features of Yaesu's top performance FT-101E (inc. built in RF Processor) plus many more additions (compact, solid state final, low power consumption).

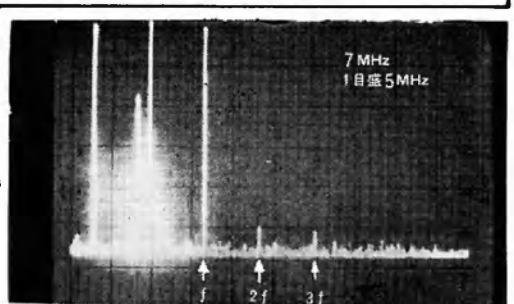


FT-301S Block Diagram

Eleven crystal locked channels and 10 Watts PEP make the FT-301S particularly suitable for the new Novice and, at a later date, a 100 Watt outboard linear amplifier will be available from Yaesu, enabling the FT-301S to be uprated for full licence operation. Additional plus features include automatic high VSWR protection of the final amplifier output transistors and selectable 100 KHz and 25 KHz calibration. Special care is taken to reduce unwanted harmonic radiation by the inclusion of eparate double section Low Pass Filters for each band. Stocks of the FT-301S are expected toward the end of September.



Graph shows Intermodulation products



7MHz Spurious Radiation

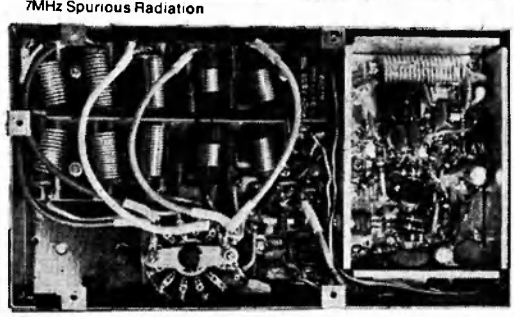


Photo shows double section Harmonic filter used in Final

Technical Data

Frequency Range
160m 1.8-2.0 MHz.*
80m 3.5-4.0 MHz.
40m 7.0-7.5 MHz.
20m 14.0-14.5 MHz.
15m 21.0-21.5 MHz
10m A 28.0-28.5 MHz.*
B 28.5-29.0 MHz.
C 29.0-29.5 MHz.*
D 29.5-30.0 MHz.*
WWV 5.0-5.5 MHz.*
Aux. 27.0-27.5 MHz.
Mode
LSB, USB, (A3J)
CW (A1)
Input Power
A1, A3J, 20 Watts DC
Carrier Supp.
Better than 40dB
Adj. Sideband Supp.
Better than 40dB
Spurious Rad.
Better than —40dB
Audio Response
300-2700 Hz. ±6dB
Intermod. Distortion
Better than —31dB
Frequency Stability
300 Hz or better within the first 30 minutes and less than 100 Hz after warmup
Input Impedance
50 Ohm
Mic Impedance
500 Ohm
RX Sensitivity
0.5μV for 10dB S/N
Image Rejection
Better than 50dB
Selectivity
SSB —6dB at 2.4 KHz
—60dB at 4.0 KHz
CW —6dB at 0.6 KHz *
—60dB at 1.2 KHz
Crossmod
Better than 60dB with a 20dB signal at the ant. terminal 20 KHz away
Audio Output
3W at 10% THD.
Output Impedence
4 Ohms.
Supply Voltages
DC 13.5V Receive 0.4 Amp
Transmit 3 Amp (at 10W)
AC 234V Receive 40 VA
(With FP-301) Transmit 110 VA (at 10W)
Dimensions
280mm wide, 125mm high, 290mm deep
Weight
7 kg.

*Options

Anticipated Prices
FT-301S Transceiver $658
FV-301 Matching VFO $149.
FP-301 Heavy Duty AC Power Supply $169.00
(May also be used to power 100W final)

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FRED BAIL VK3YS
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JAS7677-2-1

the armature extension. The 'Sword' will then turn clockwise such that when the cam is clear of the lug on the selector arm, the arm will swing back (because of the spring) to its original position.

The 'sword' will now push the arm of the T-piece to the left and swing it in a clockwise direction. The T-piece will, in this way, push the receiver rod No. 1 to the right. If the first pulse had been a space the rod would have been pushed to the left. In the same way the remaining rods are pushed in place in order and the 6th cam releases a clutch which allows the typing mechanism to operate.

The five receiver bars are displaced to right or left to correspond with the received signal. The slots in the receiver bars for the letter that was transmitted, will become aligned so that the type rod for that letter or character falls down and is struck by the hammer and the type arm is pushed towards the paper (see Fig 7).

After having completed one revolution, the cam axle will stop and the teleprinter is clear for a fresh reading.

(to be continued) ■

WHY RADIO FREQUENCY CLIPPING?

Harry Leeming, G3LLL
C/- Holdings, Mincing Lane and Darwen St.,
Blackburn B.B2—2AF, U.K.

There cannot be many Hams who at some time or another have not experimented with audio processing and clipping. In the past, on AM, results were quite encouraging, but for some reason the things just don't seem to work in many cases with SSB — why? Here are a few thoughts on the topic by G3LLL.

A typical block diagram of an audio processor which includes clipping and compression is shown in figure 1. This kind of unit looks quite impressive, but let us examine it stage by stage and see what we have to gain if we connect it into a good quality single-side-band transmitter.

PREAMPLIFIER AND PRE-EMPHASIS STAGE

This stage does just about everything that a decent microphone (plus, perhaps, a bass-cut capacitor) should do. If you are short of audio gain or if you use a microphone with a bassy response, it may help, but if you use something with plenty of output and a controlled response such as, say, a Shure 444 you will gain little or nothing.

THE COMPRESSOR STAGE

The ALC circuit in any correctly operating amateur SSB transmitter makes a very good audio compressor; why add another in series?

CLIPPING STAGE

Most ALC circuits derive their output from the PA valves grid. Before this type of circuit can work, the PA valve has to be over-driven, and in this condition the cathode and grid form a clipping diode limiting the audio peaks and giving, whether you want it or not, several dB's of radio frequency clipping. The small amount of clipping obtained may not increase the *loudness* of the signal as much as 20 dB's of audio clipping, but as it will not produce any audio harmonic distortion, in many cases it will do just as good a job of improving the intelligibility.

THE HIGH FREQUENCY FILTER

Whilst a separate audio high frequency filter may be needed to prevent square wave effects after audio clipping, it is certainly not needed to clean up any signal which is going to be passed through an SSB filter. An SSB filter has a very clearly defined response and this ensures that any high frequency distortion products are "chopped off".

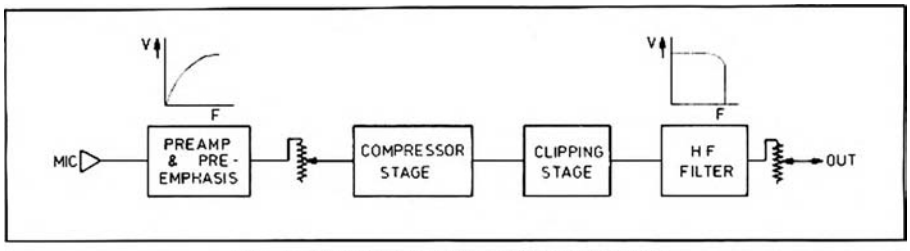

FIG. 1. AUDIO CLIPPING BLOCK DIAGRAM.

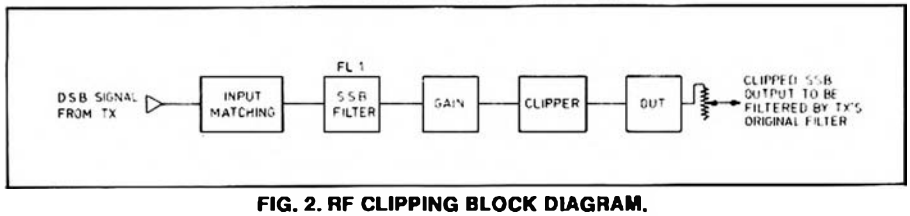

FIG. 2. RF CLIPPING BLOCK DIAGRAM.
NOTE: Clipping Level adjusted by Tx's mic gain control.

Whilst, doubtless, an audio clipper will help sometimes, I doubt if it has much to offer when used with single side band equipment if the following conditions are already met:

1. A good communications type microphone with a rising response and adequate audio output is used.
2. The transmitter has an efficient ALC circuit which is derived from the PA grid.
3. Adequate drive with some clipping at the grid of the PA valve is available on all bands.

Although many would argue otherwise, my own experience is that under these conditions the only clipper giving any real hope of more than a dB or two improvement is a radio frequency clipper.

RADIO FREQUENCY CLIPPING

To refresh your memory, the general layout needed for an "add-on" radio frequency clipper is shown in figure 2. The double-side-band signal is taken from the transmitter, and first of all converted to single-side-band by the clipper's filter FL.1. The *then* single-side-band signal is amplified by an amount necessary to ensure adequate clipping and is then clipped and fed via the output control back to the associated transmitter.

If things are working correctly it is impossible for a radio frequency clipper to *generate* audio harmonic distortion, as the SSB signal fed to the clipper diodes consists only of a bunch of radio frequencies. Harmonic distortion products in this case are at twice or more times the *radio frequency*, and so are filtered out by the simplest of tuned circuits. At very low levels of clipping no additional filtering is necessary, but as clipping is pushed to the higher levels needed to provide a meaningful improvement in performance, intermodulation distortion does occur and causes the signal to spread out on to adjacent channels. For this reason the signal is then fed back into the transmitter via the transmitter's original SSB filter which removes the additional side bands which have been generated by the clipping process.

RF CLIPPING DOES NOT ALWAYS WORK WONDERS

Have you ever been prescribed a wonder drug for hay fever? I was, and it certainly worked; that is, I think it did; but the trouble was I hardly ever woke up sufficiently to sneeze! RF clipping can also have its problems.

HEAT

Most single-side-bands rigs are rated for a 50% duty cycle on CW, and for less than this at higher power on SSB. When using any form of clipping, the speech duty cycle becomes considerably extended and if the extreme of infinite clipping was to be applied the duty cycle would become 100%. At the more realistic levels commonly used, of around 15-20 dB of clipping, you should be safe if you keep within the *CW ratings*, and if your equipment is not fitted with a blower, you fit one.

DISTORTION

RF clipping properly applied does not *cause* objectionable harmonic or intermodulation distortion, and speech can sound excellent even at 30 dB of clipping. How then do the distorted signals which we all hear on the air on occasions, occur? The purpose of clipping the peaks is to boost up the low level signals, and RF clipping boosts up all low level signals. Distortion is, however, a low level signal, and suppose for a moment that before the application of clipping, your rig has an inbuilt distortion level of 5%. This level of distortion is quite acceptable in amateur practice, and frankly no one is likely ever to have commented. If you do go ahead and add a radio frequency clipper after the stages which have produced the distortion, you will boost up the distortion. If you go as far as to add clipping in the region of 20-30 dB, the distortion will become boosted until it is nearer to 50%, and then you will be told that your clipper is causing distortion. It is not causing distortion; it is simply amplifying the distortion which already exists.

HUM

Here the same argument applies, as any hum which is introduced by the microphone lead, or in the early stages of the transmitter, will be boosted by an amount depending upon the level of clipping. Recently, I had a case where a RF clipper was accused of causing hum. Upon examination of the FT101 being used with it, hum could just be heard when the signal was at the S.9 + 40 level without the clipper, but this had never been noticed over the air until the clipper was fitted. Further checking located a poor chassis return from the transceiver's AF board and resoldering this completely removed the hum, with or without the clipper.

MICROPHONE

First remember that RF clipping shows up everything, and microphone distortion will be just as mercilessly amplified as any other kind of distortion. Frankly, if you do not wish to invest in a good quality microphone, you will be wasting your money on a radio frequency clipper.

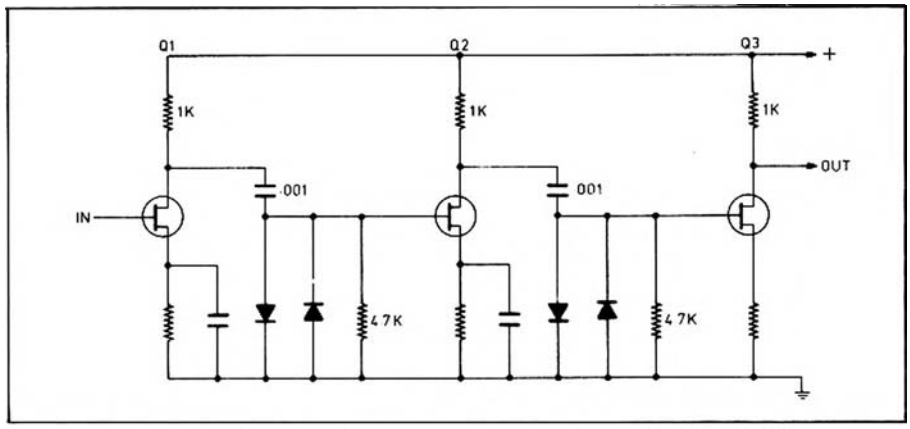

FIG. 3. RF CLIPPING CIRCUIT. GAIN OF Q2 SET AT APPROX. 10 dB.

The frequencies which carry most information in speech are in the octave and a half above 1 kHz, and whether you use clipping or not, a microphone which has a peak response in this range will give maximum talk power. If you want to get the best possible from *any* type of clipping you must use a microphone with a rising response, and even if you use a good mic it is still worthwhile adding extra low frequency cut.

I use a Shure 444 microphone, and I have modified the VOX/PTT switch so that it adds a 2000 pF capacitor in series with the audio lead in one position. Under poor conditions switching in this capacitor is at least as good as doubling the power but somewhat cheaper!

CLIPPING CIRCUITS

I could be wrong, but I am not personally very keen on using arrangements where clipping diodes are associated with tuned circuits. Under these conditions it is very difficult to measure just what is happening, and I cannot help feeling that it might just be possible for phase modulation to occur at some signal levels as the diodes change capacity with signal voltage. The very simplest arrangement is resistance capacity coupling; it only being essential to ensure that there is adequate dynamic range so that clipping definitely occurs in the diodes and not in the transistors. In this connection it is helpful if two stages of clipping are used as shown in fig. 3, the gain of Q2 being adjusted so that at the maximum level of clipping desired, say, 20 dB, clipping is shared equally by each stage.

DOES RF CLIPPING REALLY WORK?

With a generously rated transmitter having an inherent level of distortion in the high fidelity class, it should be possible to run 40 or 50 dB of RF clipping and gain anything up to fifty times effective increase in power. Under these conditions perhaps it would be necessary to operate under ground in a padded cell to keep blower and room noises down to a reasonable level, but in any case the consideration is purely academic.

In more practical terms I use radio frequency clipping with my Yeasu FT101 mainly in a static mobile condition. Without the engine running I get only 12 volts out from the battery, and so the FT101 runs at reduced power. Under these conditions I can really "push" the FT101 without worrying about overloading the power supply or PA valves, and I often use 20 dB or more of clipping. Even at these levels of clipping I often get unasked-for comments of "excellent speech quality", and some stations have told me that apart from being much louder and easier to read with the clipper, the speech quality is actually better! This may be due to over-enthusiasm, but certainly the sound quality at any level of clipping which is within the capabilities of the FT101 is of a kind that will not upset the most critical listener.

RECEPTION

As explained previously, before you can incorporate RF clipping it is necessary to purchase an extra SSB filter which usually is quite an expensive item. With quite a few transceivers it is possible to design the clipper so that the extra SSB filter is in circuit on reception as well as on transmit. The extra filter gives quite a notable improvement in skirt selectivity which is well worth having as it is "thrown in free of charge". This approach is not possible with all transceivers, but if you are home brewing a radio frequency clipper the possibility should certainly not be overlooked.

CONCLUSION

Radio frequency clipping is not cheap, but dollar for dollar it seems a much better proposition than a linear amplifier. If you really want to "flatten the opposition" there is no reason why it should not be used in addition to a linear, in which case you will have talk power in the broadcasting station class! RF clipping will make an excellent rig, even better, but as it amplifies everything including any hum or distortion, one should not try and incorporate it in any equipment which is the slightest amount under par in audio quality or else the results will be disastrous. ■

NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG
David Down, VK5HP

SUPPRESSION OF ELECTRICAL NOISE CAUSED BY VEHICLE ELECTRICAL SYSTEMS

Reducing the electrical noise generated by the ignition and general electrical circuits of a car down to a level which does not interfere with mobile two way radio contacts can be a difficult job. If you are able to determine the source of the interference and then determine the entry path of the interference to the radio equipment you are well on the way to being able to suppress it.

As I stated in my previous article on this subject in March 1975 issue, *the whole of the interference source must either be shielded completely or have suppression filters fitted where shielding is not practical.*

TRACING THE SOURCE OF THE INTERFERENCE

Tracing the source is not all that difficult as long as the task in hand is approached in a logical manner. It is assumed that the mobile has been installed in the vehicle, and can be either VHF or HF as the techniques for interference tracing are similar. Do not assume that your VHF FM transceiver will not be affected by the vehicle electrical noise because it will be, but the effects under most conditions of operation will not be particularly noticeable. Do not assume that because your set has a noise blanker or noise limiter that its performance will not be improved by attention to vehicle suppression. The reasons why this is so could be a subject of an article in itself.

With the set turned on and listening to a weak station, turn on the vehicle ignition and leave it on for about a minute. If an intermittent plopping sound is heard this will most likely be coming from the voltage regulator fitted to some cars for the proper operation of their dashboard instruments. The cure for this is shown in my previous article. With the ignition on, turn on various devices within the car — heater motor, windscreen wipers, tail-gate motor, turn indicators, then try bouncing the back of the car to cause the fuel gauge float to move. Some or all of these units will cause trouble but will in most cases respond to the fitting of a capacitor from the active lead (or leads) to earth using short leads. The capacitor value should be in the range of 0.1uF to 3uF, ceramic or the type used in suppression work for car radio installations. In stubborn cases, some shielding or the fitting of RF chokes into supply lines may be necessary. The interference generated from these sources may not be evident sufficiently often to warrant suppression, e.g. if you only go mobile in dry weather suppression of the windscreen wipers may be a waste of time.

Having sorted out all the items causing interference whilst the car engine is not running, now comes the real test — start the motor and see how much trouble you have from this source. *Interference and how?????* With the engine idling or running at a couple of thousand revolutions per minute, the steady "tick-tick-tick" of the spark ignition system will be heard. Possibly another couple of noises will be heard, one could be a whine which increases in pitch as the speed of the motor is increased, and the other is a ragged scratching type of noise which is not always present and varies erratically with the charge condition of the battery, engine speed and electrical system load. The first is caused by the alternator or generator and the second is caused by the regulator. This article will concentrate on the noise caused by the ignition and battery charging circuit.

HOW THE INTERFERENCE GETS INTO YOUR RECEIVER

You will automatically say through the aerial, of course — everyone knows that. But does it? Not always, It sometimes comes in through the power leads, through defective earthing of aerial and power cables, through speaker leads and microphone leads. The most likely of these sources is the power leads. How can this be determined? With the engine running at a thousand or so revolutions, remove the aerial lead from the set. If the interference is coming through one of the leads mentioned previously, or is being picked up directly by the set, or if it is poorly shielded, interference will still be heard in the receiver. If shielding is a problem metal shields of some sort can be made up, or alternatively aluminium foil can be draped around the set and suitably bonded to act as a temporary shield..

If possible, try the set on a separate 12 volt battery, and most likely the interference will disappear. It is impractical to run the mobile station on a separate battery normally, so some means of keeping the interference out of the power line must be found. For example, many of the cheaper cassette players require a power line filter such as shown in Fig 1. These are not very practical where the current drain is more than a couple of amps or so, certainly not for a rig drawing 20 amps. If a filter is required it is usually only required in the low level stages so it needs to be wired into the particular part of the set affected. This type of interference is mostly within the audio spectrum, and fortunately it is uncommon for the RF component to affect the set when introduced into the set in this way. The exception here of course is when a design brings the power lead into the proximity of the aerial terminal or any sensitive low level RF stage. This is a case of bad equipment design. However, before you start rebuilding your equipment it is suggested that you try the interference suppression system described below.

RADIATED INTERFERENCE

Most of the Interference that you will receive in your mobile will be of the radiated variety and as such is picked up by the aerial, if it happens to be within the noise field generated by the vehicle electrical system. The mobile aerial should be located as far from the noise producing source as is practical, usually at the opposite end of the vehicle to the engine. However, if you do a particularly good job of suppressing your vehicle's electrical system the location of the aerial may be mounted where it will conveniently do a good job.

Some time back Gavin VK3HY and Rodney VK3UG went mobile on HF only to discover that the mobile heard whilst stationary with the motor stopped, disappeared when the engine was started despite the fact that the HF transceiver was fitted with a noise blanker. Gavin and Rodney discovered this problem at great length and it was decided that something should be done about it. Each recollected the various methods that they had seen used and a decision was made to try and refine a method where fly wire had been placed over the high tension leads of the vehicle ignition system. The method that is to be described shortly is an outgrowth of the system fitted to Gavin's car.

The interference generated by the ignition system is radiated in all directions escaping under the car, through the cracks and slits around the bonnet, and is conducted and reradiated from the venting, exhaust, etc. See Fig 2 for example.

The interference radiated by the ignition must be prevented from leaving the vehicle engine compartment. The most effective way is to completely shield each spark plug line, each spark plug, the dis-

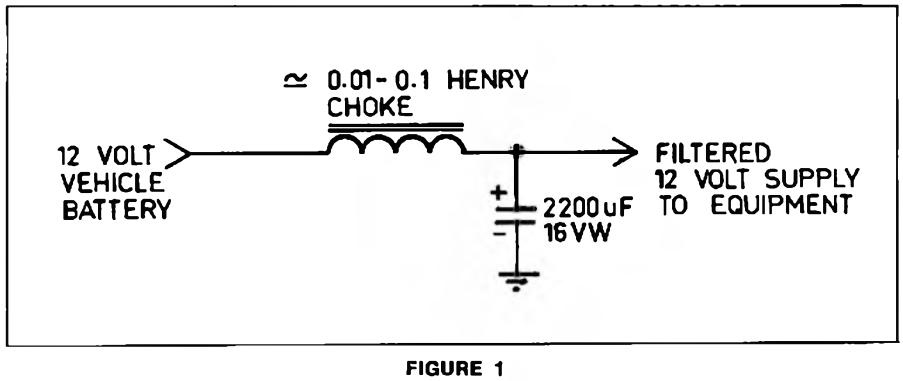

FIGURE 1

DRAKE R. L. DRAKE COMMUNICATIONS GEAR

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SSRI Synthesised communications **RECEIVER.** Provides continuous coverage 500 kHz to 30.0 MHz for AM-USB-LSB reception. Operates from AC Mains or internal batteries. Now only **$260.**

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TV — 42 — LP FILTER for Transmitters below 30 MHz — 100 Watts continuous. **$17.50.**

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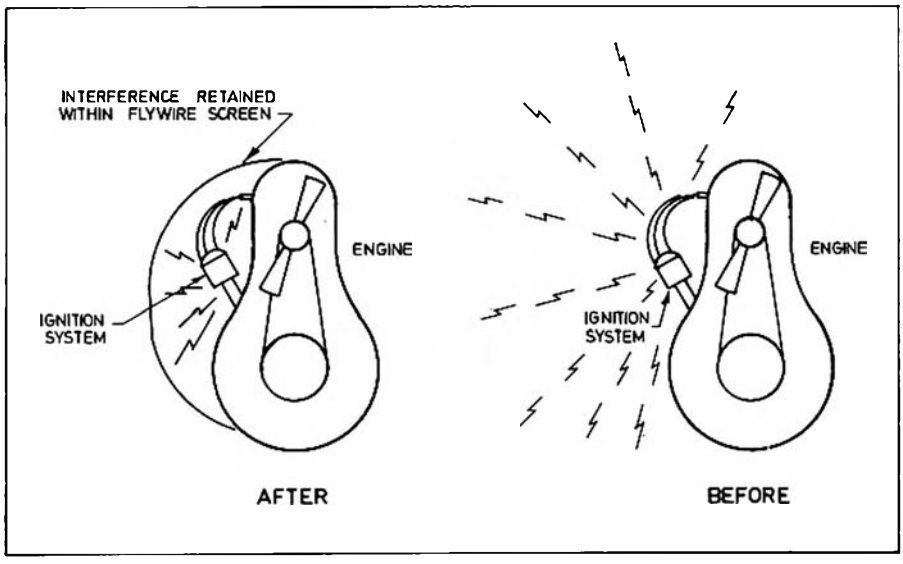

FIGURE 2

tributor, and the coil, and then filter the low tension battery supply line. A method of doing just this was shown at length in Amateur Radio for March 1975. It is extremely effective. It is a lot of work, but well worth it in critical situations.

Another way of completely shielding the ignition system is to put a complete shielding box over the whole of the system, and this is *almost practical* where all the ignition components are mounted on one side of the engine. Fortunately it has been found by experiment that it is not necessary to completely shield the ignition system, and a few holes for the interference to leak through do not raise the level of interference to a high level. The experiments have been conducted on 3 Holden cars (2 HQ models and one a couple of models before) each with success.

INTERFERENCE SUPPRESSION ON THE HQ HOLDEN

The method of suppression described is specifically for the HQ Holden, but the principles apply equally well with vehicles of other manufacture. The main interference suppression shield consists of *bronze* fly-wire, cut, folded and soldered as shown in Fig 3. The top of the screen is screwed to the rocker cover. The edge of the rocker cover is sandpapered so that good contact is made along the top of the fly-wire screen. The screen is attached by 5 small diameter self tapping screws to the rocker cover. The rocker cover should be removed to do this work. The studs which hold the rocker cover to the block are sandpapered down to bare metal as is the area surrounding each of the holes for the studs in the rocker cover. This is done to make sure of good electrical contact between the rocker cover and the engine block.

The bottom end of the screen is attached to various spots on the block of the engine. "B" is bolted to a small unused tapped hole at the rear of the engine in front of the clutch housing. The two holes "A" are bolted to a portion of the oil filter and the lug "C" is bolted under one of the timing case cover bolts. It is necessary to make sure none of the bolts or the threaded holes in the block are rusty or the efficiency of the suppressed system will suffer. The front of the screen nearest the radiator fan should be wired to the fuel and vacuum lines so that insects are not blown behind the screen.

Prior to fitting the screen, the coil LT line must be suppressed. The ignition coil is rotated through 180 degrees. The coil and ignition leads are re-located below the coil to keep them away from the spark plug leads. The ignition switch line is filtered with a Ducon PNC51 coaxial feed-through capacitor mounted on the side of the coil. There is a small bracket on the side of the coil mount just for this purpose. The lead that went to the terminal nearest the coaxial capacitor (in the ignition switch line) is disconnected from the coil, and attached to the bottom terminal of the coaxial capacitor. The top terminal is bridged with a short piece of wire to the vacant coil low tension lead. Once the screen is refitted, the suppression of the ignition system is complete, and the cost is of the order of $5. However, this amount of suppression is not usually enough as the alternator and regulator often contribute a considerable amount of interference.

It is necessary to shield the brown and blue wires going between the alternator and regulator. The cream coloured terminal block is removed from the two terminals at the alternator end by putting a sharp thin device down the front of each terminal entry to push each retaining lug out of its notch, and each terminal is then withdrawn noting which terminal went into which part of the block. The wires are slipped into a length of ⅜ in. coaxial cable braid which is earthed at the regulator and alternator. The red alternator to battery wire is filtered by fitting a Ducon PNC51 coaxial capacitor into this line and mounting the capacitor to the frame of the alternator, with a small short gutter bolt in a vacant hole on the back of the alternator. The red lead is cut, one end going to one capacitor terminal, and the other lead end to the other terminal. Another coaxial capacitor is fitted to the brown wire from the regulator which disappears into the main wiring loom. The wire is cut as for the red lead and attached to the two terminals. The capacitor is mounted as close as practical to the regulator.

Usually the work as outlined above is sufficient to quieten most alternators and regulators, but some require more. It is possible to buy suppressed voltage regulators from Bosch or from their distributors Motor Spares. The type number of the suppressed regulator is RS35NS. Although an improvement, the suppressed regulator is still somewhat noisy. A Trend GR12 solid state regulator was obtained from Clayton Diesel Electrics Pty. Ltd., Cnr. Green Street and Power Road, Doveton, Victoria. The solid state regulated has proved to be quiet and is cheaper than the Bosch suppressed regulator. The generating system should now be completely quiet unless you have either made some mistake in the suppression technique, or you have a defective alternator. Some alternators have extremely noisy diodes but they are not defective in any other way.

A number of bonding straps are used to earth together various items within the car that are often not earthed directly to one another. A prime example is the exhaust pipe. This is earthed at the engine to the vehicle body but is held off the car by insulated hangers right to the back of the car. The exhaust can act as an aerial for the interference. For this reason a number of bonding straps are fitted between suspected interference radiating areas. The straps can be made out of ⅜ in. or 1 cm wide copper braid. Bonding straps are required between the engine block (rear) and the fire wall, across the passenger and driver side bonnet hinges (make sure the bonnet is electrically connected to the braid as sometimes paint on the bonnet acts as an insulator), across each resilient engine mount to vehicle cross member, and one from the last exhaust pipe hanger to the car body.

SUMMARY

Having done all of these things you should now have a car that is fairly quiet electrically and signals down to a microvolt or so should be quite readable on your receiver without recourse to the use of a noise limiter, and the use of a noise limiter or blanker should get rid of the last vestige of interference. All earthing points must be sandpapered or scraped back to bare metal and bronze fly-wire must be used for the shield (not the cheaper aluminium or steel wire). After a number of months it may be found that the interference does come up a bit. If this is so, check that all earths are clean and clean the bronze

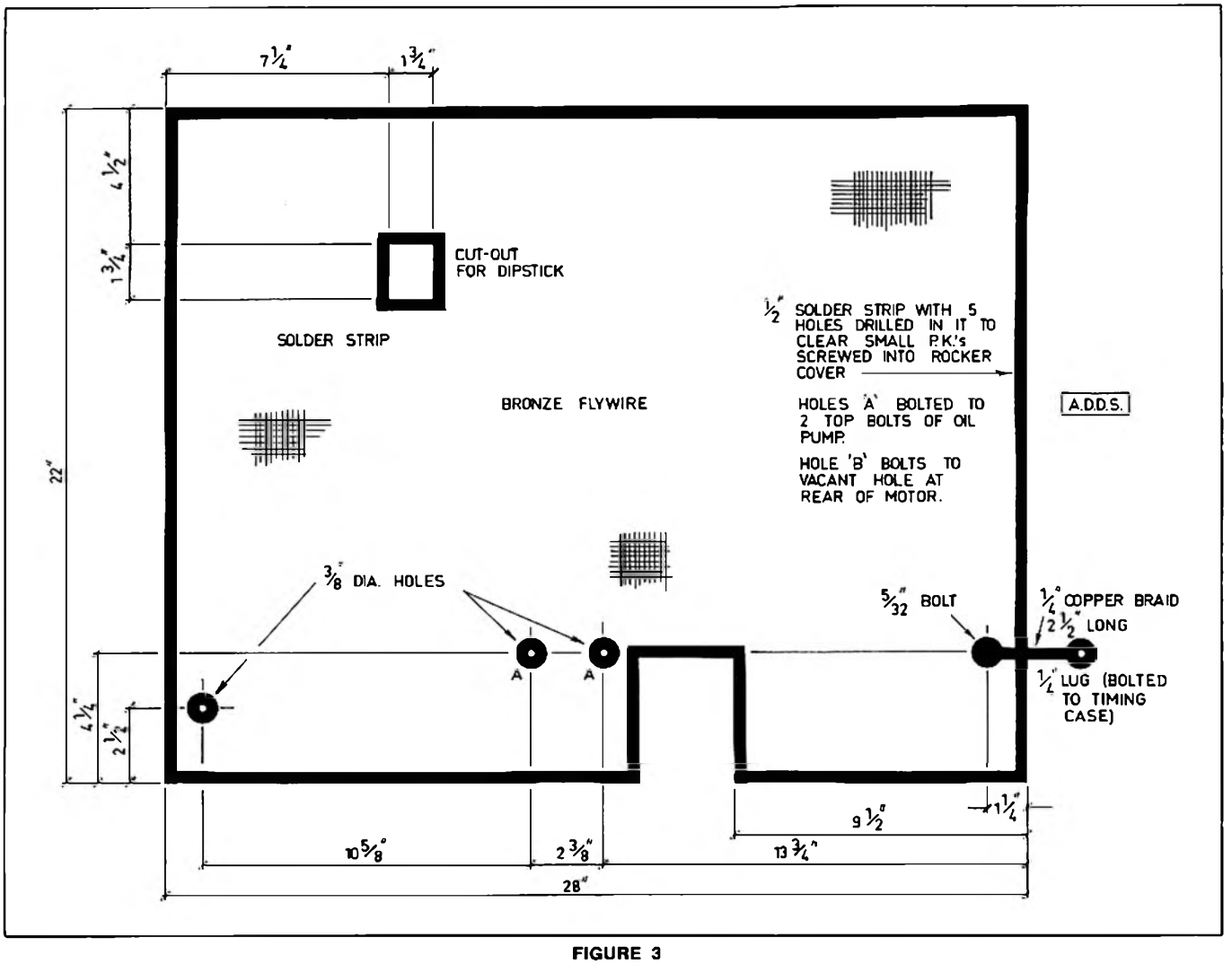

FIGURE 3

fly-wire, or if very fouled, replace it. This method of suppression is cheap and costs less than $30 for all of the items required including the regulator if needed. It is extremely easy to remove the shield for servicing — just remove 5 screws and undo 4 bolts and the shield comes out. The carbon trace leads must be retained on the ignition system for the shielding to work.

References to read for further information are:

A.R. March 1975, page 5 — Vehicle Ignition Noise Suppression, by R. Champness VK3UG.
A.R. Jan. 1975, page 17 — Ignition Noise Reduction, by G. Sones, VK3AUI.
A.R. July 1976, page 11 — Starting Mobile Operation, by Maurice Evered VK3AVO.

Some time back the author obtained a copy of "Eliminating Engine Interference" by John D. Lenk. This book does not seem to be available here in Australia and was obtained direct from Ham Radio Magazine for $U.S. 4.50. The book deals exclusively with interference, methods of suppressing it, circuits used in receivers to overcome some of the interference problems, and some of the suppression kits that are available in America. Vicom International and agents for some of these, and all are more expensive than the system just described. If you are serious about getting rid of interference from a mobile environment you should try and get this book. It is a Howard W. Sams publication and bears a number 21004 which could be a stock number. ■

TECHNICAL CORRESPONDENCE

The Editor,

Dear Sir,

The Audio Staircase Generator (AR Dec. 76) has been in use for over 12 months without any noticeable drift in performance or output bias level. However, on a couple of occasions, one of the multivibrators has failed to start when the power supply is switched on, on the "mains" side.

The reason is simple enough; there is no "self-start" circuit incorporated. In my case it is of little importance, as the unit is normally turned on by plugging it into a supply that is turned on already, and the sharp turn-on transient is sufficient to ensure reliable starting.

This may not be satisfactory for all applications, and a modification to the original circuit to include a "starter" gate is then necessary. Fig. 1 shows the func-

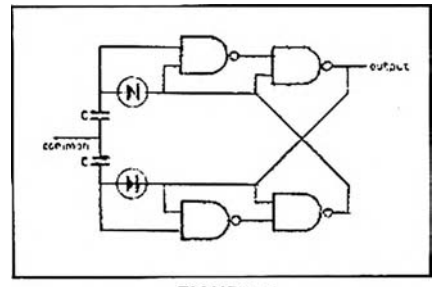

FIGURE 1

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QTR-24

24 hour World Clock

QTR-24

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Also shown in the photograph is the YO-100 monitorscope, FT-101E transceiver, YC-601 digital readout adapter and YP-150 dummy load-power meter.

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- KNOBS
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- MICRO PROCESSOR SYSTEMS
- MIXER P.A.
- PLUGS
- RACKS (EQUIP)
- RACKS ACCESSORIES
- RESISTORS
- SPEAKERS
- STANDS P.A.
- SUBCONTRACT
- TURNTABLES
- TERMINAL PINS
- WIRE ENAMEL
- WIRING FACILITIES

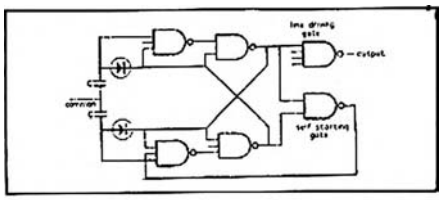

FIGURE 2

tional circuit of each multivibrator in the original circuit and Fig. 2 is the functional circiut of a "self-starting" unit that could be used. One of the advantages of the original circuit is that the whole circuit can be built around a 25c IC. Both these circuits are taken from a TTL Application Book published some years ago by Phillps.

Omissions from the circuit diagram in the December issue are the designation of an IC (MC 1496) and that pin 10 of that IC should be connected to the —5.1 volt rail.

Rodney A. J. Reynolds VK3AAR

NEW NOVICE OPERATOR

Victoria's first novice operator, Phillip Harden VK3NAA, operating his new transceiver. Phillip is active on 80, 15 and 11 metres.

PHIL VK3NAA USING A FT301

MOBILE WITH FT75B

TECHNICAL TIPS - CB STYLE

D. S. Down VK5I

Dedicated to:

The many radiating, spuriating, and nauseating illegal users of the "27 MHz Band", without whose untiring efforts, co-operation, excessive on-air time, and thorough lack of knowledge in the subject of Radio Communications, this would not have been possible.

Introduction:

The following pearls of wisdom are repeated as copied "off air". In the interest of furthering experimentation in Radio at the higher HF level, it is requested that selfishness does not prevail — SHARE the benefit of the extra knowledge you are about to acquire with others who may be blundering along aimlessly whilst adhering to conventional theory, and especially anyone you know who is studying for any Radio-type exams.

Tip:

1. "I've got hold of an old Army tank transmitter and receiver. It's 24 volts but I'm having the coils professionally rewound to change the circuit impedance to 27 Megs."
2. "Using a homebrew helical whip here mate. When I first made it for going mobile, I put it inside the boot to avoid detection, but it didn't work too good, so I've got it on the guard now."
3. "A five-eighth helical whip on a car roof acts like a panoramic reflector."
4. On hearing local diathermy activate near 27035 kHz, one op to another: "There goes that laser from WRE again."
5. On hearing high speed CW on 27035 kHz (VK5 amateur testing keyer) First op: "I wonder what that is breaking up on a carrier?"
   First op: "I wonder what that is breaking up on a carrier?"
   Second op: "Probably Telecom trying to DF us, but they can't because we haven't got CW fitted on our rigs. On the other hand, it might be one of the VK boys practising his morse. I don't think it would be Telecom or VNA5 practising because they don't need to."
6. One op ashore to another using hand-phone from boat off Glenelg: "If you want to improve the signal strength from your hand-phone, grab a bit of wire, plug one end into your aerial socket and hang the other end into the water so you turn the sea into a ground plane antenna. Should work good."
7. "The PMG and Telecom have ordered new snooping gear which takes photos of your transmissions, but it only takes one. Be another waste of our taxes because by the time they get the photos back, we'll be long gone."
   Second op: "Yeah, but they might have got one of those Polaroid things."
   First op: "Yeah — I didn't think of that. So I'm going QRT in case they're on."
8. "The VK boys use 100 watts of power. Some of them use more if they are using skip licences."
9. "I'm running a 6 channel Realistic into a 5 watt helical whip."
10. "I'm going to get a Ringo or Super maxim whip which will give me 4.8 dB gain, and if I feed it with coax I should get another 5 dB."
11. "The reason more of us are going SSB is because with SSB you get more bandwidth per frequency."
12. "As far as I know, the synthesiser mixes your AM and SSB to give more frequencies. That's as far as I've read so far, but when I've done some more, I'll pass it on."
13. Experienced (?) CB-er assisting newcomer during his first QSO and with brand new rig straight from carton: "The DX button, yeah, well if you want to work local up to about a mile, don't press it, but if you do press it, you'll bring on the skip and you won't do any good local."
14. "Glad I joined the CB club. It's a nice feeling to know you have a legitimate callsign at last."
15. One mobile op (stationary mobile) to another when first op jammed by VK5 on CW: "There goes that bad high tension from the light here — it's hard to tell the difference between high tension and CW these days. There's a lot of one and not much of the other."
16. "I'm going to fit a relay to my whip so I can hear while I transmit."
17. "I wish that b——— button pusher would pack it up, it's blokes like that who get us legitimate operators a bad name with the RIs."
18. "Don't give your 10^0 (location) he QSY to 14 and give it on SSB so the RIs don't hear." Second op: "Upper or lower sideband?" First op: "Upper." Second op: "Was that channel 14 come on?" First op: "1004." Second op: "1004, we're gone."
19. First op: "What's it mean about dBs with an aerial, come on?"
    Second op: "It's to do with gain — if you use more than one aerial you get more gain."
    First op: "1004. What's gain?"
    Second op: "I'm not sure."
20. Two ops arranging an eyeball QSO. First op: "What colour vehicle am I looking for, come on?"
    Second op: "I won't give that over the air for obvious reasons, but my rego number is R———." (Actual number given.)

Conclusion:

And I thought I was fairly well informed????? ■

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ASTRO—200 digital solid state 200 W PEP

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TRIO KENWOOD model TS-520 AC-DC transceivers 10 to 80 M

TRIO KENWOOD model TS-820—expected shortly.

HF RECEIVERS

DRAKE SSR-1 continuous coverage receiver

YAUSU MUSEN FR6-7. Uses Wadley loop principal

VHF TRANSCEIVERS

ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz

ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz

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Large number for all popular channels to clear

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AS-WW ⅝ wave 2 M mobile whip
AS-GM gutter clip mount with cable and connectors
M-Ring body mount and cap

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PROJECT AUSTRALIS

David Hull, VK3ZDH

FEBRUARY 1977

	OSCAR 6			OSCAR 7			
	Orbit	Time	Long	Orbit			Long
Date	No.	Z	°W	Date	No.	Time	°W
1	19652	01.01	74.60	1	10127	01.06	68.21
2	19664	00.01	59.60	2	10139	00.05	53.09
3	19677	00.56	73.35	3	10152	01.00	66.71
4	19690	01.51	87.10	4	10165	01.54	80.33
5	19702	00.51	72.10	5	10177	00.53	65.21
6	19715	01.46	85.85	6	10190	01.48	78.83
7	19727	00.45	70.85	7	10202	00.47	63.71
8	19740	01.40	84.60	8	10215	01.41	77.33
9	19752	00.40	69.60	9	10227	00.40	62.21
10	19765	01.35	83.35	10	10240	01.35	75.83
11	19777	00.35	68.35	11	10252	00.34	60.71
12	19790	01.30	82.10	12	10265	01.28	74.33
13	19802	00.30	67.10	13	10277	00.28	59.21
14	19815	01.25	80.85	14	10290	01.22	72.83
15	19827	00.25	65.85	15	10302	00.21	57.71
16	19840	01.20	79.60	16	10315	01.16	71.33
17	19852	00.20	64.60	17	10327	00.15	56.21
18	19865	01.15	78.35	18	10340	01.09	69.83
19	19877	00.15	63.35	19	10352	00.08	54.71
20	19890	01.09	77.10	20	10365	01.03	68.33
21	19902	00.09	62.10	21	10377	00.02	53.21
22	19915	01.04	75.85	22	10390	00.56	66.83
23	19927	00.04	60.85	23	10403	01.51	80.45
24	19940	00.59	74.60	24	10415	00.50	65.33
25	19953	01.54	88.35	25	10428	01.44	78.95
26	19965	00.54	73.35	26	10440	00.44	63.83
27	19978	01.49	87.10	27	10453	01.38	77.45
28	19990	00.49	72.10	28	10465	00.37	62.33
29	20003	01.44	85.85	29	10478	01.31	75.95

MARCH 1977

	OSCAR 6			OSCAR 7			
1	20015	00.44	70.85	1	10490	00.30	59.58
2	20028	01.39	84.60	2	10503	01.25	73.20
3	20040	00.39	69.60	3	10515	00.24	58.08
4	20053	01.34	83.35	4	10528	01.18	71.70
5	20065	00.34	68.35	5	10540	00.18	56.58
6	20078	01.29	82.10	6	10553	01.12	70.20
7	20090	00.28	67.10	7	10565	00.11	55.08
8	20103	01.23	80.85	8	10578	01.05	68.70
9	20115	00.23	65.85	9	10590	00.05	53.58
10	20128	01.18	79.60	10	10603	00.59	67.20
11	20140	00.18	64.60	11	10616	01.53	80.82
12	20153	01.13	78.35	12	10628	00.53	65.70
13	20165	00.13	63.35	13	10641	01.47	79.32
14	20178	01.08	77.10	14	10653	00.46	64.20
15	20190	00.08	62.10	15	10666	01.40	77.82
16	20203	01.03	75.85	16	10678	00.40	62.70
17	20215	00.03	60.85	17	10691	01.34	76.32
18	20228	00.58	74.60	18	10703	00.33	61.20
19	20241	01.53	88.35	19	10716	01.28	74.82
20	20253	00.53	73.35	20	10728	00.27	59.70
21	20266	01.47	87.10	21	10741	01.21	73.32
22	20278	00.47	72.10	22	10753	00.21	58.20
23	20291	01.42	85.85	23	10766	01.15	71.82
24	20303	00.42	70.85	24	10778	00.14	56.70
25	20316	01.37	84.60	25	10791	01.08	70.32
26	20328	00.37	69.60	26	10803	00.08	55.20
27	20341	01.32	83.35	27	10816	01.02	68.82
28	20353	00.32	68.35	28	10828	00.01	53.70
29	20366	01.27	82.10	29	10841	00.56	67.32
30	20378	00.27	67.10	30	10854	01.50	80.94
31	20391	01.22	80.85	31	10866	00.49	65.82

Amsat has announced two target dates for future satellites:—

1. AOD June '77.
2. Phase III December '79.

Thus it seems that Oscar 8 will be another low altitude short range satellite similar to Oscars 6 and 7. This news was somewhat disappointing to Project Australis as it was hoped that 8 would provide an increased range for VK satellite users and effort expended on another low altitude satellite must detract from the Phase III program. However, the importance of the ARRL schools program is recognised and the need for a continuing commitment to this will be met by AOD. It is hoped that in future programs will adhere more closely to the decisions taken at the international conferences and not be subject to post-conference ARRL pressure. ■

AWARDS COLUMN

Brian Austin, VK5CA

P.O. Box 7A, Crafers SA, 5152

EU - DX - D (GERMANY)

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. The award is an annual one and contacts made between 0000 1st January and 2400 31st December are valid for that year. The first year of issue was 1964 and contacts are valid from that year.
3. QSL cards must be submitted with the application.
4. Awards are issued for all CW, all telephony, 2 x SSB and mixed modes. The "mixed modes" award requires that at least 30 per cent of the contacts are on a mode different from the other 70 per cent contacts, e.g. 70 per cent on CW and 30 per cent on 2 x SSB.
5. The fee for the award is DM4, 10 IRC or equivalent and stickers are DM 0.80, 2 IRC or equivalent.
6. The EU-DX-D Awards Manager will provide application forms and a country list for 1 IRC.
7. The address for applications is:

   Walter Geyrhalter DL3RK
   Post Box 262
   D-895 Kaufbeuren
   Fed Rep of Germany.

Rules: Each country, which may only be contacted once per year, counts as ONE point, except on 3.5 and 1.8 MHz where each country counts as TWO points. The total points of each calendar year may be added together to obtain EU-DX-D 500 (points), for which an honorary label is issued, and for EU-DX-D 1000 (points), for which a trophy is awarded. The calendar years do NOT have to be consecutive.

Requirements: A minimum of 50 points are required in any one calendar year. 20 of these points are required from European contacts and 30 from non-European contacts. Stickers are issued for each additional 10 points in the ratio of 4 European contacts and 6 non-European.

Countries List:

CT1	IP	SV Crete
CT2	IS	SV Rhodes
DL/DJ/DK/DM	IT	TA eu part
EA	JW	TF
EA6	JX	UA
EI	LA	UA FJL
EI0	LA Bear Is.	UB
F	LX	UC
FC	LZ	UN
G	OE	UO
GC Jersey	OH	UP
GC Guernsey	OJ0	UQ
GD	OK	UR
GI	ON	YO
GM	OY	YU
GM Shetlands	OZ	ZA
GM Orkneys	OZ Bornholm	ZB2
GW	PA	3A2
HA	C/31 PX	4U1
HB	SM	9A1
HB0	SM1	9H1
HV	SP	
I	SV	

Countries outside Europe:
ARRL country list plus the following addition —
MP4D Das Island
UA0Y Tannu Tuva
VO Newfoundland and Labrador
VK7 Tasmania
VS9 Socotra Island
YN0 Corn Island
ZS3 Walfishbay

WALA AWARD — NORWAY

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 1-1-1950 are valid.
3. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. The award is issued for all CW, all phone or mixed modes.
5. The fee for the award is 5 crowns or 10 IRC.
6. The address for applications is:

   NRRL Awards Manager,
   Post Box 59,
   N-3251 Larvik,
   Norway.

Rules: Contacts with JW Svalbard, JW Bear Island and JX Jan Mayen count for the award.

Requirements: Stations must have confirmed contacts with 20 different LA (JW JX) stations on any bands with at least SIX located north of the Arctic Circle. The QTH must be indicated on the QSL card. ■

LARA

Ladies Amateur Radio Association

As we are now a month into the New Year, it may seem inappropriate to greet members with best wishes for the year but I am going to anyway. Lack of notes from LARA last month was due to the intrusion of academic priorities into my somewhat crowded schedule and we were too late for publication. Sorry.

With the new year it seems appropriate to introduce LARA to those who may not have heard of us. As our fairly self-explanatory title suggests, we are a group of YL's who are interested in some (or all) aspects of amateur radio. Any YL can join and levels of technical expertise amongst us range from extensive knowhow to cheerful ignorance. Those in the latter group, like me, are given much help in learning about amateur radio and some LARA members will be sitting exams this month. Best of luck to these intrepid adventurers! The rest of the time we manage to have fun and liven up the amateur scene. Members of the group have taken part in conventions and field days of other groups and also in the more humdrum field of Institute Organisation (and hard work).

Within LARA we keep in touch with a "regular" newsletter (regularity varying from once in six months to twice in two) and 80m skeds, weekly. Monthly, or so, meetings are held in some States and annual general meetings once a year, or so. Formalities such as membership enquiries or just getting in touch can be handled by Norma Boyle VK3AYL or Irene Robinson, who can be contacted through the Victorian Division of the Institute. For those just interested in hearing about LARA we can usually be found in the pages of this magazine, if the creative process can be sufficiently co-ordinated to get our efforts in on time. ■

CONTESTS

Kevin Phillips, VK3AUQ

Box 67, East Melbourne, 3002

CONTEST CALENDAR

February

5/6	ARRL DX Phone contest
12/13	*JOHN MOYLE MEMORIAL NATIONAL FIELD DAY
19/20	ARRL DX CW contest
19/20	YL - OM Phone contest
26/27	French Phone contest

March

5/6	ARRL DX Phone contest
5/6	YL - OM CW contest
19/20	ARRL DX CW contest
26/27	CQ WW WPX SSB contest
26/28	BARTG Spring RTTY contest

April

12/13	DX YL to W/VE YL CW contest
16/17	ARRL CD CW Party
23/24	ARRL CD Phone Party
26/27	DX YL to W/VE YL Phone contest

* Indicates a contest for the Contest Champion Trophy.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY 1977

This contest is on the week-end of 12/13 February. It is the second contest counting towards the 1977 Contest Champion Trophy, although only single operators will be eligible for trophy points. There is something for most people in this contest, whether they be a club group, single op., VHFer, home station, or SWL. So, if you have not already done so, dust the cobwebs off your rig, turn it on,

and work all your old friends and make a few new ones, too. And please submit logs to P.O. Box 67, East Melbourne.

BARTG SPRING RTTY CONTEST

Starts at 0200 GMT on Saturday, March 26, and finishes at 0200 GMT on Monday, March 28 1977. No more than 30 hours of operating is permitted. The 18 hour non-operating period may be taken at any time, but must be at least 3 hours at a time. Times on and off the air must be summarised on the log and score sheets. Bands used are the 3.5, 7, 14, 21, and 28 MHz Amateur bands. Stations may be worked only once per band. Countries will be taken as the ARRL Countries list with, in addition, each W/K and VE/VO call area counting as a separate country.

Exchange (a) the time GMT as a four figure number, and (b) RST and message number, consisting of a 3 figure group starting at 001 for the first contact made. Points are 2 for each 2 way RTTY contact within one's own country, and 10 for others. Bonus points of 200 will be awarded for each country worked (includes own country), claimed once per band. Continents may be claimed once only.

Scoring is (a) QSO points times total countries, and (b) total country points times bonus points (200), times the number of continents worked. Add (a) and (b) together for the final score.

Logs must be received by May 31st 1977. Use a separate log for each band. Logs must contain date, time GMT, callsign of station worked, RST and QSO number sent, RST and QSO number received, and exchange points claimed.

Logs should be sent to Ted Double, G8CDW, at Linden Gardens, ENFIELD, Middlesex, England EN1 4DX. ■

COMMONWEALTH CONTEST 1977

COMMONWEALTH CONTEST 1977

Australian participation in this contest has increased greatly over the last couple of years and 34 VKs sent in entries for the 1976 contest in which VK3MR took out 3rd place world-wide. (Results AR December '76.)

It is felt that the above 34 could easily be doubled if some of the many regular RD operators would lend a hand. The scoring system is a good one — chasing bonus points apart from contact points is a great interest in itself (a key also to success), and with the recent improvement in conditions on 10 and 15 metres, there is more scope in the bonus area than for years past.

Try it, you'll like it!

TIME

1200 GMT Saturday, 12th March, to
1200 GMT Sunday, 13th March.

MODE

CW only 3.5 to 28 MHz. Call is CQ BERU!

Eligible entrants are radio amateurs licensed to operate in British Commonwealth call areas. In the region, Lord Howe VK2, Willis VK4, Christmas 9, Cocos• VK9, Norfolk VK9, Heard VK0, Macquarie VK0, and Australian Antarctica, as well as VK1-8, are all separate contest areas.

Two trophies have been presented for competition between VK stations — a silver medallion for the highest VK scorer in the official RSGB results and a bronze medallion for a middle placed VK scorer based on total VK entries divided by two, that is for 34 entries, to 17th placing, for 53 entries, to 27th placing. Last year's trophy winners were VK3MR and VK5KL.

SCORING: 5 points for contest exchange, plus 20 bonus points for 1st, 2nd and 3rd contact with each call area other than one's own (there are 111 in all, with G, GW, GC, etc., counting as a single area) — exotic prefixes, A2, C6, 8P, 9L, etc., are the rule rather than the exception.

LOGS: Separate logs are required for each band showing columns — 1. Date and time GMT; 2. Station worked; 3. NR sent; 4. NR received; 5. Band; 6. Leave blank; 7. Contact points claimed; 8. Bonus points.

Each band log should be separately totalled and should include, at the end, a check list of areas worked on the band. Separate band totals should be added together and the total claimed score entered on a cover sheet, giving particulars of station, QTH, equipment, power, and a declaration that the rules and spirit of the contest have been observed.

Entries may be single or multi-band. Single band entries should claim entries on one band only, but submit details of contacts on other bands for checking only. Entries should be addressed to

D. J. Andrews G3MXJ,
18 Downsview Crescent, Uckfield,
Sussex, England.

Closing date 16th May 1977 (by airmail, please). ■

AROUND THE TRADE

A letter received from Mr. G. P. Fitzpatrick (Network Engineering and Building Company) states that they hold quantities of Teletype Model 15 RTTY machines and are the main source of these machines in VK. These machines are given a pre-sale check and set to 50 baud. Mr. Fitzpatrick is seeking information on electronic speed controls for RTTY machines. He also suggests that the company may offer a Teletype machine as a competition prize.

Write to P.O. Box 99, Pyrmont, N.S.W., 2009. ■

AMATEUR COMMUNICATIONS ADVANCES (P.O. Box 57, Rozelle 2039) advise that they have available RISTON pre-coated pc boards. Riston is a dry photo-sensitive polymer film. A negative of a pc board is placed over the Riston coated board which is then exposed to sunlight or a UV source. This causes the Riston to harden. The unwanted resist is removed by a developer and the board etched. The board is then cleaned in acetone. One advantage claimed for Riston is its insensitivity to over-exposure. ■

PROJECT AUSTRALIS

IARU NEWS

From Region 2 news of Nov. '76 comes news that during Sept. '76 IARU President Noel Eaton VE3CJ and Region 2 President Vic Clark W4KFC visited Malta after the all Region Conference in Geneva then onwards to Eastern Europe, where they held conferences with officials of the Radio Sports Federation in Moscow and the equivalents in Rumania, Hungary and Bulgaria. Wide-ranging discussions were held at each point regarding plans for WARC '79, growth and development of the world-wide amateur radio service, and means for achieving strengthened liaison among the IARU member societies of the world.

Each of the Eastern European societies had been represented at the IARU Region 1 conference in Warsaw last year and each has indicated support of plans to seek exclusive and additional world-wide amateur frequencies.

Amateur radio was reported as thriving and growing in each of the countries visited, with Government encouragement and support being provided in the form of electronic components and equipment, society headquarters and club station facilities, as well as national recognition of accomplishments in amateur radio activities and competitions.

Characterised as a "radiosport", amateur radio in the Eastern European countries is valued both for its technical training attributes and the opportunities which are provided for developing operational skills through on-the-air contests, fox hunts and code speed competitions.

The amateur radio service is growing at a rate of from six to ten per cent per year in the countries visited, with increasing interest being exhibited in more exotic transmission modes such as SSTV and satellite operation.

Amateur radio in these countries makes effective use of club stations in which newer amateurs are provided with supervised on-the-air training activity. A large part of the population lives in high rise apartments in which antenna possibilities are limited by the hundreds of TV antennas that sprout from the roofs, so the ratio of club to individual stations tends to be greater than in western countries.

In certain countries a beginner is given the parts and materials to construct his equipment and a six months period in which to complete the job, as a prerequisite to becoming an amateur.

News from a reliable correspondent in Africa indicates that amateur radio appears to have been banned in Malawi from about mid-1976. The reasons are not known. He also says there are now no radio amateurs operating from Angola, Zaire, Mozambique, Tanzania, Zanzibar, Rwanda, Burundi and Somalia. It is presumed that none will be operating from Uganda, Ethiopia and Djibouti (Afars and Issas) but this is conjecture. ■

REPEATERS

Ken Jewell, VK3ZNJ
Peter Mill, VK3ZPP

The problems of keeping a column going are not made any easier by the complete lack of information and this leads me to my opening remarks. In this column we print only the facts that are supplied to us by the repeater groups and not grapevine data that is freely given away by so-called informed people. Those of you who have purchased the Electronics Australia Yearbook should carefully study their repeater listings and compare them with those that have appeared in AR. A large number of discrepancies will be noted and unfortunately people who believe that it is correct will act on that information. A question was asked by the South Australian Repeater Committee, "What happened to our communication pipeline?" Well, that is a good question. If nothing goes in then nothing comes out, and after 10 months we have found out about all their repeaters in that State. Also if any committee in each Division wants to know what is happening on the repeater scene then we suggest they contact their Federal Councillor who receives copies of the Minutes of the FRC meetings.

QUEENSLAND NEWS

My thanks to George VK4ZMG for his letter bringing me up to date on the repeaters in his State. In Queensland there are now 9 repeaters in operation, or in the planning stage, both VHF and UHF, and an updated listing will appear at the end of the column. Since our last listing the Townsville, Ipswich, and Toowoomba repeaters have advised that they are operational, but there are no details to hand about the equipment or operational features. Could someone please assist?

VICTORIAN NEWS

In the continuing saga of the Mt. Macedon repeater, which is threatening to hold the record for the longest times coming, they now have the receiver to go with the site, tower and antennas. When Peter VK3ZPP sorts it out there is only the Tx and Controls to go. Perhaps by Christmas? The Ballarat gang have moved their repeater to a new site on Mt. Buningyong and are getting coverage up to 80 kms. Their licence application is with the P. & T. Department and should be through soon. Up in the north-east the Mt. Big Ben repeater is not too far away as the site has been completed and the tower and antennas are well on the way. At Geelong we have been suffering with our seasonal problems which I hope has been fixed again when you read this. The Country Fire Authority have a radio which is taken up to Mt. Anakie each summer. This set has a local oscillator chain that has an output 4 kHz away from the input of the repeater, causing the repeater to lock on and time out. The UHF repeaters in Melbourne are both in a state of flux with the experimental station of the 70 cm Group VK3RAD located at Doncaster giving a very limited range. A new site is being investigated. Because the 70 cm group was given the prime national repeater frequency as they requested, the service repeater for Melbourne will be on a secondary channel which is used elsewhere in Australia. At the time of writing the equipment for the Melbourne service repeater was being prepared and the keyer for VK3RMU was needed to complete the installation. Finally, the annual State repeater meeting is to be held soon and agenda items are invited to be submitted to the secretary, VK3AAA, 57 Race Street, Bendigo, Vic. 3550.

SOUTH AUSTRALIAN NEWS

The mid-north repeater near Pt. Pirie, VK5RMN, is now on the air after a battle over the site with 3 government departments for 2 years. The equipment is all home brew exept for the Tx

exciter which is a Phillips 1680. The final is 2N5590 at 10 watts output. The receiver is a VK5ZHF design and a diplexer is used to feed the station to the Hustler G6-144 6 dB gain antenna. The operating conditions of this repeater, such as time out and identification, are similar to those of the Adelaide repeaters. The second Adelaide repeater VK5RHO was originally planned to operate on channel 46 but due to a problem with harmonics from a commercial site, channel 45 is being used. Once a significant number of stations have been equipped with the new channel, VK5RAD will be taken off the air for a face lift. Perhaps by the time you read this the Mt. Gambier repeater will be on the air as it was originally planned to be on for the convention last year. ■

QUEENSLAND REPEATERS

OPERATIONAL

CALLSIGN	Ch	LOCATION OR SERVICE AREA	TYPE OF IDENT	RANGE	PROJECT OFF.
VK4RBN	48	Brisbane/Mt. Glorious	Audible	80 km	VK4ZMG
VK4RGC	42	Gold Coast/Mt. Tamborine	Audible	60 km	VK4ZDA
VK4RAR	42	Rockhampton/Mt. Archer	Audible	80 km	VK4MM
VK4RAT	42	Townsville/Mt. Stuart	Audible	75 km	VK4XZ
VK4RDD	44	Toowoomba	Audible	80 km	VK4ND
VK4RAI	46	Ipswich	Audible	60 km	VK4CCR
VK4RGC	322/822	Gold Coast/Mt. Tamborine	Audible	?	VK4ZDA
PROPOSED					
VK4RBU	44	Bundaberg/Mt. Goomamemah	Audible	?	VK4GI
VK4RBC	352/852	Brisbane	Audible	30 km	VK4ADC

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

35 Florabella Street,
Warrimoo, N.S.W. 2775.
30-11-76.

The Editor,
Dear Sir,

I really think it is time I voiced my feelings about this so-called CB Radio in Australia.

After listening to 27 MHz last Sunday, I was appalled to hear the large volume of so-called CB activity. There is absolutely no doubt in my mind that this activity is not CB. Far from it indeed. Let there be no qualms about the fact that these operators are unlicensed amateurs with all the privileges of the Novice on 27 MHz. Certainly they are not operating as CB-ers. Listening to their talk it is hard to distinguish them from the real hams, the only difference in many cases being their phoney call signs; and the activity is not just males, quite a good proportion of girls were heard working their own stations. What is really galling is their apparent freedom to work DX, many with home built beam antennas. I heard an enormous number of VK2's working VK6's, VK5's VK3's, VK4's and some boasting of their DX contacts overseas, into Europe, ZL and VK7 and Japan. I like to work other legal hams on 27 MHz myself and I also like to work and encourage the Novices who appear on 27 MHz, but I was shocked to hear Novices, both CW and phone being severely interfered with by very heavy QRM from the pirates. They run 5 and 7's to 5 and 9's signal strength and 5/5 to 5/7 on DX in some cases.

I understand the WIA has no real policy regarding CB activity in Australia. This really rocks me. I think too many influential people who should sound a louder, sterner, more discenting voice, are taking too soft a line against illegal CB. Get cracking and be more energetic and active in trying to put CB, if it is to flourish, in its right place. Try even, a few articles in the newspapers!

Another disturbing note was realised when I walked into two large electronics retail stores in Sydney recently and witnessed the blantant way CB equipment is being sold over the counters.

Many real hams have voiced their concern over the ham bands and it is now time to act before we all, WIA included, regret out indolence or our tolerance, or whatever it might be called.

Frank Wright VK2BZ. ■

The Editor,
Amateur Radio,
Dear Sir,

On behalf of a large number of members of the WA VHF Group, I express concern at the new rules for the Ross Hull VHF Contest 1976-77. The rules deny any recognition to the challenges associated with frequency and distance.

It was my understanding that one of the main purposes of this contest was to encourage activity on all VHF/UHF bands; to have amateurs improve the technical performance of their equipment and to explore propogation characteristics. The scoring system announced without warning does not give all amateurs a chance to participate with the thought of winning.

The VK6 call area is the largest in Australia, and the minimum distance for any contact to a new call area from the south-west of this State is over 2000 km — contrast this with all other VK call areas!

VK6 amateurs will be there to work DX — but as for the contest — it's another reason to secede! Please restore incentive for acitvity on higher frequency bands and give a bonus for distance worked — not according to political boundaries of of call areas!

W. J. Howse VK6KZ on behalf of: 6MR, 6AU, 6ZDY, 6ZKO, 6ZGG, 6ZFY, 6SS, 6ZBW, 6BY, 6CU, 6KZ, 6ZKV, 6ZED, 6ZAC, 6ZKF, 6IQ, 6ZDN, 6ZAF, 6ZEG, 6YL, 6PD, 6TZ, 6ZDU, 6ZIS, 6ZIH, 6ZFO, 6DS, 6ZDO, 6ZBE, 6WG, 6WH, 6VF. ■

The Editor,
Amateur Radio,
Dear Sir,

The following account of a recent experience might provide food for thought in the current controversy over CB radio.

I walked into the store of a well known supplier of electronic gear and stood waiting to be served by a salesman who was already serving a rather scruffy looking youth. On the counter between them, there was an imposing-looking range of gear consisting of a so-called CB transceiver, a mobile antennae and base to suit, and co-ax cable and plugs. The customer was in the process of paying over money for the gear. I overheard the following conversation between the salesman (S) and the customer (C):—

S: "You will get a lot of fun out of this gear. Everybody's in it now."
C: "Yes. A lot of my mates are in it. While I'm here, could you tell me how to hook it all up?"
S: "You won't have any trouble. You can mount the transceiver anywhere in your car where you can get to it easily. Then take this cable through and connect it to your battery. Then mount the antennae on the car. It would be best on the top of the roof. Then run this cable down into the car and connect it up to the transceiver with this plug."
C: "How do I connect this plug to the cable? Does it just screw on like a power point?"
S: "It's a bit more complicated than that. One of your friends would probably be able to show you how to do it. If not, you could bring it back in and we would do the job for you."
C: "How do I work the set?"
S: "It's very easy. You just turn this switch on to one of the channels. Some of these channels are for America, so you won't get anything on them, but just switch it around until you hear someone talking, and then you can talk back to them."
C: "What do I say?"
S: "Just talk the way you usually do to your friends. Be sure to press this switch on the side of the microphone when you talk, otherwise they won't hear you."
C: "I'm glad you told me that. What do I do if I can't hear anyone?"
S: "Just say CQ followed by your call."
C: "What's a call?"
S: "That's your call sign. If you don't have a licenced call sign you just make one up for yourself. If you listen to other people talking, you'll see how it's done."
C: "I don't have a licence, so I'll have to make one up. Is there anything else I should know?"
S: "No. You'll pick it up as you go along. After you've listened to others for about an hour you'll see how it's done. By the way, when you switch to this channel here, you might hear a beep beep now and then. Don't take any notice of that. It will only be one of the hospitals. They won't worry you too much, and if you talk loudly enough you'll get through. If there is too much beeping, just switch to another channel."

At this point I pocketed my meagre list of required components and walked out in disgust. As one who had a long hard grind with the AOCP, not to mention the inordinate delays in the conduct of examinations and the marking of papers, I did not think it would be wise to trust myself to deal with the salesman in the frame of mind which I had developed during the course of the overheard conversation.

Fred Herron VK2BHE,
President, Summerland Radio Club.

The Editor,
Dear Sir,

I herewith protest most emphatically concerning the insertion in December 1976 AR of the advertisement by Audio Telex Communications Pty. Ltd., which faces page 11.

I draw your attention to the fact that this CB advertisement has no place in AR, regardless of the income to the WIA which it provided.

There is such a thing as tainted money and this advertisement which is purely CB should not have been accepted.

This probe by the CB industry and perhaps by the Federal Executive is not going unchallenged.

Should this practice continue then reaction and retribution will surely follow.

Advertisement of CB equipment as suitable for Novice use, and so stated, in combination with items of specialized amateur VHF and HF equipment are tolerable. However, advertisements relating solely to CB equipment and without the CB references deleted, are not, in my opinion, admissible in AR, regardless of loss of revenue.

Please note that my concern is with the principles and ethics of advertising involved here and in no way is any criticism of the item of equipment, its suitability for amateur use, or its technical specification implied or should be inferred.

Finally, may I stress this point, that any repetition of 100 per cent CB advertising in AR will inevitably require a re-evaluation of the intent and integrity of the entire Federal Executive the WIA by the membership.

Sincerely yours,
George Harmer VK4XW, MWIA, Qld. Division ■

The Editor,
Dear Sir,

My recent letter to the editor on morse code has brought no response that I am aware of in the various groups who send slow morse tuition to would-be amateurs. There are a few other points perhaps that need to be stressed as well as those previously expressed.

A variety of tuitional groups conducting theory classes for the amateur and novice have approached the Postal and Telecommunications Department for syllabuses for these exams. Why? I can only assume so that they then know exactly what to teach the prospective amateurs the things they are likely to be asked in the examination.

However, apparently this query has never been presented in relation to how the morse code is to be sent at the exams. Strange, you would think tutors would want to prepare their students so that they would PASS the morse examination. After all, isn't the name of the game to get as many students through the examinations whether the subject be theory, regulations or morse?

This hysterical attitude on the part of many tutors and other so-called experts that the morse

ELECTRONIC ENTHUSIASTS EMPORIUM

ITEMS OF INTEREST TO HOMEBREWERS. See current issue "Electronics Today International" for more detailed listing of components.

TRANSISTORS

BC107	.19
BC108	.19
BC109	.19
BFY50	.75
MPF102	.55
MPF103	.85
MPF104	1.10
MPF105	.85
MPF106	6.0
MPF131/121	1.30
2N706A	.95
2N918	1.60
2N2222A	.95
2N2905	.95
2N3638A	.50
2N3642	.45
2N3819	1.25
2N5245	.65
2N5590	7.75
2N5591	9.40
2N6084	17.50
40637A	2.85
40673	1.65
40841	1.50
MRF603	7.90

74 SERIES TTL

74S00	1.15
74S74	1.80
74S112	2.50
74S196	5.95
7400	.39
7404	.39
7474	.69
7489	3.90
7490	.65
74121	.75
74145	1.95
9001	1.50
9368	3.20
74C90	1.95
82S90	5.95
9SH90	P.O.A.
11C90	P.O.A.

PC BOARD

FIBREGLASS —

4" x 3" S.S.	.75
6" x 4" S.S.	1.20
6" x 3" S.S.	1.20
6" x 6" S.S.	1.60
8" x 6" S.S.	2.20
12" x 4" D.S.	2.90
12" x 12" D.S.	6.00
6M CONVERT	2.50
2M CONVERT	2.50

LINEARS

CA3018	3.50
CA3028A	1.80
CA3089/LM3089	2.90
CA3130/T	1.85
CA3140/T	1.65
LM370	2.95
LM373	4.70
LM555	.95
LM556	2.75
LM562B	9.50
LM565	2.90
LM567	3.50
LM723	.95
LM741	.49
LM1496	1.80
LM3900	1.75
MC1350	1.60
MC1351	1.95
MC1468	6.50
MC1648P	P.O.A.
MC7805	2.50
MC7812	2.50
MC7815	2.50
SG3009K	1.95
TAA300	2.90
TBA651	3.90
UA720	3.80
ZN414	3.95

DIP SOCKETS

8 PIN	.38
14 PIN	.39
16 PIN	.45
24 PIN	.78
40 PIN	1.25

TOROIDS, etc.

IRRESPECTIVE OF MIX

T-12	.70
T-25	.75
T-37	.80
T-50	.85
T-68	.95

COIL FORMS

NEOSID772/1	.20
5027/6PLB	.20
7100CAN	.20
5200/8PLB	.25
7300CAN	.25
F16 or F29	.12

DIODES

ZENERS 400MW	.35
ZENERS 1.3W	.72
BA102	.60
BB105G	.85
EM402	.20
EM404	.20
EM408	.35
IN914	.10
MV140I	P.O.A.
OA47	.45
OA90	.25
OA91	.25
PA40	4.90
2530	.95
2530R	.95

MISCELLANEOUS

SO239	1.50
PL259	1.50
BNC Plug	2.30
BNC Sockets	1.60
7 Seg Displays	2.50
Miller Coils	Indent
A.R.R.L. Publications	See E.T.I. or write

BOXES

108 x 108 x 50	2.50
216 x 108 x 50	3.75

INSTRUMENT BOX

160 x 160 x 70 (Black/White)	5.90

12 OR 24-HR. CLOCK

MA1002 Module. Transformer. Bits. Pieces. Data. but not case (specify version)	27.95

VALVES

6DQ5	7.25
6GK6	4.95
12BY7A	1.95
OD3	P.O.A.
7360	7.65
*QQE06-40	34.90
*6146	8.90
*6146B	9.70
*6939	16.35
*4-125A	63.90
*4-250A	71.90
*6JS6	P.O.A.

* Indent only.

SEND NO MONEY

Where QTHR, simply order by mail or phone and pay on Invoice. No charges. No Post/Pack under 500 g (1 lb.)

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must be their own particular brand is a bit like saying you're going to drive on the right side of the road in a country where the law says that all vehicles must stay on the left side of the road. Sooner or later you will hit or be hit by someone who is abiding by the road law, you could be dead unlucky. Is it therefore not unreasonable to expect that there is some recognised morse standard — there is and it is specified exactly in the International Telecommunications Union Telegraphy Regulations. Australia, along with most of the countries of the world, is a signatory to the ITU. The morse code characters and spacing is specified as follows where the dot is considered the unit of character length:—

The length of the space between elements of a letter equals a dot, a dash equals 3 dots, the space between letters equals 3 dots, the space between words equals 7 dots.

Many instructors say that the characters should be sent fast with big gaps and that as the speed is increased the spacing between letters and words is reduced. That is all very fine if you are being taught morse for the Services or such like where they train you for a specified terminal speed. But for amateur purposes what speed will be your terminal speed 5 wpm, 10 wpm, 30 wpm? Perhaps the terminal speed should be 5 wpm for Novice with characters sent at 5 wpm rate when you are sending 2 wpm and gradually reduce the spacing until 5 wpm is being sent. 10 wpm more terminal speed could be sent at 10 wpm character rate at 6 wpm, gradually reducing the spacing until 10 wpm is reached.

To would-be full call amateurs, and novices, I suggest that it is a waste of the tutors' time, your time and the examiners' time if you are taught on non-standard morse — after all, you do want to pass that pesky morse exam. If your tutor sends the wrong morse, change tutor or ask him to send ITU morse. Whether the morse should be ITU standard or not is immaterial, the point of the exercise is to pass the exam and if it is sent ITU standard, as I gather it is, learn it to that standard. One final point, stop whingeing and griping about the morse exams, if you do some practice and will yourself to pass, you will.

Yours faithfully,
Rodney Champness VK3UG. ■

The Editor,
Dear Sir,
I would like to comment on Chess via Amateur Radio AR January '77.

To play or Not to play? That is the question.

To play? — Back in August '72, VK9GN, Gene in Ukaraumpa called CQ Chess CQ . . . on 20 m. Intrigued, I replied and from then on some very enjoyable and challenging times ensued.

Later, Dave VK8DO, Jim VK6JX (Kalgoorlie) and Bruce VK5OR joined in.

Calls from VK, ZL, K, Europe, and Asia were acknowledged, Central Europeans and Russians were most interested as chess is their No. 1 pastime. Gene and I had all the DX we wanted between moves.

On one occasion VK8DO and VK9GN were in session, I tuned just in time as QSB between Darwin and Ukarumpa was making hard copy and stood by relaying moves, 8000 km for each move. Dave and Gene finshed the game.

Not to play? — About mid '74, the axe fell! Bruce and I were playing on 40 m, a good band for VK3 and 5. Some days later I received a notice from our Advisory Committee stating that playing chess on the Amateur Bands was forbidden and that call signs were not given at the required periods.

I assure you, identification was given at the correct time. There were intervals between moves but the frequency was clear. We had to QSY many times to finish the games.

Naturally we abided by the ruling and as not to tempt the wrath of officialdom to descend upon us, went QRT on chess.

There is one thing for sure. I really miss that familiar "Pawn to Echo 4".

73. Len Pearson VK3LP. ■

The Editor,
Dear Sir,
After reading the motion passed by the Moorabbin and District Radio Club (December '76 AR), several thoughts come to mind.

Firstly, why should the amateur service just freely give up its 27 MHz allocation just because some so-called Citizens' Band service would like to have it, so some retailers can line their pockets with the great god "money". If the amateur service freely gives up 27 MHz then why don't we just give away 40 metres as well, after all the commercial intruders won't go away, and what of 15 metres, might as well give 15 up as well, there's not much activity at the moment. Why don't we amateurs just give up all our frequency allocations to any other service that may lay claim to them?

I can't for the life of me see a CB type progressing on to an amateur licence. Surely with the Novice scheme now operating anyone who is "fair dinkum" would study for the Novice licence and not opt for a CB licence.

While I don't oppose the principle of a so-called citizen's band service with its dubious advantages to the community, I do most emphatically object to its establishment in an amateur band.

If such a CB service is needed, then why not establish such a service in a higher part of the frequency spectrum where it could provide a constant short range reliable communications system.

It's about time we stood up and fought to retain our frequency allocations, rather than lying down like "a damp squid" and giving our bands away to any other service that may lay claims to them. If we lose 27 MHz to these poachers, without so much as an argument, then why won't we lose any other band for any other reason to whoever might want it.

Glen Molloy VK2AGM. ■

QSP

PROGRESS

Pat Hawker writing his T.T. column in January '77 Radio Communication has this to say on the subject of how good is good enough —

"The other day, reading an excellent and informative article on optimum HF receiver design by Ulrich L. Rohde, DJ2LR ('Ham Radio' October 1976), I found myself thinking 'how good is good enough?' The solid-state techniques described by DJ2LR are basically those which have gradually gained acceptance for the very highest quality professional general-coverage receivers costing thousands of pounds: up-conversion to VHF, rooling as well as selective crystal filters, elliptic filters, etc. While we would certainly not wish to deter anyone from tackling the design and construction of such an advanced receiver (though we still feel that for an HF amateur-bands receiver an I.f. of 9 to 10.7 MHz is probably high enough and presents fewer problems) we suspect that only a handful of amateurs could or would complete such a project, although of course many will wish to understand such trends. For many years the electronics of communications equipment has been getting progressively more and more complex and less and less within the economics (and sometimes the understanding) of the average amateur. Yet the competitive nature of amateur operating has encouraged the view that we all need 'optimum' equipment. Sometimes it seems that everyone is having to run faster and faster to stay in the same place; not only ever more complex receivers and transmitters but also all the ancillary equipment to go with them.

Now if an amateur wants to buy a fully-equipped, all-mode, highly-professional station, that is his or her affair; my concern is rather that we need to reassure newcomers that they do not have to spend a mint of money to take any sort of active or useful part in the hobby — plus sometimes a worry that the whole hobby may eventually blow itself up by trying to become too professional, at professional prices."

He concludes his remarks with these observation:—

"So, sure; as amateurs we need good equipment; and we need many of the latest techniques. But we also need occasionally to ask ourselves just how good is good enough. If not we risk 'galloping obsolescence' and biting off more than we can chew in seeking 'optimum' equipment. Then again, do we really need to eliminate manual controls and adjustments and human skills in dreaming of running our stations from microprocessors and electronic memories? After all, amateur radio is still a hobby for humans — not yet for computers." ■

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	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

The two six metre beacons in the Antarctic area previously listed in these pages have now been removed from the listing. Talking with VKOLD recently on 20 metres I asked about the present state of the six mtre beacons down there and was advised there are none, so they have been withdrawn for the time being. I have also been advised that the Townsville beacon on 52.600, VK4RTL, is temporarily out of commission due to some TVI problems. However, as you will not read this before February, it is possible it will be in operation again by then, so the listing continues, but would ask if it is closed for an indefinite period would the custodians please advise me accordingly.

The Palmerston North beacon on 52.500 ZL2VHP has been heard on a number of occasions throughout November and December, quite often with signals to S7.

SIX METRES

Well what a DX season! Truly something like the old times with all States being available during a single day many times. As I reported last month, the good openings started a little later this year, but with the thus expected result that they would be good, and they have been. One of the more consistent signals around has been Ken YJ8KM in the New Hebrides, who has been worked in all States, with signals to S9 at times. The distance from VK5 to Ken is about the same as New Zealand, 2000 miles or 3400 km. New Zealand stations have been heard with greater regularity this year, either there are more stations keeping on the air or conditions are better looking that way. All call areas ZL1 to 4 have been worked. An interesting feature of the stations worked in the New Hebrides and New Zealand has been the signal strength, many dB over S9 at times, which is a bit rare in VK5 anyway. Most double hop transmissions run around the S7 mark due to attenuation through the second hop. This leads one to believe that the signals this year on the 2000 mile circuit have been by some mode which does not involve second hop, like extended Es. The same has applied to P29, well over S9 at times. On all these paths, however, there have been strong signals also from the intervening distances, while YJ8KM has been S9+, then so have been the VK4's, when ZL is 9+ so is VK7 and so on. However, there has been a noticeable absence of strong VK3 signals, indicating a lower overall maximum useable frequency (MUF), usually around 90 to 100 MHz for these type of openings.

Nevertheless, many tries have been made on 144 MHz to other call areas without avail under these conditions. However, on 16/12/76 conditions improved still further, the MUF rose right up to about 180 MHz for about 20 minutes in VK5 around 0000Z when the following events took place: David VK5KK copied the Ipswich repeater VK4RAI Channel 6 at S9+, and the Gold Coast repeater VK4GC at S5 which may be a private repeater. However, he could not raise anyone as they were unoccupied at the time. By this time we had John VK5ZBU and Rod VK5ZRK nosing around on 144 MHz with the result they were able to get two of the Brisbane boys who were very strong on 6 metres, to come down to 2 metres. David VK5KK worked Rod VK4ZRQ 5 x 9 and Neville VK4ZRQ 5 x 7. At this time John VK5ZBU was not hearing the VK4's, first they rose sufficiently for Rod VK5ZRK to work them at 5 x 9, and soon after John VK5ZBU the same. Finally Clem VK5GL came on and worked them. Rod VK4ZNC was using 400 watts PEP, John VK5ZBU and Clem VK5GL each 2½ watts from an IC202. Band closed 0026Z. There were no other stations around to work either way, but this is understandable due to it being a Thursday. Both David and John commented on the very selective pattern of availability of the signals, moving from one area to the next adjacent, etc. Good work, chaps, it shows what you can do when the band opens and you are there. As we usually only have one such Es type opening each year, I guess that will be it for this time. In passing, it may be of interest to advise readers that at the time of the 2 metre opening, Channel 7 TV in Adelaide did have the usual line pattern on it similar to that observed on Channel 2 more frequently, giving proof of a very rapid rise in MUF. But it didn't last long.

Excellent strength 6 metre signals have been emanating from Tony VK6BV at Kalgoorlie this year, better than ever, and Perth has also been good, again a further series of good long distance signals.

SIX METRE JOTTINGS

The following snippets of information have been taken from things heard on six metres during openings; they may be a bit jumbled but generally of interest to the VHF operator . . . P29MJ is now VK7MC . . . ZL3QK available in VK5 for more than 3 hours on 21/11 up to 5 x 9 . . . Mike VK2AM in Sydney reports SSB 2 metre activity quite high there . . . ZL1QI excellent signals with only 6 watts . . . 23/11 Jim VK5ZMJ worked ZL with only 3 watts . . . Lance VK4ZAZ long remembered for his famous AM signal worked using SSB, but AM transmitter not wrecked, merely in mothballs . . . 1/12 VK6BV and VK6XY both worked YJ8KM, signals 5 x 4 . . . later to Harry VK6ZZ . . . Peter VK6ZDY interested in 6 metre meteor scatter skeds, please contact . . . 5/12 YJ8KM into Perth again 5 x 9, that's nearly 5500 km . . . 1/12 Geoff VK8ZGF worked for first time this season . . . 10/12 reported ZL's copied VK5 Field Day stations on 6 m . . . Bob VK5ALV worked from Marree 700 km north of Adelaide, first known operator from that area . . . Ken YJ8KM reports nothing heard so far of the beacon in Suva 3D3AA . . . News came to hand of VK9ZM on Willis Island operating 53.1 and 52.525 . . . Albert VK2ZFB observed back on band with FT620.

What has been of interest this season are the large number of low powered stations operating, many with IC502's, etc. In a brief look down through my log book I note ZL1QI 6w, VK2ZAF 3w, VK7ZMM 3w, VK4ZWP 5w, VK2ZIB 2w, VK2ZAY 1w, and lowest of all Rod VK4ZRQ 50 mw! Rod's signals were 5 x 7, so that's not a bad effort. There are of course large numbers of other low power stations not necessarily documented plus the army of stations using FT620 or TS700 gear running 10 watts. All this is very fine when band conditions are good, but operators running QRP rigs to only quarter-wave whip aerials make the going tough at the other end when conditions are not optimum. How about an improvement in the antenna department you guys, say a 4 element beam — it will work wonders with your small rig, and will be heard better under poorer conditions. There is absolutely no doubt in my mind that since the advent of high power stations with large antenna systems located in good areas, we are finding 6 metres in particular is available for operation for many more hours than previously imagined, and it is still the same ops. who can be worked when there are no other signals, simply because of the improvements to the station equipmnt. There is a chronic shortage of QQE06/40 valves for linear amplifiers these days, but readily available 30 to 40 watt transistors which make nice linears can be purchased for less than the cost of a 6/40. From the time you read this you will have 9 months to build one before regular band openings commence at the end of 1977, so why not get into it now?

Still on six metres, and that's where most people are it seems, Barry VK2ZAY enters a plea for stations to separate out more than they are doing. He says, and it's true, almost all operators crowd the first 100 kHz of 52 MHz causing unnecessary QRM, and often blotting out weaker long distance stations. He has been trying without a great deal of success when contacting stations to get them to VFO above the 100 kHz mark and so spread out. I recall years ago when we all worked using AM we would be spread over more than 500 kHz of the band, and one regularly tuned "from the band edge up" or "53 MHz down" according to our fancy. Are we, therefore, indicating to the powers that be, and perhaps more particularly, commercial interests, that we can satisfactorily get by with only a fraction of our 52 MHz allocation of 2 MHz? For my part, nowadays I enter the frequency I am operating on in the log book, e.g. 52080, rather than just stating 52 MHz. Someday it may be useful to prove other areas of the band are used by me. For extended cross band contacts of a local nature both parties go up, say, to 53 MHz on six, and perhaps 147 MHz on the 2 metre band. This is duly noted in the log. So next DX period chaps, why not let us utilise the area between 52.000 and 52.200 and then in subsequent years go a bit further? Think about it!

TWO METRES

To change the subject of bands, let's have a look at 144 MHz. Lots of things have been happening there too. You have already read about the opening between VK5 and VK4, but I have it on good repute that on 11/12 Alan VK4ZAN at 0605Z copied VK5ZNN and VK5VJ through the Adelaide Channel 8 repeater, but these stations thought he was portable in VK5. Alan was using an IC22A to a stacked pair of 5 el. yagis at 35 feet, and gave a number 51002 in the Ross Hull Contest. It is unfortunate Alan was unable to run more power, he may have made a contact then, but again indicates that even the FM repeaters can help with warnings of an opening on 146 MHz. And again on 4/12 Lance VK4ZAZ mentions hearing a Channel 5A TV station, probably Wollongong, and the VK1RTA beacon on 144.475, but despite calls no stations were worked.

There have been a number of occasions during November and December when band conditions across southern Australia have brought contacts between VK5 and VK3 and 144 MHz, to mention some, 7/12 to Ray VK3AV, Eric VK3BEH; and VK3BEH; 18/12 Keith VK5SV reported 60 dB o. 9 signals from Ch. 7 repeater at Mt. William, and strong signals on the side of his beam at the same time from Ch. 8 repeater at Mildura. On 19/12 good morning opening to VK3BEH (5 x 9), VK3AIH, VK3YII and others. Ron VK3AKC also worked, while Col VK5RO added he worked 12 VK3 stations from his superior location in Adelaide.

So any of you doubters who wonder what can be done on 144 MHz, there's your answer, Col VK5RO does not have elaborate equipment, but he has a good location, with equipment which works well, and is a dedicated VHF operator who knows when to be around.

I had quite a long discussion the other night with Darrell VK3AQR, who makes a worthwhile suggestion, and one which I would like to see VHF operators give serious thought to, and if you have specific thoughts on the matter, please write to either Darrell or myself, and we will then see what becomes of the idea.

It has been suggested that an HF net be formed for operation perhaps once a week, preferably on a Monday or Tuesday night, to encourage the exchange of ideas and thoughts for the use of 144 MHz on a greater scale, to pass on information of new and impending stations, equipment in use, etc., to inform those in the net and listeners

of what is being heard on 144 MHz and when, advance notice of possible good propogation conditions.

Additionally, six metre operators will be encouraged to join in any discussions, and probably those on 432 MHz, as there will be news to disseminate from both those bands. The total outcome of course is to encourage greater use of the vast amount of equipment which is currently available for use on VHF bands, and which for a great part of the year is not used. To provide a greater coverage throughout the year, it is tentatively suggested a net frequency of about 3580 plus or minus QRM. The original time suggested was 0930Z, but there are problems with this time and the proposed frequency. Firstly, 3580 would be useless for VK6 at that time, also it would be too early as that would be only 1730 local in Albany and Perth and most likely operators would hardly be home from work. To operate on an all-year-round basis on 3580 a time not earlier than 1130Z would have to be considered, which should not be too late for the likely interested operators in the eastern States, and probably conditions would not be too bad for the West. Problems again arise from the use of summer time in some areas making a further hour difference, and yet 80 metres seems the only band likely to be of use to operators listening to other stations in their own call areas. 40 metres suffers from various forms of skip distance problems. Anyway, what do you think? I would suggest a Tuesday night as being the most consistently suitable here, but then I am thinking of myself!! But it would be close enough for the week-end just passed for info. to be current! What about bands and/or frequencies. Can he cater for Z and N calls satisfactorily, e.g. cross band operation? Please think about all the above, also what about a net controller, and from which State would he be best to operate from?

MOONBOUNCE REPORT

Lyle VK2ALU through "The Propogator" reports not much return for their efforts during December. Scheduled tests with SK6AB and LX1DB on 14/11 provided no signals other than their own echoes to a max. of 7 dB above noise.

A special test requested by K3PGP was run on 27/22, and despite an extension of the period to a total of 1¼ hours, the best report they could give him was "T" copy, as his signals did not peak over 2 dB above noise. He indicated that he was copying them quite well — but then his ears must be better than those at VK2AMW. On this occasion Lyle reports their own echoes were received at approx. 45 degrees varied polarisation, thus causing 3 dB in strength to a max. of 5 dB above noise. Both test sessions were attended by VK2ALU, VK2ZEN and club member Peter Venner.

A new output audio amplifier is being made up, with modified frequency characteristics, to see what effect this has on readability of signals.

Chris VK5MC mentions having heard ZL1BJQ calling on 144 MHz EME on 8/11. No other details at this stage.

BITS AND PIECES

The further beacon news. Advice is to hand that the 432.000 MHz beacon in Brisbane will be shifting to 432.400 and will be radiating with a 6 dB gain antenna. It will be interesting to observe the coverage of this beacon and whether it will be subject to any increase in coverage with improved band conditions as noticed on 144 MHz.

Aub VK6XY advises the shifting of the Albany beacons to Mt. Adelaide, about one kilometre south of Albany. This now means the four beacons located there will now all be at the same site, namely the two amateur beacons on 52.950 and 144.500 and the two commercial beacons on 135.500 and 1700+ MHz. For those in Adelaide particularly who monitor the Albany beacons these changes will be welcome.

Aub mentions also that Bernie VK6KJ is now on 432 MHz, and hopes soon to be on 1296. Wally VK6WG is now on 1296. Bob VK6BE is now operational on 52, 144 and 432 MHz. It is to be hoped enough of the Adelaide boys sitting in prime positions near the shoreline will be doing something positive to provide the other end of the path. 1296 to Albany appears now to be only a matter of time. Ron VK3AKC no doubt will be watching the situation with interest.

On 11/12 I observed at my QTH at 0400Z a sharp rise in noise on six metres, and on investigating I noted a number of strange JA signals on 28 MHz. Looking down at the 50 MHz end of the band I heard a lot of TV rubbish with sundry carriers between 50.3 and 50.8 MHz around S4. A steady carrier was noted at S3 on 50.110, but no ident. All was quiet again by 0424, so a possible opening to JA didn't quite make it.

It has been noted with much interest that throughout the excellent 6 metre openings we have been getting this year, that quite a large degree of backscatter signals are here and being worked, and it does appear to be more prevalent when long haul DX is operating. For those new to the game backscatter signals are usually weak (around S1 to 4), can be fluttery and usually have a hollow or echoing sound. They are generally perfectly readable though, and many contacts are made by this method. They will be heard from, say, VK4 when you may have your antenna on VK6 as an example, and you can prove the situation by turning your antenna in the direction of the station you are hearing and the signal will disappear. Quite an interesting form of contact.

John VK5ZBU has written with some observations he has made on VHF this year. He mentions the extremely good conditions prevailing on 21/11 when ZL signals were so good, and goes on to give support to what I have already said about these transmissions being other than double hop due to their extreme strength. John is equally interested in the large number of very strong signals, particularly from VK1, 3 and 6. I must agree with him in regard to VK6 anyway, I can never recall hearing signals from there so strongly as this year.

John adds further strength to the plea for us to spread out further on the six metre band. He wonders just how it is possible for stations in ZL, P29 and YJ8 to effectively work VK stations when all are cluttered together in less than 100 kHz, and with so many calling whilst these stations are in QSO with others. On this point it does seem evident from many observations that stations in some States are calling these long distance stations on spec, without actually hearing them. How else can one explain why they continue to call say YJ8KM when he is already in QSO with another station in another State?

On the matter of long haul DX John speaks of activity on 10/12 when ZL3QK worked Garry P29GR, Graham VK8ZCQ in Darwin, VK6BV Tony in Kalgoorlie. That's certainly spreading the signals around! VK7MC and VK7JV worked VK8ZCJ, while VK7MC also worked VK5ZBH, the newcomer at Ceduna, who has virtually filled the vacuum left by Kerry K5SU when he was transferred to Moree, N.S.W.

I guess that's about where I had better stop. It has taken a long time to prepare these notes this time with so much info. to be sifted and placed in some sort of order. In the next issue I will present a summary of observations covering the overall VHF activity for the early summer period of operation.

Closing with the thought for the month: "February is when millions of bright, shining, happy, laughing faces turn towards school. They belong to mothers."

73. The Voice in the Hills. ■

INTRUDER WATCH

Alf Chandler, VK3LC
1536 High Street, Glen Iris, 3146

It is interesting to read a Memo issued by ARRL, and I quote — "The Intruder Watch program has been publicized recently in the form of a W1AW Official Bulletin and the response has been fantastic. We've already added about fifty new IWers to the program so far, and many of them are already on the active list." Unquote. If they can do this in the US it behoves us to act in a similar way, don't you think?

More Observers are needed in all States. More information is also of interest to us in Region 3, and I quote again — "Since late June, Treaty action has been taken on the following cases: 7050 Cairo A3; 7060 Peking A3; 7065 Tirana A3; 7075 Cairo A3; 7080 Peking A3; 7072 transmitting the latter 'Q' A1, near Moscow; 14208 and 14080 F1, near Moscow. This does not mean that reports on these should stop coming in! If a station does not cease interfering after receipt of a formal complaint, then we intend to continue complaining, and initiating periodic Treaty action, and this will result in a collection of evidence which will be instrumental at the 1979 WARC." Unquote.

This applies equally to our Administration, and complaints are being forwarded to countries allowing intruders to transmit in our bands. A case in point is the Japanese fishing boats operating in Australian waters on frequencies in the 3.5 MHz band, and also to the pulse signal heard on all frequencies from time to time. This pulse, as you know, is on all HF frequencies at different times and causes interference to all Services using the high Frequencies. I was interviewed recently by VK3LX for the ABC program "Club Forum" with regard to that same subject. They had received letters from their listeners complaining of the interference.

Referring to pulse transmissions, yet another one has been heard in the 21 MHz band. Whereas the one mentioned above has been measured here at my QTH and transmits 27 pulses per second, this one is slower at 5 pulses per second, but just as loud and from the same direction. It is a wide band pulse, and seems to sit on a frequency for some time before moving. More reports on this one would be appreciated. ■

WICEN

Emergency communications were set up and operated by radio amateurs in the Hornsby area on 3rd to 5th December last during severe bushfires.

In a note, Tony VK2BTL, said the President of the newly formed Hornsby and District AR Club, Barry VK2AAB, contacted the local SES offering assistance.

The offer was accepted. Control centre was sited in the Hornsby Shire Council chambers. A call was put out for amateurs with mobile equipment. The response was excellent. Some moved to trouble spots with fire fighters, some went to remoter places and others operated as spotters. The club call VK2APF became net control.

The activities lasted over 30 hours so shifts had to be arranged. Assistance was given by the NSW Division and the VK2 WICEN organisation. The Ch. 8 Dural repeater and simplex channel 50 were used for the emergency traffic communications.

Towards sunset on the 4th there was a total power failure in the area and for some 15 minutes the amateur nets were the only means of communication. Heavy pressure on the telephones meant that additional channels were essential. Some 60 to 70 amateurs assisted and many others volunteered but were not required.

Further amateurs were put on standby, with fires at the same time in the Blue Mountains, when the police activated WICEN in that area. Fortunately these fires were brought under control reasonably quickly. ■

AR AWARDS

The Publications Committee have pleasure in advising the following awards granted for the year 1976 —

HIGGINBOTHAM AWARD:
Mr. Maurie Evered VK3AVO.

[NOTE. The Committee recorded appreciation for the work of Mr. Ron Fisher VK3OM for AR but regretted inability to grant this Award to him because of his membership of the Committee.]

TECHNICAL AWARD:
Mr. R. A. J. Reynolds VK3AAR for his Linear Amplifier articles in the issues of April, May and June.

ASJA:
Mr. B. J. Morgan VK7RR for his repeater article in September.

1977 SUBSCRIPTIONS REMINDER

Final Notices cost the Institute time and money to mail out to unfinancials.

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AR is cut off automatically to unfinancials after a short period of grace. It may not be possible at a later date to send missing issues because of copies becoming out of print. ■

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AWA car phone, low band, complete $30; VHF test set, brand new, $35; HF wavemeter, suitable as sig. gen., $25; crystal callbrator, etc. Prof. G. R. Feiser VK2ZGF. Ph. (02) 221 1655 bus. or 487 1353 weekend.

Cushcraft 5 el. heavy duty beam for 6 m; perfect condition, $45. L30134. Ph. (03) 467 2131 bus.

Mosley TR33 trap ant., old but useful, $20. 12 FG rod blanks, 12 ft long ¾ in. taper to 3/16 in. plus Alum angle centres. Go Quad or fishing, $75. Would be interested to buy hand Ken. VK2AEM QTHR.

Collins KWM2 Transceiver S/N 36461, four years old with 516F-2 AC power supply, Collins MM1 dynamic mic and manual, $700. Yaesu FL2000B linear (572B's), $300. Both mint condition. VK4YM, QTHR. Ph. (075) 31 7830.

Swan MB40A Transceiver and Microphone, as new, 12V DC, 160 Watts PEP, fully solid state, 3 in. x 8 in. x 9 in, $250. VK4NB, QTHR. Ph. (07) 349 4615.

2 Selsen Motors, new cond., never used, pair $15. Tranpro VCT with additional socket board for mod. tubes, operates on AC or 6V DC, $35. H.T. transformers, 1500/1500 at 300 mA, plus many others, also new and used valves. Send SASE for lists and prices. HV 4 mFd and 2mFd conds. VK2DA, QTHR. Ph. (02) 94 1039.

FTDX 400 Transceiver, good condition, $325. VK2AAC, 20 Timaru St., Kirrawee 2232. Ph. (02) 521 7080.

Oscilloscope, solid state lab. instrument, Fairchild type 766H with 50 MHz dual trace and delayed sweep plug-ins, very good condition, complete with leads, probes, set of manuals, $650. VK2HS, 23 Brisbane Street, Bondi Junction 2022. Ph. (02) 387 2492.

Power supplies, power and audio trans., magazines, mobile whips, 5BPI tube, variable condensors, morse records, various components, odd chassis, etc. Send SAE for list or Ph. (03) 546 3940 A.H. Jeff Silvester L30409, 9 Goodwood Drive, Springvale, Vic. 3171.

IC22 2 m FM 10W mobile, fitted for repeaters 2-8, reverse 2-8, simplex 37, 40, 43, 49, 50, 51, with mic., manual, all cables, brackets, etc., $165 ONO; IC2020 2 m SSB, portable, as new, with crystals for 144.00-144.60, plus Oscar, with mic., manual, all cables, etc., $135 ONO; Siewa MR-2 pocket sized VHF monitor Rx, 12 channel, fitted for VK3 police and CFA, with nicad battery and charger, $55 ONO. Ray VK1ZJR, 19 Gungurra Cres., Rivett, A.C.T. 2611. Ph. (062) 88 5624.

IC202, only three months o.d in as new condition, complete with all original extras, packing case, mike and case plugs, etc., English instruction manual and Vicom warranty, 144 to 145 MHz crystals fitted plus Oscar crystal 145.5 MHz, $150. VK8IG, QTHR.

Genave 25W 2m 10 ch. mobile transceiver with xtals for repeater, new, $275; 60 ft tubular steel tilt over mast, will take rotating beam, new, $300; Kenwood TS500 80-10 transceiver, had little use, $375. G. Down, 3 Broome Street, Katanning 6317. Ph. 21 1457 (bus.).

ICOM 21A, base/mobile FM 2m transceiver, includes xtals for 11 channels, as new, only $210. Ph. (03) 467 2131.

From estate of the late J. Georgeson VK2AKU: Hallicrafter Tx HT37, $150; Hallicrafter Rx SX100, $125; Ferguson transformer 240/115V 750VA, for sale with the above equipment, $65; 30 ft. free standing steel tower, with prop pitch motor, selsyns, and their power supplies; purchaser to arrange dismantling and removal, $250. VK2AJL, QTHR. Ph. (02) 41 7729.

Kirk Super Quad, 2 el. 14, 21 and 28 MHz, fibreglass spreaders, new and unused, complete with all wiring, instruction book, etc., not able to use because change of QTH in new year, $200. VK3OC, QTHR. Ph. (03) 29 4260.

WANTED

Still looking for Vintage Morse Keys and pre-WWII parts and gear. Any type, condition, will buy or swap. VK5S, QTHR.

Illustrator needed for simple humorous pen sketches on AR subjects. If anyone can help please write VK4SS, QTHR.

FV50 VFO for FT75B; also manual or photo copy of manual for FT75B and AC and DC P/S. Notify details including price to Ray VK1ZJR, 19 Gungurra Cres., Rivett, A.C.T. 2611, or phone (062) 88 5624 (A.H.).

Antenna coil for the Rx section of a vane spindler SR5-2 marine transceiver. Details Michael, 80 Edithvale Road, Edithvale, Vic. 3196. Ph. 772 3175 (A.H.).

Any information re circuit, operation or connections of APX6 radar transceiver. VK5RI, QTHR.

Steam engine and generator to power type 3 Mk 2 transceiver. Also wanted airborne radar systems, scanners, CRO indicators, duplexers, test sets, harnesses, handbooks, i.e. A276, H2S, APS3, APS4, APS13, Rebecca, Eureka, type 717. Details to W. Babb VK3AQB. Ph. (03) 337 4902.

Wanted urgently by Volunteer Bush Fire Brigade. Your surplus and working hi-band carphone (Pye overland for preference as the mobile mount is already on fire trucks), plus handbook or schematic for photocopy. Limited funds but your expenses happily paid. Don't delay, the fire danger will be high for some months. Please write or despatch today to Les Kinch VK2BBD, c/- Bush Fire Brigade HQ, Terry Hills, NSW 2084.

Urgently need to keep communications going during high bush fire danger period. Handbooks/schematics for Pye overland, AWA carphone, vinten, etc. All high-band models. Can photocopy if needed and return. Please don't delay. Contact or despatch today. Expenses paid and all letters acknowledged. Les Kinch VK2BBD, c/- Bush Fire Brigade HQ, Terry Hill's, NSW 2084.

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RT181/APG30, complete or incomplete. Replies to D. A. Page, 76 Castlereagh Street, Penrith 2750, or ph. (047) 31-1311, ext 726 (bus.) or (047) 21 8102 (A.H.).

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. IVOR MORGAN	**VK3DH**
Mr. L. J. SALTER	**VK4XS**
Mr. R. J. EVERINGHAM	**VK6BO**
Mr. H. S. DOWNIE	**L60250**
Mr. W. J. HARWOOD	**VK5ZD**
Mr. STANLEY H. MILLIGAN	**ex-VK3AU**

ROLAND JOHN EVERINGHAM VK6BO

Rolo Everingham VK6BO died suddenly on Tuesday, 9 November, 1976. His death is a great loss to amateur radio and especially VHF in Western Australia. Rolo became involved in VHF in the late 1940s. It was he who made the memorable contacts on 144 MHz to VK5GL and VK5QR in Adelaide from Perth in 1951 and 1952 respectively. The Adelaide/Perth path has not been re-established since that time despite increased power and activity at both ends. Rolo remained keen on 144 MHz and could generally be heard using MCW on 144.22 MHz during 6 metre openings to the Eastern States.

He was active on 6 metres and is the only Western Australian to have ever won the Ross Hull VHF Contest Trophy.

Not content with 6 and 2 metres, Rolo built one of the first crystalled controlled transmitters on 288 MHz and held the WA record for that band until it was withdrawn. He was active on 432 MHz and made many contacts through Oscar satellites.

His tenacity with VHF experimentation and propogation was evidenced by his early morning (06.45) skeds with Wally Green VK6WG. These persisted over many years and established that the 400 km path to Albany could be worked virtually every day at that hour. The same pair had less success over the Norseman/Perth path but the presence of these signals served as a benchmark for other amateurs who participated from time to time in these tests.

Rolo fostered young people interested in amateur radio. Much of the impetus for the early 2 call holders came from Rolo's quiet assistance — both to gain a callsign and then to use it. He was able to help solve the technical problems of VHF in a period when TV components and 2-way mobile radio were not in existence in Australia.

Rolo was a founder of the WA VHF Group Inc. and was one of the six signatories to the letter widely circulated seeking retention of the 50-54 MHz band when the introduction of TV had shifted the 6 metre band to 55-60 MHz.

In his professional life Rolo was the Principal of the Mount Lawley Technical College before retirement. This College was the major institution for trade, Certificate and Diploma teaching in Electrical and Electronic Engineering and for TV servicing production and transmission. Hence in an amateur and a professional sense Rolo Everingham made an outstanding contribution to electronics in Western Australia.

He is sorely missed.

W. J. House, President
W.A. VHF Group (Inc.)

EXCHANGE

Swap two 4-125A tubes (list price $63.90 ea.) for four 6JS6 tubes (list price $8.25 ea.). VK8RR, QTHR. Ph. (089) 81 2558 A.H.

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CSW216, includes quality swr/pwr meter which operates up to 150MHz. The coupler cover 3.5 thru 28 MHz at 500w pep. $210
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BL 50A quality heavy duty dipole type, 4 Kw pep, 2 KW am, 1.8 thru 38 MHz, 52 ohms, vswr better than 1.2 at 30 HMz. Housed in sealed cycolac which will withstand 250 Kg tension. Price $22. BL 70A (72 ohm model) $24.
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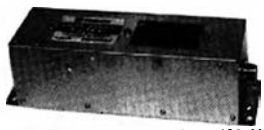

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- 116MHz Crystal Oscillator. Maximum Frequency Error 1 kHz
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- Aerial and I.F. Sockets both BNC as Standard

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1296/28 CONVERTER
- 105.66 MHz Crystal Oscillator
- Hybrid Ring Mixer utilising Schottky Diodes
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All Units housed in attractively finished and sturdy Die-Cast Boxes

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All solid state 70w pep (ssb) output linear amplifier for 14w pep input, 12 vdc operation and internal automatic RF sensing switch means that you only need to connect this unit in your 2m antenna line together with a source of 12 vdc for 10w pep OUTPUT. Accepts ssb, fm, am, or cw with switchable hang time for ssb and cw operation. Supplied complete with dc power cord and fitted with SO239 sockets.

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2M/432 FM Transverter
This small unit obviates the need for the expense of a second transceiver or the complexity of numerous add on units with multiple connecting leads. By simply inserting the unit in the antenna lead of your 2m fm transceiver you are ready to transmit and receive on either 2m or 70cm AT THE FLICK OF A SWITCH! The unit has its own 70 cm to 2m receiver converter built in and all switching is carried out within the unit. Size 105 mm x 40 mm x 180 mm. Supplied complete with power cord and mobile mounting bracket.

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Model MC33A ac/dc includes two tone generator and built-in compression level meter. Handles low and high impedance mics with distortion better than 0.5%. Compression level -3 dB to -35 dB. $65 + P&P
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HF PLL Transceiver

More expensive than an FT101E ? New uniden 2020 Mark II

Featuring a number of circuit improvements as a result of a year in the field, the fabulous "2020" PLL transceiver offers separate usb/lsb/cw 8-pole filters as STANDARD and 6146B's in the final with screen grid voltage stabilisation for minimum distortion products. Features pcb's and even the front panel can be swung out for easy servicing. A comprehensive range of spare parts is available together with back-up service support. Overseas this rig sells for at least $65 more than the FT101E! Compare the features of the UNIDEN 2020 with other HF transceivers and you'll be quickly convinced that it offers the best value!

Uniden 2020, complete	$772
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13.8V DC POWER SUPPLY

This is a fully regulated supply with an output of 13.8 vdc at 3 amps (5A peak). Includes an on/off switch and neon indicator and comes complete with mains flex and 3 pin plug. Ideal as a bench supply or for powering transceivers.

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CS201 quality 2 position coax switch. Will handle up to 2.5Kw pep. 50 ohms impedance with insertion loss better than 0.2 dB. VSWR better than 1.2 up to 1 GHz. Position not selected is automatically grounded.

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The famous IC202 handy portable runs 3w pep with VXO control 144-146 MHz. Comes complete with mic, carrystrap, dry cells, English manual and VICOM 90 day warranty.

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This is ICOM's first FM portable and it puts good times on the go. Change vehicles, walk thru the park, climb a hill, laze on the beach, the ICOM quality FM communications go right along with you. Long lasting internal batteries make portable FM really portable while accessible features make connection to external power fast and easy.

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- Fully collapsible antenna
- 15 channels (12 on dial and 3 priority)
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- Crystal specifications identical to IC22a

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amateur radio

VOL. 45, No. 3 MARCH 1977

CONTENTS

COVER PHOTO

Popular place for enthusiasts and the interested alike at the 11th Australian Scout Jamboree at Rossmoyne Park, Dandenong, for the first week in January, was the amateur radio marquee.

With several rigs operating at once, it was a busy spot. At the time this picture was taken, the Scouts had made 85 overseas contacts from VK3BSA/Portable.

Pictured, from left: Mike Thorne (VK3ZVN) of Nunawading, an instructor for the Blackburn Scout Radio Club, filling in the cards; Rover Scout Bruce Kendall of 1st Werribee (VK3ZDM) with microphone, and Scout Antony Perri, 14, of 2nd Templestowe, a fascinated observer.

(See page 13.)

Photo by ROBERT L. SUGGETT (03) 267 2316.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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amateur radio

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QSP WHAT DOES THE "CB" REPORT* SAY ABOUT THE AMATEUR SERVICE?

1. Radio Spectrum management is a complex matter. It is a limited resource and therefore is controlled internationally. It must be conserved by efficient planning. Australia is a major user of the spectrum.
2. No allocations are made without a need being demonstrated. Nothing has been provided for unskilled people for hobby or general conversation purposes (para. 41).
3. The Amateur Service exists for those who have a hobby interest. Genuine seekers after knowledge can obtain a Novice licence. The examination syllabus is subject to continuing review to ensure that the standard remains appropriate to the needs of the Service (para. 42).
4. The Australian administration is now largely powerless to take action against illegal operators (para. 57). Only 6 of the 148 ITU member countries have a CB Service (para. 59).
5. DXing attractive to CB-ers when the skip is right (para. 67). Major difficulty in establishing a CB service using the 23 USA CB channels is that radio amateurs in Australia and New Zealand are permitted the use of the 11 m band.
6. Para. 82 states the WIA made strong representations to reserve inviolate all the amateur bands and is opposed to giving up any portion of the 11 m band (NOTE. What the WIA said was correctly reported in WIANEWS in AR for November 1976.)
7. As propagation is now poor there is minimum use of 11 m by amateurs for DX. As sun spot cycle progresses 11 m will be used more by amateurs than now (paras. 83/84).
8. WIA opposes sacrificing 11 m band (para. 87). (NOTE. See 6 above.)
9. A CB Service is not designed for DX operations. The Amateur Service caters for this kind of activity (para. 106).
10. Three options were proposed. Modify existing services, use USA CB frequencies or use UHF.
11. Amateur radio operators are regarded as responsible users of their allocated frequencies. The service in Australia is largely self-policing (Appendix C, para. 9).

The Executive.

* "Report to the Minister for Post and Telecommunications on the Introduction of a Citizen Band Radio Service in Australia" released January 1977. ■

QSP

SECONDS GET LONGER

The International Time Bureau (BIH) has announced that the rate of UTC (UTC replaced GMT) will be decreased by 1 in one million million on January 1 1977. This is necessary (or so the AR statistician says) to prevent the international clocks being 1 second fast at 20 h 53 m, February 1 in the year 33,665 AD.

PENSIONERS

Please remember that if you wish to apply for regrading as a pensioner this must go direct to your Division. Only the Divisions can approve pensioner rates in respect of their members, so please write there enclosing a photocopy of any appropriate document. Since there could be delays in dealing with applications anyone likely to be affected should pay the appropriate pension grade rate (see January AR, p. 3), if any, to Toorak, to keep AR coming. Unless advice is received that a member has been re-graded as a pensioner the subscription notice for the following year will automatically show a debit for this year plus the full rate for that year.

W. MALAYSIAN REPEATER

MARTS newsletter for October '76 reports that approval has been obtained for their 2m repeater frequencies as 147.9 MHz out, 147.3 MHz in. Work is now going ahead to determine the most suitable equipment. The location is given as Ulu Kali.

NBS RADIO STATIONS WWV AND WWVH

Effective February 1 1977, broadcasts will be discontinued on 20 and 25 MHz from WWV and 20 MHz from WWVH. The 2.5 MHz broadcast from WWV will not be discontinued as previously proposed. Services will continue with no changes on 2.5, 5, 10, and 15 MHz from both stations.

JOTA

"I have heard amateur operators commenting on air of another problem they seem to be encountering with increasing frequency. This is that Scouters set up the arrangements for the amateur to operate his gear at the local Scout hall and, having delivered his boys to the Den to participate in the event, the Scouter then departs and leaves his members solely in the charge of the amateur radio operator. In one instance an amateur had to leave hurriedly in the middle of a contact to deal with an emergency in the grounds of the Scout den. He could have lost his gear as well as the den in which it was located during the resulting crisis. I believe all Scouters must take steps to ensure that participating Scouts are always under the control of a responsible Scouter, leaving the amateur operator free to concentrate on the job of making radio contacts for the enjoyment of the Scouts taking part." From Report on 19th JOTA to the Scout Association of Australia, which also included sincere thanks to radio amateurs for their contributions to JOTA.

TEACHER'S NOTES

Roger Davis VK4AAR has prepared a most useful and comprehensive set of teacher's programme notes for a one year course leading to the Novice licence. The course is in three stages. There is another course leading to the AOCP. The notes for the elementary introduction to the first course were submitted for publication in AR. Unfortunately they run to some 11 pages and could not be compressed to less than 5 in the magazine. This would be too much as space is at a premium and the number of teachers requiring guiding notes represent a very small number of the total readers.

However, if you, or someone you know, would like a copy of Roger's notes why not write to him at 2/3 Farrington Street, Alderley, Qld. 4051.

AX CALL PREFIXES

Why not use your AX prefix throughout the month of March and therefore gladden the hearts of prefix hunters.

WIANEWS

This month WIANEWS departs from normal reporting and instead, offers you the basic texts of the four segments of Federal tapes broadcast during February.

1296 MHz WORLD RECORD SHATTERED

"Firstly a world record contact — subject to confirmation. This took place on the 23 centimetre band on the morning of Tuesday, 25th January, at 09 hundred hours West Australian time between Wally VK6WG in Albany and Reg VK5QR in Enfield, a suburb of Adelaide.

The approximate distance is 1886 kilometres or about 1172 miles. Wally's rig was on 1296.111 MHz and Reg's about 50 kHz lower in frequency. Wally gave Reg's SSB signal strength 5 readability 4 and received from Reg a 5 4 3 for his CW which was verified later as 5 4 7 because of a tone variation in Reg's receiver. Wally tried AM but Reg could copy only the occasional word because of the passband on his receiver.

As far as can be ascertained the existing world record on this band was set up on 26th October 1973 between WA2LTM and W9WCD over a distance of 1240 kilometres. Official confirmation of this new record will be conveyed to all the major amateur radio societies as early as possible.

Wally's rig was a crystal oscillator on 8000.017 kHz to a 5763/6BQ5/6BW6/832 line up with output on 144 MHz followed by an 832 tripler to 432 MHz and a 3CX100A5 tripler to 1296 all home brewed. The final ran 500 volts at 65 mA, giving 32 watts input and about 10 to 15 W on 1296. The modulator was 807's in AB1. The antenna was a 3 foot dish made up according to specifications in the RSGB's VHF/UHF Manual. The receiver front end was one which came from Ron VK3AKC into a microwave module 1296-281F thence into an FTDX 100.

Reg writes that his gear to generate SSB was an experimental hook-up of the circuit suggested by Karl Meinzer DJ4ZC, in 1970. In this, you process the SSB signal to eliminate most of the distortion caused by tripling. The home-brew 9 MHz signal, mixed to 28 MHz, was led into his normal home-brew 432 MHz transverter to a 2C39A amplifier and then through a varactor tripler to 1296 MHz. The power output was about 10 W to a 3 foot dish. The receiver was a mixer only converter but he says he did include a pre-amp between it and the converter tunable IF, the 101B receiver.

At both ends of the contact there were participating observers and much of the contact was tape recorded by Wally. It is more than likely that the two observers, Roger VK5NY and Bernie VK6KJ, were themselves green with envy about the contact as Roger himself made a recording at his own QTH but was unable to get his signals through to VK6.

This contact was the culmination of previous contacts on 144 and 432 MHz with all four stations being involved. Reg apologised for the tone reports he gave but said he had dropped the 28 MHz pre-amp in his excitement!!!

The Federal President sent telegrams of congratulations and many members will wish to add their praise perhaps bearing in mind the considerable number of stations further east than Adelaide equipped with 23 centimetre capability. Perhaps therefore the record could be bettered in the near future.

The second item of good news was that replies were received at last from central office on a number of outstanding questions. At least a few gains were recorded. Details will be found in WIANEWS in AR for February.

CB

The issue, late in January, by the Minister of the discussion paper on the future of citizens band radio in Australia should indeed produce a wealth of discussion.

In 1974 the Wireless Institute wrote to the then Postmaster-General expressing opposition to the establishment of a radio communication service for or on behalf of unqualified persons under uncontrolled conditions.

The Minister replied that his Department considered it would not be in the public interest to provide for the operation of a citizens radio service in this country. This was based, he wrote, largely on the experiences of overseas countries on this question.

He also said that the introduction of the proposed Novice amateur licence would help to alleviate the problem. The correspondence appeared in full in AR of October 1974 and listeners are asked to study the wording rather carefully before coming out with comments at variance with the facts.

The Minister assured the Institute as late as March last year that the Government did not contemplate changing the long-standing policy adopted in relation to the operation of a CB service in Australia. Please see Amateur Radio journal for May 1976, page 4.

WIANEWS in the June 1976 issue reported that the Minister had been asked if there was any intention by the Government restrict or prohibit the importation, sale or disposal of the equipment commonly used by illegal operators. Only an acknowledgement was received.

In AR for last November, page 5, WIANEWS reported a further approach to the Minister that if the 11 metre band is withdrawn from the amateur service in Australia Novice Licencees would lose 68 per cent of the frequencies allocated to them. Members will remember that ever since 1972 the Institute has been pressing Central office for the Novice Segment of 28.1 to 28.3 MHz.

Views about a citizens band service reflect quite a variation. Officially there is no policy laid down by the Federal Council concerning the concept of a citizens band service. This was clearly stated by the Federal President in his editorial for the November 1976 issue of Amateur Radio. He said that the Wireless Institute has a duty to look after the interests of the licensed amateur and those who wish to obtain a licence. In this context the well-informed member will have read the views of the Radio Society of Great Britain on CB. These were published in Amateur Radio for November 1976 under IARU News on page 18. Also remember that the Institute has listened to the views of prospective CB-ers. Have a look at the first few paragraphs on page 4 of that AR.

Why quote all this material? The reason is very simple. To show the consistency of thought on the subject over quite a period of time and to ask that those who criticize should first inform themselves on the many aspects involved.

One prominent radio club last October passed a motion that the attitude of the Wireless Institute in respect of citizens band operation should be modified and that positive efforts should be made to assist would-be-users in their attempts to secure wider and more legitimate operation in that service.

The club believed that the Institute's stance cannot remain substantially neutral. Ultimately, the writer said, the Institute will have to come out either for or against the aspirations of would-be citizens band users. In terms of future Institute membership it seemed to them more pragmatic to foster alliance with CB users than to oppose them or ignore their existence. It was pointed out that if CB became a reality a CB Association would be formed which would wield considerable influence. It was then asked if it would be any sacrifice if the Australian Amateur Service gave up its 27 MHz allocation to CB users.

The memorandum ended with a reference to a book clearly describing the demise of people and organisations who refuse to acknowledge change or who refuse to accommodate change. They end up as vegetables.

Another influential club adopted as official club policy that the CB service may be inevitable and agrees with the principle of a licensed CB service and supports its introduction. Their policy stated that the amateur should press for an increased allocation on other HF bands as compensation — preferably in the 160 and 40 metre bands — and that Novice operation be permitted on 10 metres and also on 160 metres if this band is extended.

Another group recommended the voluntary abandonment of the 11 metre band by amateurs in favour of a CB service.

Not too far distant, geographically, another influential group addressed the Minister on the lines that the introduction of CB on 27 MHz into this country would be a disaster and something the Government would live to regret. They wrote that there is no justification for this type of service into Australia as any person requiring communication is well catered for independent of his or her particular vocation. They pointed out that if pressures win out, many amateurs may well wonder if all their study and effort has been worthwhile or indeed necessary. They recommended that the present policy of not legalising CB operations should continue, but if this is beyond the Government, due to pressures by commercial financial interests, then the assignment of a part of the UHF spectrum should be granted so as to ensure restricted range and restricted usage by reason of extra cost. It is also stated that the Department has not and could not enforce any requirements because of staff shortages.

This group, and others, point to the development of open confrontation between licensed services, including amateurs, and the present illegal operators on the 27 MHz band who have in some cases threatened physical violence to legitimate users of the band.

One or two individuals and groups have done their utmost to have the amateur case, as they see it, published by the media. They have not been particularly successful.

One writer wrote that Government and Departmental procrastination and the slow processes of the law, have allowed the situation to develop almost to the point of no return. He refers extensively to the chaotic situation in the USA which must not be allowed a foothold in Australia. Other writers pointed out the relationship between the Novice programme and CB activities. One wanted vigorous Institute reaction to the CB threat and thought that Communicator licences — a 4th grade amateur licence — would be the answer, by absorbing the better types of pirates, he said. We must have dialogue with CB-ers he thinks.

Another club letter asked whether the Wireless Institute should concern itself with such a thing as the allocation of frequencies to the Diplomatic Service or other commercial users. They believed the WIA would be doing a disservice to licensed amateurs by taking part in discussions about CB licensing. Such matters, they said, do not affect amateurs unless their frequency allocation is threatened. It is a political matter of no direct concern to us, they say. An official opinion, on such an emotional issue as CB radio, should be avoided, as taking either side is bound to alienate some section of the community they said. Their view is that the allocation of the 11 m band to Novices appears to be a disaster.

In all the flow of words on the subject very little seems to have been missed. Interference to other services, TVI and FRI of all kinds, the Australian position in relation to international obligations, Australian credibility at ITU conferences (beware WARC 79 it is said), the proliferation of sub-standard equipment, what percentage of present illegal operators would licence themselves and what happens to those who don't, what about all the other services using the 27 MHz band apart from ourselves, controls over third party traffic, the outward spread or migration of illegal operators out of an assigned band for purposes of overseas Dx on high power in one form or another, the welfare of the nation in trying to close down, in any National emergency such as a world war, an illegal service which does not exist, false accusations that it is the amateur service which creates interference or that only such and such a service can provide proper emergency communications.

And so the list expands and expands. The right of the individual to have access to the frequency spectrum, the ready availability of suitable equipment, the cost factor and so on.

Finally we return to the Government's discussion paper which sets out three options for legislation. One — introducing a CB service similar to the one in the USA. Two — introducing a CB service on UHF. Three — modifications to existing services to meet genuine community demand for radio communications.

At this stage it seems clear that vociferous elements will opt for the USA type of service on 27 MHz, which is similar to those in use in Canada and West Germany. The only other countries in the world which are known to possess a CB service are New Zealand — 75 kHz either side of 26.5 MHz — and Japan — 21 MHz band.

The lobby is expected to intensify notwithstanding the costs to the community as a whole and the alleged disenchantment of many in higher places who seemed quite keen about such a service only a short time ago.

What advice can we give? No problem. Join the Wireless Institute of Australia and study for an amateur licence. If a CB service comes into being some time in the future you will have trained yourself to become a more discriminating participant in radio communications."

POSTAL MOTIONS

The two postal motions, 76.20.02 and 76.20.03 (see Jan. '77 AR, p. 4) listed in WIANEWS, were both adopted. ■

WIA EDUCATION

THE ELEMENTARY RADIO COURSE by Roger Davis (VK4AAR), Fourth edition.
This publication is intended to provide an introduction to electricity and radio for the beginner. It forms the first part of the Queensland Amateur Radio "A" course. The 43 typed pages cover electricity and magnetism, radio reception and transmission, plus practical details on constructing a crystal set and a one transistor radio. The text is clear and easy to read. The necessary theory is adequately explained without the use of misleading analogies. A commendable effort.

Incidentally, the "A" course which is sponsored by the WIA Qld. Division and the Windsor YMCA also includes the Intermediate Radio Course by L. Whyte, Novice AOCP Study Guide, parts 1 and 2, by R. Davis and Introduction to Morse Code (cassette) by R. Davis: all for $15. Individual texts such as the one reviewed here may be obtained from the Education Officer of the Qld. Division of the WIA, Box 638, G.P.O., Brisbane 4001.

ERC will be available separately direct from Roger Davis, 2/32 Farrington Street, Alderley 4051 — $1.20 includes postage.

THE ADVANCED RADIO COURSE — A STUDY GUIDE FOR THE AOCP. First edition January 1977. Written and compiled by Roger Davis and Trevor Thompson.

After having completed the "A" course (see review of the Elementary Radio Course) and presumably thus obtained a Novice licence the student may obtain this study guide for only $4. It is a very comprehensive study guide which makes reference to two text books only. The course can be completed in 26 weeks. The knowledge required to pass any AOCP paper may be obtained almost painlessly by following the guide. All necessary topics are covered without undue effort being expended on peripheral areas yet the treatment is most thorough. Chapter one lists a syllabus for the AOCP. Chapter two is the study guide itself and covers the theory in 15 sections. Each section lists the relevant paragraphs of the text books plus the time (1 to 3 weeks) for study. To test the depth of knowledge gleaned each section concludes with a set of questions. Chapter three contains the answers to the sets of questions. Chapter four contains past AOCP papers and chapter five gives sample answers.

The guide is well compiled and any students following this guide would be virtually guaranteed an LAOCP pass.

Recommended for Novices and other aspirants. VK3AFW. ■

Dx TO Dx

Peter B. Dodd, VK3CIF
P.O. Box 150, Toorak, Vic. 3142

Here is something different — a lot of travel with a little bit of amateur radio.

GD3PBD, YA1PBD, OE1ZBW, ETC., ETC., ON SAFARI

Some years ago — long ages it seems — we were living on the Isle of Man. Right in the middle of the Irish Sea; operative as GD3PBD. Not a very good place for working DX because of the extremely hilly terrain and a house without a garden but tall enough to sling a multi-band dipole from the roof ridge down to small shrubs front and back. The "little people" were kind enough to us, attendance at the regular meetings of the radio club, exploration trips round Ellen Vannin, practising Manx Gaelic, learning the local history, watching parts of the Isle of Man TT races, taking the kids on the horse trams and many other pleasant diversions kept us active. No population pressures except summer tourists, but plenty of windy wet winter days and the low cold cloud associated with so many of the Western Isles — once under the rule of Tynwald.

I suppose the years of service postings here and there around East Africa had made us into wanderers. So it turned out sooner than later that a decision was made to emigrate to New Zealand. In three months all was made ready to travel overland since air travel for so large a family was too expensive now that we had to pay the bills ourselves, and sea travel was too booked out for years ahead so it appeared. The paper work involved was fantastic.

Great care was taken with mounting the KW2000 transceiver inside the motor caravan but a mistake was made in mounting the mobile whip on the baggage trailer. Only during the happy lazy weeks in Singapore did the opportunity and parts become available to mount it on top of the caravan. Thereafter the DX started rolling in.

Special pains were taken about a suitable little generator but it really was a noisy beast. Essential however for supplying mains voltage for lighting as well as power for the rig, heaters and fans. The rating was 240V at 800W and seldom was it found wanting. In some places we had 3 inches of overnight snow on the roof. In other places we ran through pre-monsoon heat over 130°F, minus a windscreen accidentally broken near Lahore but irreplaceable on the sub-continent. When you plan to travel self-contained, more or less, through almost unknown primitive countries, it really is amazing the things you find must go with you. A total of 3 tonnes sounds a lot. A small sealed carton of toilet-rolls stacked on the back seat of the little sedan we took with us nearly landed us in big trouble upon entering Yugoslavia from Austria. I had gone through Customs first in the caravan and the XYL followed in the car. All seemed well but as she was about to drive away, an armed frontier guard menaced her with his rifle and demanded to know what was in the carton. Since he spoke no English, and we had mainly English and a now useless Ki-Swabili, it took time to figure out what he wanted. Fortunately the opening of the carton, and the sheepish production of toilet rolls from within, brought a big grin over his face and we were waved on.

That was where, of all places, I was sure we would have trouble with the rig and had taken the precaution of having it included in the carnet for the caravan. It was slung up inside in full view but received no attention whatever to our great relief. As it turned out we had no trouble with it upon entering all the 17 countries we passed through, except here in Australia, where carnets were not recognised and masses of paperwork had to be signed. The little rig performed faultlessly throughout. Many enjoyable QSO's were had, especially in this part of the world, despite its "innards" being clothed in layers of dust from the Nullabor back to Iran.

What a far cry it seems to the camp site on the shores of a dam outside Kabul where the DX was hard to work and the only safe water to drink came from the American embassy well in the city. The activation of YA1PBD made me a member of the Camel Drivers' Club but I guess all of us could have done without Afghanistan. A dedicated non-tourist country where the petrol was little better than kerosene and your local currency needs could economically only come from the black market. Where the mountain scenery was magnificent but the deserts harsh and forbidding. Where there were more official road barriers than anywhere else, including bandit barriers of sharp stones across the road. Where you learned very quickly to maintain a firm grasp of your money until your change could also be firmly grasped. Where students riot, tanks and armoured vehicles required negotiating with the utmost caution. What a relief, and a thrill too, to motor safely through the famous Khyber Pass — the land of the wild hill tribes — into the sub-continent of India where I had served a spell of duty back in the 1940's.

Should I have obtained reciprocal licences before setting out on the journey? Unfortunately in those days only a few

FILL 'ER UP!

would have been obtainable and then only by personal application to cut delays. In the Asiatic countries there was, and still is, little hope of a foreigner obtaining amateur licences let alone reciprocal visitors' licences. Apart from this the winter in Europe was still with us when we set out thus we made no really lengthy stops until reaching Vienna. It was mouth-watering to be in Liechtenstein without a licence. Perhaps we might have needed radio communication during the many hours slowly inching forward through a blizzard in Switzerland knowing full well the hundreds of metres drop if you strayed off the "road". Anyway it was a pleasure to spend a few quiet days of sightseeing in Vienna by day and operating as OE1ZBW by night.

Listening on the bands whilst in Athens was a severe temptation to indulge in a little pirate activity. The military situation at the time and the advice of George, SV1AB, dictated that discretion was perhaps the better part of valour after all. We wasted little time in crossing Turkey — mile after mile of mountain passes with rotten dirt tracks the further east we travelled. Snow was still on the mountains but the roads were mainly clear as it was early spring by that time. Viewing the beautiful lofty white cone of Mt. Ararat was little compensation for the hours detained the same day at the Turkish frontier post overcoming a graft-hungry Customs officer without smoothing his palm.

Perhaps I should have applied for a licence in Teheran, but we had few thoughts at that time beyond resting a while and preparing for the tougher journey ahead. Another visitor in the same caravan site was Larry Pace, a W6 and his XYL. The magnificently scenic road from Teheran to the Caspian Sea and a dip in its waters did us good after the dust of the capital.

There was no hope of getting licences in Pakistan and India. The former because our road transit pass was only for four days and the latter because our stay in New Delhi was cut short by the need to reach Madras in time to catch the ship to Singapore. Yes, we visited the beautiful Taj Mahal, Akhbar's tomb and many of the other tourist sights of Agra, Gwalior and other historical places. It was a pleasure to meet and address a meeting of amateurs in Madras struggling so hard in the face of poverty (general) and a shortage of everything.

The lazy voyage across the Bay of Bengal and the delights of being in "civilisation" once again in Singapore set us back on our feet. I tried for a licence in Singapore but the delays involved and being merely a visitor finally beat me.

The very day after arrival in Fremantle saw me walking out of Cable House in Perth with my VK6CIF licence! This later changed to VK5CIF, VK3CIF, VK1CIF and finally VK2CIF as we motored leisurely across the Continent. We are truly grateful for the magnificent hospitality shown to us in so many places by friendly amateurs and old friends. We even had a solid 5 x 9 QSO with old friend Robby 5Z4ERR, from the caravan park in his son's garden in Adelaide.

The trip over to New Zealand was uneventful and ZL1BDC was activated for a few days precisely one year (for Customs purposes) after setting out from the U.K.

How come I came back to Melbourne? Well, that is quite another amateur story which really began during an amateur cocktail party in Singapore.

If you travelled this route today you would find that reciprocal licensing arrangements for visitors much easier in Europe as long as you possess a G licence. You would find 2m and 70cm repeaters in use almost everywhere but you would need 40m or 80m or even 20m for longer hauls although the first two of these bands are very noisy with QRM and QRN.

The position in Asia is virtually unchanged except that amateur radio is now banned altogether in Afghanistan.

Meeting amateurs in Europe is somewhat difficult unless you have the addresses of old friends, recent copies of local amateur magazines and a working knowledge of the language. You could travel through city after city without even seeing an amateur's beam because there are bigger and taller trees about the place. Even if a beam might be visible from the road it could be almost totally hidden from sight behind the double-storey houses.

Many years earlier we had shown hospitality to a visiting couple who turned up at our house one evening in Malawi during their cine film-making journey through Africa. It was an unanticipated and unexpected pleasure therefore for us to drop in on them unannounced at their country retreat on the eastern side of Lake Constance. Walter DL9HF and his charming XYL (also a licenced amateur) were as surprised to see us as we were to become snowbound the next day in their garden. It is visits of this nature which are of the greatest benefit to host and guest alike. Visits "cold" — that is to say, without at least prior "on air" contacts — are seldom so satisfactory. In the same way it takes time to achieve a thawing of the atmosphere if you, as a stranger, attend a local group or club meeting without first being known to one of the members.

Nearer to home I think, VK5ZX, VK3AHR, VK1JF and VK2GN will know exactly what I mean. Some amateurs derive great pleasure in welcoming visiting amateurs but despite the "bonds of fraternity" in amateur radio there are many who take a different view. Since this applies universally and not solely to Australia, it behoves the visitor to be cautious and tactful when he is overseas. The stranger in your midst might be seeking a pleasant evening in a friendly atmosphere. More often than not he does not want to borrow money, run off with your wife or steal anything loose lying around the place. If he does, throw him out, quick. ■

BURGLAR-PROOF YOUR SHACK

Ed Manifold VK3EM
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Hearing of the loss of further radio equipment on a recent Sunday morning broadcast, and having had an attempted burglary here late in May, together with other thefts of amateur gear in recent months, it looks as though the pattern is becoming more prevalent, and while insurance can compensate in part for the lost equipment, the unhappy experience of a breaking and entering by the thief remains for many years after.

Having experienced this, it was decided when going overseas in 1974, that the installation of dead latch door locks on all external doors, and a good alarm system was the first line of defence against a repeat of this event.

In general there is no house, shack, garage door or window which cannot be protected by one means or another.

Probably the best for door and window openings are concealed reed switches and magnets fitted into (or on to) surrounding frames, with micro switches as a second choice, wired with 22 gauge Bell or jumper wire concealed in mouldings and walls, while fixed windows can be protected with metallic tape.

It may not be acceptable to put metallic tape on front windows from the XYL's point of view, but as these windows are usually covered by Venetian blinds or drapes, and would have to be disturbed by a would-be thief, cords across the blinds or drapes, could be attached to magnets and reed switches, which the slightest movement would actuate.

Roof spaces can be actuated where necessary with fine gauge trip wires, contact plates or other circuit breaking devices.

Even the "Loo" louvre windows, fixed or moveable, can be protected with metallic tape or fine trip wires.

The system which seems to be most favored these days is the closed circuit continuously activated transistorized control.

While the circuit is activated the current requirement is very low, being of the order of 2 mA at 12 volt supply, which from 2 lantern type batteries means a long life, almost equal to shelf life, and if only used as back up supply to an AC power supply, could equal shelf life. Refer to Fig 1.

These days all the necessary "Black Boxes" for control and amplifiers are available from your friendly radio parts man, and even at current prices the cost is cheap, as compared to the loss of that "Black Box" transceiver, but the junk box has usually a goodly quantity of the necessary parts to construct a reliable alarm system, and we would not be amateurs if we did not like constructing something useful, and at present, looks to be a necessity.

For reliability it is suggested that the following points are mandatory:

1. A.C. and battery power supply.
2. Operational at all times, day and night.
3. Well concealed locations for, Unit, Speaker, Switches and Wiring, to prevent premature de-lousing by the would-be thief.

The inclusion of push-button switches in series with each key operated door switch, Fig 2, provides protective alarm "Panic Button" should the need arise for the XYL, against the forced entry of any undesirable type of caller.

The system could be extended to include smoke or fire detection sensors, and no doubt other uses would suggest themselves where needed.

One additional control which would be desirable for inclusion (not shown) is that of a "Time-out" circuit after a period of operation, as it has been found that the wailing siren doesn't find much favor with the neighbors after the first few minutes, while they are waiting for the Police to arrive to investigate the cause of the alarm.

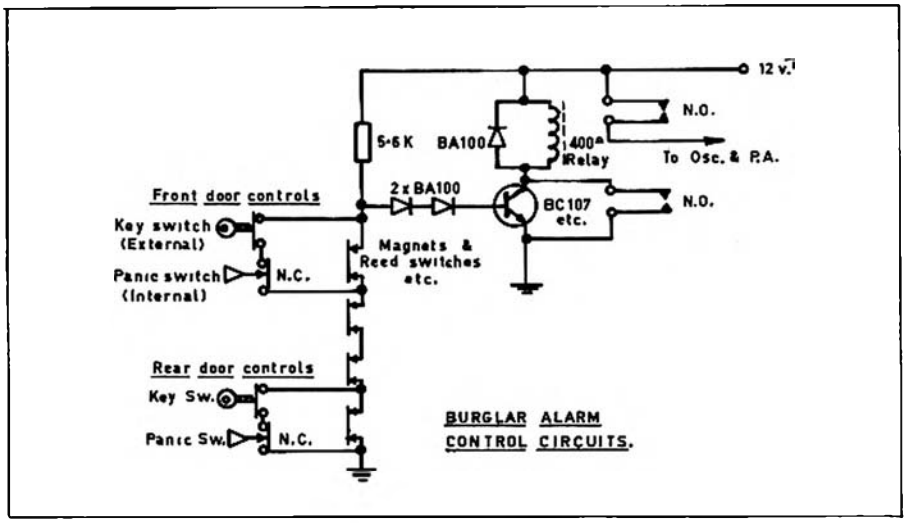

FIG. 2. IMPROVED CONTROL CIRCUITS

Suitable time-out circuits are available commercially.

When away on holidays, or for an extended period, a key should be made available to a neighbor, or to the local Police, in a sealed envelope, with instructions where the alarm control is situated and how to shut down the system, together with address and phone number, of who to contact in case of building damage by forced entry.

In my own installation an internal speaker is switched into circuit while setting and testing all sections, and when found operational the external speaker is switched into circuit so that when all doors are locked and key switches activated the system is in "GO" condition.

By preference this article should not be necessary for "AR", but the thieves and parasites have turned their attention to hard earned, and in some cases pensioner owned equipment, and while my own equipment is always with me when I am away, I have been thankful that the alarm system has deterred one known attempted burglary while away, as my son said after taking the phone message, "you will be pleased to know that your alarm system paid for itself in full last night". I hope it can do the same for you!"

Acknowledgements:
Electronics Australia

A Reader Built It — October 1969. P. 98
Control circuit & power supplies.
Eastern & Mountain District Radio Club
Project — Basic U.J.T. Alarm.
Fairchild Australia Pty. Ltd.

App. brief A.004 Economic Amplifier 3.5 watt.

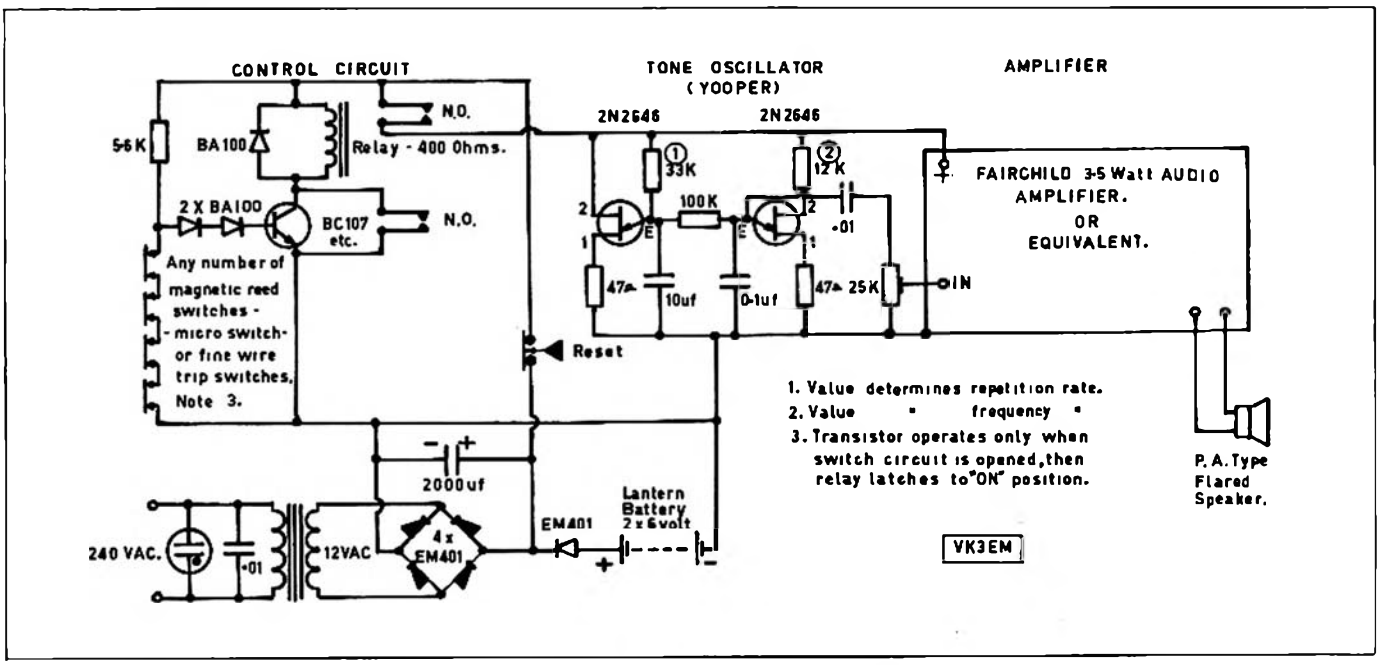

FIG. 1. BURGLAR ALARM CIRCUIT WITH BASIC CONTROL CIRCUIT

A SIMPLIFIED METHOD OF ANTENNA TRAP CONSTRUCTION

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This article describes a simple method of constructing a higher performance antenna trap with the advantage of low cost and easy tuning.

Trap dipoles provide multi-band operation with a minimum of complexity. Compared with paralleled dipoles, the trap dipole is neater, uses less material and takes up less room. Unlike atennas using tuned feeders, it of couse needs no tuning unit.

Many articles have been written about the trap dipole in its various forms, and it is not proposed therefore to go into the details of its operation. It would appear that the main problem associated with the construction of this type of antenna, is the manufacture of the trap itself. Assuming a suitable high voltage capacitor is available, the process of tuning the trap around a fixed value of capacitance is often tedious and time consuming. The VK5QV trap uses an inductor wound with hook-up wire and a capacitor made from a short length of coaxial cable with good results.

A suitable L/C combination to resonate at say 7080 kHz is approximatey 10.75 uH of inductance and a 47 pF capacitor. The *exact* value of inductance is not important, since the capacitance can be readily varied to bring the circuit to resonance, thus making this type of trap an attractive proposition.

The original trap was wound with 19 turns of 7/.0076 PVC hook-up wire close wound on a 1¼ inch diameter former which also acted as the strain insulator. Suitable material for the former is readily available in the form of PVC electrical conduit (1¼ inch class B) or PVC pressure pipe (25 mm) of the type used extensively in plumbing.

The capacitor is made from RG58AU or RG58CU 50 ohm coaxial cable. RG58CU cable uses a non-contaminating sheath and is therefore to be preferred. Data sheets on hand for these cables gives a capacitance of 30 pF per foot. The necessary length of coax to give 47 pF can easily be calculated thus:

$$12 \text{ inches} \times \frac{47}{30} = 19 \text{ inches}$$

This is the *approximate* length of coax required, but in practice, a slightly greater length should be prepared and subsequently pruned to bring the trap to resonance at the desired frequency.

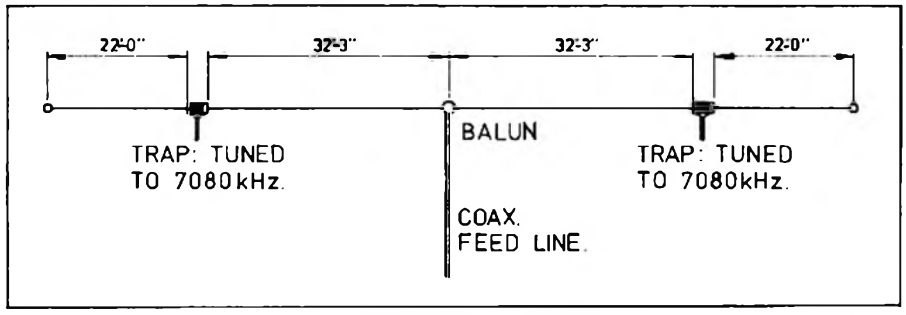


FIG. 1. ANTENNA DIMENSIONS.

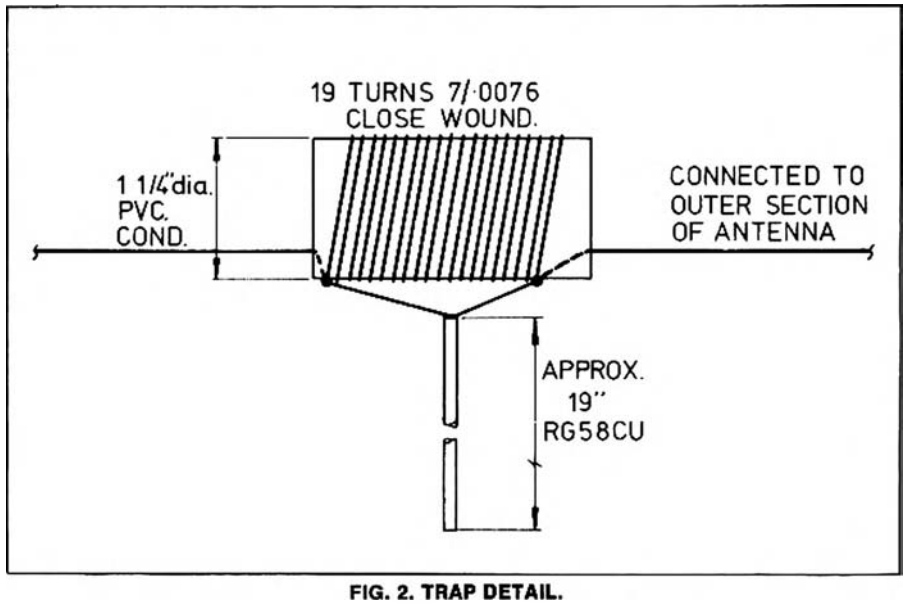


FIG. 2. TRAP DETAIL.

With an inductance of 10.75 uH, a variation of capacitance from 46 pF to 48 pF is all that is necessary to cover the 40 metre band. It can be seen therefore that the pruning of the coax should be carried out with care. Notwithstanding, tuning can be achieved accurately in a very short time. When tuning is completed, both ends of the coaxial capacitor should be sealed with a suitable material such as epoxy resin to stop the ingress of moisture.

It has been found that this type of capacitor tends to "load" the antenna to some extent. Thus different antenna dimensions to those given in articles on trap dipoles using conventional traps, will most likely be required. It would appear from the results obtained from experiments using this type of trap, that part of the antenna connected to the braid of the coax capacitor will be most affected. By connecting the braid to the inner dipole as shown, the length of the 40 metre dipole will generally be shorter than usual due to this loading effect. It can be seen therefore, that the outer section of the antenna will now have to be lengthened to resonate on 80 metres.

The approximate dimensions of the original antenna are given as a guide, but it should be remembered that the final dimensions may vary somewhat with each installation.

Very good reports have been received on 80, 40 and 20 metres since this antenna has been installed, so if you are looking for a simple multi-band antenna, may I suggest you give it a try — you may be pleasantly surprised.

REFERENCES

The ARRL Antenna Book. ARRL.

Trap Dipole for 80 and 40 Metres. Amateur Radio, Sept., 1975.

Coaxial Cable Catalogue. Acme Engineering. ■

RADIO TELETYPE

PART THREE

Jostein Gjerde, LA7MC

RECEPTION OF RTTY

Now that you understand the basics of teleprinter operation, this article will gently introduce you to reception "off air" of RTTY signals. Firstly, however, your machine must be set to the right speed. Here is how it is done.

In this country (Norway) most amateurs get their teleprinters from the Telegraph Co. which regularly — and normally long before the machines are completely worn out — change over to newer models which come on the market. (A similar situation exists in Australia although many of the machines available have come from overseas sources — Ed.).

This means that amateurs normally get outdated machines. When you come into possession of a machine there are a few things you must check before setting up operation as an amateur station.

The first is that you must regulate the speed such that it equals 45 baud used by amateurs instead of 50, as the machine is set for Telegraph service. For speed adjustment, the machine should be equipped with a so-called stroboscope field round the motor axle. This field is divided into alternating black and white sections, usually 10 of each. While the motor is running, if you observe this field through a peep-hole in a tuning fork vibrating at 125 Hz, it will appear that the field is stationary if the motor is running at the right speed to give 50 baud. If you now make a new field, divided into 11 black and 11 white sections, you can set up as above and thereby alter the machine to 45 baud. (A strobe lamp operating at 125 Hz could be used. — Ed.).

The other thing you must check before operating is the margin searcher. This comprises of an adjustable scale on top of the machine. The scale has either 100 or 200 divisions.

The important thing is, you should be in the middle of this scale with the indicator.

As mentioned before, the live sections on the receiving cylinder are narrower than on the transmitter cylinder, so there is room for a slight discrepancy in speed.

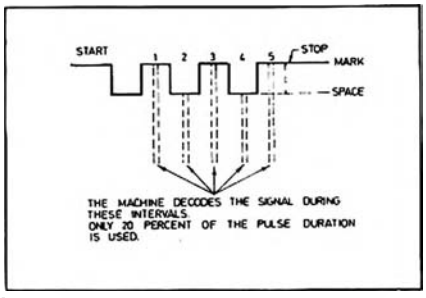


FIG. 1. TIMING DIAGRAM FOR MACHINE DECODING OF A SIGNAL

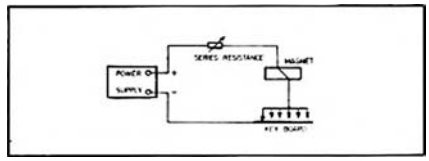


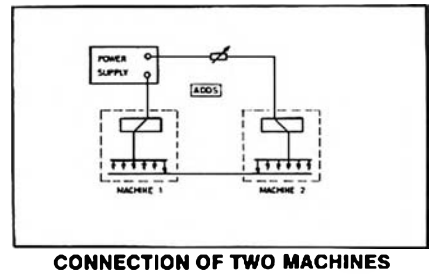
FIG. 2. LOCAL LOOP CIRCUIT

This means that the receiver makes use of only part of the transmitted mark and space pulses. The receiver, in fact, only 'sees' about 20 per cent of the transmitted signal (see Fig 1).

What you do with the margin searcher, is in fact just to move these peepholes in relation to the start impulse — this also applies to signals sent from your own keyboard. The peepholes are placed so that, as close as possible, they come in the middle of the transmitted signal as they are shown in Fig 1.

You will therefore, within a relatively large adjustment range on the margin searcher get a useable type. If you want to check the adjustment, you can wire the machine such that, the receiver magnet receives current through your own keyboard (the local loop Fig 2). You will then get printout. When you move the margin searcher to and fro on each side of the mid point, you will come across two limits where the machine begins to type errors. When you have found these two points, you can set the margin searcher to the middle value and let it remain there.

FIG. 3.



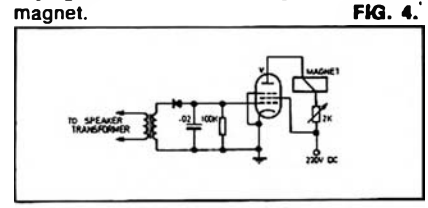
CONNECTION OF TWO MACHINES

If you pass current through the motor without it passing through the receiver magnet, the machine will run continuously. It is useful to couple up a local loop as shown in Fig 2. You then get print out and can begin to practice sending to yourself.

If you have two machines you can couple these as shown in Fig 3, and therefore have set up a Telex. You can easily see that the receiver mechanism will run continuously without current to the magnet. The no current state is the same as a space signal and this is just a message to the receiver cylinder to start searching.

Most radio amateurs will rather be interested in getting the machine connected to a radio receiver so that they can receive radio teletype signals to operate it. For this they need a so-called radio teletype converter or demodulator. This is often called a TU (terminal unit) and is connected between the receiver and the teleprinter and converts the two tones to keying of the current through the receiver magnet.

FIG. 4.



SIMPLE RTTY DEMODULATOR

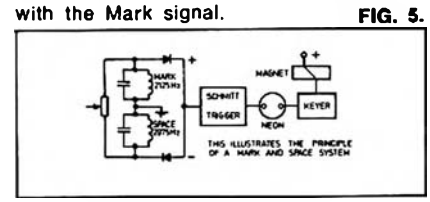
A very simple type of TU is shown in Fig 4. Valve V is an ordinary pentode which is capable of carrying the magnet current, about 45 mA for a Siemen T37 with the magnet poles in series (e.g. 6AQ5 — Ed.). The series resistance is adjusted to this current when there is no received signal input.

Transformer T is an ordinary output transformer from an old radio. It is connected "back to front", i.e. with the voice coil winding connected to the station receiver's output.

When a signal is received, that is transformed up and rectified so that it creates a large negative blocking voltage on the valve's grid. This will cut off the valve so that the magnet current ceases.

When you wish to use this converter for receiver radio teletype signals, set up the receiver so that it is in 'zero beat' with the Mark signal.

FIG. 5.



PARTIAL SCHEMATIC FOR RTTY CONVERTER

The tube is now without bias and passes the full current, as it would with 'Mark'. When the 'Space' signal comes, we get a tone of 850 Hz in the loud speaker. The tone is rectified by the diode, this increases the blocking voltage and the magnet current stops. We thereby get a break in the relay current for a space signal. With this simple arrangement you can get good results, particularly if you have a receiver with good selectivity.

However all signals coming from the loud speaker will produce rectification and blocking, and you may well ask how this will cope when QRM is received. You will soon see the need for a converter which

makes use of both mark and space signals. Fig 5 shows a scheme for such a coupling. We have here two resonant circuits which sort out the two tones and rectify the signals such that a mark signal gives a positive voltage and a space signal gives a negative voltage. A Schmitt-trigger will now change this combination signal into an on/off keying which will operate the mechanism via a neon coupled keyer. You can see that this is the basic principle of most more complicated converter systems, but there are all the subtleties and they are such an extensive subject, that they need an article of their own.

(to be continued) ■

BOOK REVIEW

PRACTICAL ELECTRONIC PROJECT BUILDING by Alan C. Ainslie and M. A. Colwell. Published by Newnes Technical Books. Review copy from Butterworths. Chatswood, N.S.W.

This book of over 100 pages is one of six in a series for the home constructor and appears to be the best of the series.

A concise guide to sound construction techniques is given. Topics covered include: tools, components, kits, layout, wiring p.c. boards, metalwork and cases, finishing, testing and fault location.

The book is liberally illustrated with clear drawings and photographs. At about $4 it is definitely recommended — perhaps as a gift to that nephew (or uncle) starting out as a do-it-yourself electronics expert.

VK3AFW.

PRINTED CIRCUIT ASSEMBLY by M. J. Hughes and M. A. Colwell. Published by Newnes Technical Books. Review copy from Butterworths, Chatswood, N.S.W.

Another volume in the series for the home constructor, its 90 pages contain much information for the beginner. The OT "chassis basher" will also find much to enlighten him. The techniques involved in producing your own printed circuit boards are well covered except for one unfortunate omission. Photographic development of p.c. boards is not dealt with at all. Topics that are covered include analysis of board materials, layouts from circuits, processing, assembly and some supplementary data.

Useful for the inexperienced. VK3AFW. ■

QSP

TELECOM 79

The 3rd World Telecommunication Exhibition, Telecom 79, organised under the auspices of the ITU, will be held in Geneva from 20th to 26th September 1979. Telecommunication Journal, Oct. '76. It will be remembered that WARC 79 begins in Geneva on 24th September 1979. The editorial in the Telecommunication Journal advises that the central theme of Telecom 79 will be "Governments. Industry, Research: Partners in Progress". The last exhibition, Telecom 75, embraced 360 exhibitors from 37 countries in a 37 000 m² area and attracted over 100 000 visitors.

SOME FIELD STATION!

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On December 29th, 1976, 15,000 people converged on a point 20 km south-east of Melbourne to attend the 11th Australian Scout Jamboree. This day and the following ones were to be classified by many people as "never to be forgotten". Amongst those were a handful of amateur radio operators who had volunteered to organise an amateur radio facility at the Scout Camp.

The team of workers led by Max VK3TR and Mike VK3ZVN commenced work in June 1975 to gather personnel and equipment to set up a field station to introduce Scouts to the art of AR. As time progressed, the magnitude of the task became more and more apparent. As well as those in camp it was expected that as many as 100,000 visitors would pass through the camp and any number of these may stop by for a look at the Amateur Radio station.

While this was being organised, two other radio activities were being planned. The Jamboree Publicity Committee had taken up the idea of a fully fledged Broadcast Station, and it had also been decided to provide an introductory construction project for the Scouts.

All three aims were achieved and perhaps the easiest of the lot was the one which, only a few years ago, would have been completely unacceptable. I refer to the Broadcast Station. Liaison with the Australian Broadcasting Control Board resulted in permission for the project to proceed under the conditions of an Experimental Licence. Co-operation from commercial broadcast stations was sought and received — 3DB's mobile studio and audio equipment arrived on site on the 23rd December. The transmitter was housed in a cupboard in the van and coupled to the audio equipment via an audio compressor and out to the aerial via 50 ohm coaxial cable. The transmitter was christened officially as a type "Fisher Mark 1", originally starting life as Ron VK3OM's 160 metre rig, and now converted to crystal watts was officially logged and fed into control on 1550 kHz. An output of 6.6 watts was officially logged and fed into the aerial. A 50 ft telescopic mast (by courtesy of Hills Antennas) fitted with some top loading in the form of half of Ron's 160 metre helical. Some L and C at the base of the mast provided a feed point for the coax. Jamboree Radio was ready to go on the air at 6.00 a.m. on 29th December. Operation was then from 6.00 a.m. until 8.00 p.m. each day until the official close down on the 6th January. Thanks go to Colin Tyrus of 3AW and Paul Mason (Telecom Australia) for organising the programs and staff.

In the meantime, two tents had been arranged for each of the other activities — a 45 ft x 20 ft marquee for the construction, and an 80 ft x 20 ft marquee for the "shack". The main organisation of the construction project was handed to Bob VK3AIC to get his teeth into. The unit to be built was a discrete component flip-flop capable of operating in several different modes — a morse code oscillator, a flashing lamp or as an amplifier. About 1,000 boys took part in this activity with hundreds of boys having to be turned away, showing a real need for more of this type of introductory project for the 12 to 14 year old boys.

Meanwhile, on the AR front, aerial masts had been erected. Three of these towered to 60 feet above the ground and were arranged in a triangle. Dipoles for 160 metres, 80 metres and 40 metres were hung at 60 feet on the three sides of the triangle. The two prizes of the aerial farm were hauled to the top of two of the poles — a Hygain TH6DXX on one (with a 2 metre Ringo above it) and a TH3MK3 (with a 27 MHz vertical above it) on the other. The fourth aerial pole was quite a small one, being a bare 30 feet high. On the top of this, however, were two beams — a 10 element two metre and a wide spaced 6 element 6 metre beam (boom length 24 feet). A 2 metre quarter wave on the side of one of the 60 ft poles at about 40 feet provided an aerial for 2 FM.

The dipoles were fed with half-wave length open wire lines and then to baluns to provide coaxial inputs. All other aerials were fed with coaxial cable to the mast heads directly using matching as required at that point. Baluns and a HAM 11 rotator for that BIG beam were loaned for the period by Vicom International and the other beams were ably supported by Stolle rotators on loan from Hills Antennas.

Inside the shack, the equipment finally took shape. Two complete HF stations comprising FT101E transceivers, driving in one case an FL2100B linear, and in the other an FL2500 linear (thanks, Jack VK3APU). Auxiliary equipment for the first station was as follows — an external VFO, a monitorscope, a panoramic adaptor and a digital frequency readout (thanks, John VK3JH). On the VHF side of the fence an IC502 plus 10 watt linear and an IC202 plus a 25 watt linear (thanks, John VK3BAF) gave us our SSB facilities. Several FM rigs were on the side for special contacts.

Having put everything together, it was then an easy (?) matter to commence operation at midnight on the 28th December and operate 24 hours a day until 5.00 p.m. on the 6th January. Who said it was easy? Four hours sleep a day, too many cups of coffee and many exciting DX contacts contributed to the reasons that allowed us to survive the ordeal. The best

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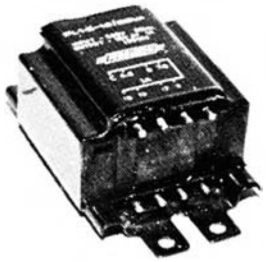

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estimate we can make is that between 10,000 and 12,000 visitors passed through the shack, our logs tell us we made 1420 contacts to 72 different countries, including many quite rare ones. Some of the interesting ones included three out of the four A4X stations licensed, 4U1ITU Geneva, HB9S — the Scout World Bureau station in Geneva and many others.

The interest shown in amateur radio generally could not have been any greater. The questions asked by Scouts and Scouters were very intense and *in many cases were obviously based on knowledge gained from the current popularity of 27 MHz.* Most questions were satisfactorily answered and in many cases converts to Amateur Radio were made, again indicating the need for more pro-amateur propaganda throughout the community.

The project was organised overall by the Blackburn District Scout Radio Club, a small but keen club who were ably supported by the Eastern and Mountain District Radio Club. Any enquiries from would-be members or supporters of the Scout Club are welcome to contact me at home, QTHR. The club meets at Blackburn on the second Sunday of each month and we would be glad to see any prospective members.

Thanks to the following ops for their assistance: VK3's, ZZB, YCP, ADD, ZVN, ZND, KX, BEX, YAN, AIC, AIS, AYO, LM, ZDM, NAW, AUM, BII, 1O, ZU and NAK, VK2ZUR, JR3THH, JR2KDA and KG6JHQ. ■

TONY VK3IO LOOKS ON AS A SCOUT TESTS HIS HANDIWORK

ABOVE: NICK VK3ZND WAS TAKING NO CHANCES FIXING SIGN TO A MAST — (IT FELL DOWN 3 DAYS LATER)

LEFT — THE SHACK AND ANTENNA FARM AT VK3BSA/P

RAISING THE ANTENNA FOR THE JAMBOREE BROADCAST STATION

BILL VK3ZMI LENDS A HAND IN THE CONSTRUCTION TENT

PHOTOS BY BILL ROSE

AN AR SPECIAL

A REVIEW OF THE KENWOOD TS-700A TWO METRE ALL MODE TRANSCEIVER

The new Kenwood TS-700A is a fully self-contained AM, FM, CW and SSB transceiver. Full coverage of the 144/148 MHz amateur band is provided in four 1 MHz bands. Whilst now on the Australian market, a version with 144/146 coverage has been available on the Japanse and European markets for some time. It would seem that providing a full four megahertz coverage on a transceiver of this type is not without its problems as other companies now producing VHF gear have yet to market a transceiver of this type. With the addition of the TS700A, Kenwood are now well represented on the Australian scene with a complete range of fine equipment.

FEATURES OF THE TS-700A

The TS-700A has a full VFO coverage of the two metre band from 144 to 148 MHz in four bands. The VFO and its associated tuning mechanism is similar to that found on normal HF transceivers except that there is 1 MHz coverage instead of the usual 500 kHz. The only feature not included in the basic package is VOX. This is, however, available as an external plug-in extra.

Enclosed in a steel cabinet measuring 278 mm wide, 124 mm high and 320 mm deep, it has a smaller front panel than its HF relation the TS-520, but is almost the same depth. Appearance bears a strong relationship to other current Kenwood models. The effect of the grey panel and cabinet with a brushed chrome trim around the panel and control knobs contrasts with the vivid green illumination of the "S" meter and main dial calibration scale to produce one of the prettiest rigs available at the moment. Facilities include both normal and reverse repeater off-set for FM operation; selectable upper or lower sideband on SSB; provision of 11 crystal controlled channels for fixed frequency operation (crystals are, of course, optional for this facility).

The front panel meter reads either relative power output, signal strength or as a centre zero discriminator indicator to facilitate netting on FM.

Transmitter power output is rated at more than 10 watts on FM and CW, 3 watts on AM and 20 watts DC input on SSB. The reason for rating SSB on an input basis is not stated. An AC power supply is built in and AC or DC operation is selected simply by plugging in the appropriate power cord, both of which are supplied with the set.

Receiver offset tuning is available on all modes as is a noise blanker for SSB reception and a squelch control for FM. Another optional extra is a tone generator for tone access repeaters. This would not be needed for Australian repeaters.

The main tuning dial has two speeds, one giving a 25 kHz per turn rate and the other 100 kHz per turn rate. The dial plate at the back of the tuning knob assembly is calibrated in 1 kHz segments.

Accessories supplied with the TS-700A include a push to talk dynamic microphone, an assortment of plugs and spare fuses, AC and DC power cords, and a pair of extension feet to enable the front of the transceiver to be tilted up slightly.

The circuit is fully solid state and uses a total of 63 transistors, 17 FET's, 3 IC's and 100 diodes. Construction is on nine main printed circuit boards which are connected together by a comprehensive wiring harness. Accessibility for service would not seem to be one of the TS-700A's good points. However, the front panel can be easily removed and the final amplifier can be detached by removing several bolts securing it to the rear panel of the rig.

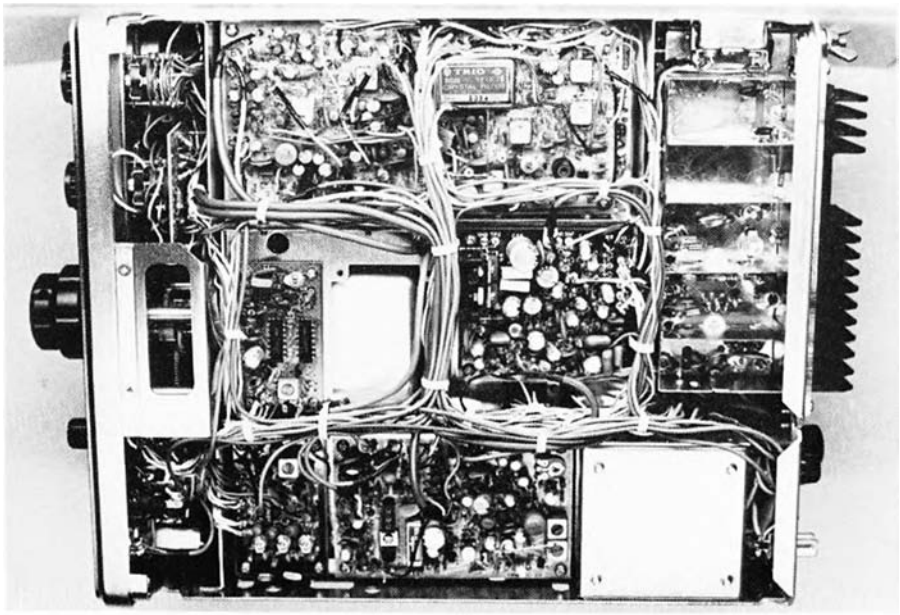
THE TS-700A CIRCUIT

Although the TS-700A is naturally a complex piece of equipment, the circuit is easily sorted out. Firstly it should be noted that no phase locked loops are incorporated and that the signal paths are straight forward, more or less on the lines of the more familiar HF transceivers. On SSB, AM and CW the transceiver operates in a single conversion set-up with a 10.7 MHz IF and a filter that provides 2.4 kHz selectivity on all these modes. For FM, the 10.7 MHz IF is followed up with a 455 kHz section to provide the correct selectivity and required limiting for this. Naturally the 10.7 MHz take off point for this section is before the high selectivity filter used for SSB.

The VFO used in the TS-700A is of the same design as the one employed in the TS-520 but modified to provide a full 1 MHz coverage. The actual tuning range of the VFO is from 8.2 to 9.2 MHz. The output of the VFO is mixed with the heterodyne oscillator to give the actual output frequency. The heterodyne oscillator employs six crystals, four of which mix with the VFO to give the four bands as normal operation. The other two are selected with the repeater offset selector and operate on the 146 and 147 MHz segments only. These two crystals are switched in and out automatically for either transmit or receive depending on whether normal or reverse repeater operation is selected. The heterodyne oscillator frequencies are 125.1, 126.1, 127.1 and 128.1 MHz for simplex working with the two repeater off set crystals on 126.5 and 128.7 MHz. Extensive use is made of balanced mixers throughout the transceiver which is perhaps one of the factors why spurious responses are practically non-existent.

Transmitter output and receiver input are both fed through a band pass filter network which is tunable via the front panel 'FINAL' control. This serves two purposes. It gives the receive section

KENWOOD TS-700A — PHOTOS BY KEN REYNOLDS VK3YCY



INSIDE THE TOP COVER OF THE TS-700A

excellent front end characteristics with a total absence of cross modulation. It also assures a transmit output free from spurious signals. A calibrator provides 100 kHz marker points. These are derived from a basic 10 MHz crystal followed by a buffer stage and two divide by ten stages.

Three different modes are produced in the transmitter generator unit. The SSB carrier generator which also acts as the receive BFO, feeds a four diode balanced modulator for SSB generation. On CW the balanced modulator is unbalanced to produce the carrier required. A separate low level AM modulator delivers normal double sideband signal, however, the carrier output from the transmitter has to be kept to about a quarter of the normal CW output to make allowance for the peak output of the AM signal. All modes are produced at 10.7 MHz plus or minus a small amount for USB, LSB or the AM/CW frequencies.

THE TS-700A ON THE AIR

Firstly the transceiver was put through a series of tests to determine its actual capabilities. Just how these findings translate into actual operation in the shack will be discussed later.

Receiver sensitivity was checked first. 20 dB of quieting was achieved at an input of .25 uV on 148 MHz and .18 uV at 144 MHz. This of course was on FM, and with the squelch control set just on the mute opened with .14 uV input at 146 MHz.

Sensitivity for SSB was measured at 144 MHz and the following results were obtained: .1 uV produced a 4 dB signal to noise ratio, .5 uV gave 22 dB, and 1 uV gave 26 dB. The calibration of the 'S' meter was next tabulated.

For FM		For SSB	
S1	2.0 uV	S1	.8 uV
S3	2.4 uV	S3	.9 uV
S5	2.9 uV	S5	1.9 uV
S7	5.6 uV	S7	2.6 uV
S9	25.0 uV	S9	9.0 uV
S9 + 20	2.0 mV	S9 = 20	100 uV

As received the 'S' meter would not read above S9 + 20 dB and all readings were taken with the meter set as received. However, it is possible to readjust this with an internal preset control.

The maximum deviation accepted by the receiver was ± 7.0 kHz. Above this figure the distortion on the received audio increased rapidly.

Transmitter power output was next on the list. CW and FM output at 146 MHz was 14.0 watts and SSB peak output at 144 MHz was 10 watts. Somewhat higher output on SSB could be obtained higher in the band.

Transmitted FM deviation was set at 6 kHz as received from the agents, but the FM microphone gain control was set far too high. When this was reset the transmitted audio quality on FM was judged to be fairly good, although somewhat lacking in high frequency response. Transmitted audio on SSB was judged excellent with a very acceptable degree of balance between highs and lows. Received audio quality on FM was slightly lacking in high frequency response, but on SSB it was excellent and quite comparable with any good HF transceiver.

VFO stability was checked and found to be very good. From a cold start the total shift did not exceed 500 Hz but the linearity of the dial calibration was only fair. Setting against the calibrator at the low end of the band, the calibration error increased up to a maximum of four kHz at the centre of the band and then gradually returned to reference at the high end of the range. So long as the calibrator is used frequently when moving up and down the dial no real problems should exist.

The FM discriminator was out of balance on our review transceiver. With the meter switched to the centre zero position, the zero point was accurate and stable but on tuning through a signal, the needle swung much further one way than the other. We did not check this further but it could have been the reason why the receiver was very critical to deviation over 7 kHz. At 144 MHz the calibrator was 700 Hz off frequency.

Next we transferred to the shack to actually try the TS-700A on the air. The tuning control had a rather odd feel about it. On rotating the knob every tooth in the gear drive could be felt and when using the fast speed tuning to traverse the band a noise like filing metal was produced. Several visitors were invited to try the tuning and opinion was divided, some liked it, others did not.

Tuning up was easy. The FINAL control could be set for the desired portion of the band, the actual peak being very broad. The DRIVE control was peaked on transmit in either the FM or CW mode and again it proved to be very broad. In fact it had only minimal effect on output. Indicator lights signalled the 'ON AIR' condition and also the selection of receiver offset operation.

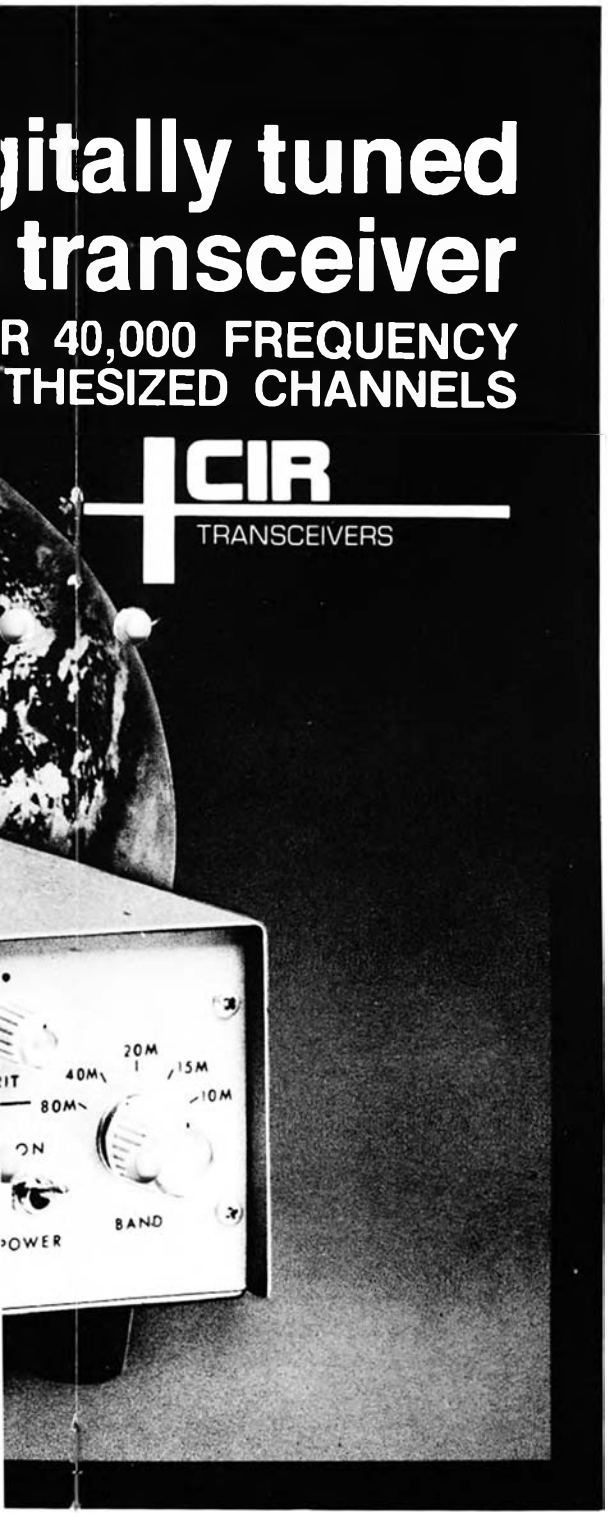
Reception of SSB signals was excellent with good quality and very low audible distortion, due no doubt to the excellent AGC action and the balanced diode product detector. The AGC release time was slow, taking about three seconds to decay from the 'S' 9 point. Fast acting AGC is automatically provided for CW and AM operation. The noise blanker action was fairly good. It was effective on car ignition noise but, perhaps in common with most blankers, its effect was variable on power line and domestic appliance type noise. Using the blanker did not seem to produce any cross modulation.

INSTRUCTION BOOK

The TS-700A instruction book is well written and gives clear information on all aspects of operation. Most of the internal adjustments are covered but, as is usual these days, no actual service information is included. At this point in most reviews we make some criticism of this fact but not in the case of the Kenwood. Available from the distributors at nominal cost is a complete service manual that would delight the heart of any enthusiast. If you are the "fix it yourself" type then all the information you will need is included — circuit board layouts, full parts list, and complete alignment procedure. If you are just the type who likes to see how things work, again this is for you.

In any case, full service facilities are available from the Melbourne agents for Kenwood, Vicom International, 139 Auburn Road, Auburn from whom our review TS-700A was obtained. ■

Sideband Electronics Sales



SPECIFICATIONS

GENERAL

Frequency Coverage

3.5000 MHz - 3.9999 MHz	21.0000 MHz - 21.4999 MHz	Built in Digital Synthesizer
7.0000 MHz - 7.4999 MHz	27.0000 MHz - 27.9999 MHz*	in 100 Hz increments
14.0000 MHz - 14.4999 MHz	28.0000 MHz - 29.9999 MHz	

*receive only

Frequency Control: Ultra stable digital frequency synthesizer with crystal reference oscillator, 100 Hz digital readout resolution. <20 Hz per hour drift. Frequency accuracy equal to WWV calibration. Additional fine adjust control allows >± 50 Hz for continuous band coverage.

External Frequency Control: Rear socket for external VFO or synthesizer input for crossband operation. Frequency input coverage same as that with built-in synthesizer.

Modes of Operation: SSB with selectable sideband. CW with automatic 1 KHz offset on transmit. Semi break-in with adjustable delay and sidetone comes standard. **Internal features include:** WWV receiver, squelch, noise blanker, VOX, speech processor.

Power Input Required: 12-14 VDC, negative ground only. (No damage 10V - 15V DC.)

Dimensions: 2.8" H x 12.1" D x 9.5" W (Depth includes heat sink)
7.2 CM x 30.8 CM x 24.13 CM (Depth includes heat sink)

Weight: 8 pounds, (3.6 kg)

Rear Panel Connectors:

Auxiliary Functions: External L.O. in;
V++ output;
Ground;
V_{fo} control for optional external synthesizer;
EXT L.O. gate for optional external synthesizer.
EXT MOD in;
Current sink for driving external circuits.
ALC in.
Audio out, 8 ohms.

Power: 12-14V DC input
RF: UHF type
Phone Jack: Earphones, RCA type (8 ohms)

RECEIVER

Circuit Design: Direct conversion to 5.6 MHz IF using balanced mixer. Exceptional immunity to overload and cross modulation.

Sensitivity: <0.3μV for 10 dB $\frac{S+N}{N}$

Selectivity: Crystal ladder 8 pole filter. Bandwidth 2700 Hz @ 6 dB down, 4900 Hz @ 60 dB down. 1.8 shape factor.

Image Rejection: >50 dB 80M - 15M
>40 dB 10M

Internally Generated Spurious Response: <1μV equivalent input signal.

AGC: 6 dB change in audio level over input range of 0.5μV - >0.1V (108 dB)

Audio Output: 1 watt available @ <10% distortion. 300-3000Hz

Meter: S units from 1-9, 20, 40, and 60 dB over S-9.

Frequency Control: By digital synthesizer with 6 digit readout to 100 Hz. RIT (receiver incremental tuning) allows receiver tuning >± 50 Hz from indicated frequency without moving transmitter frequency.

TRANSMITTER

Circuit Design: Broadband design to eliminate the need for tuning. Excellent harmonic and TVI suppression. ALC. Infinite VSWR protection. Provision for external ALC input, positive going.

Frequency Control: By synthesizer with 6 digit readout to 100 Hz. Fine tuning adjustment allows >± 50 Hz from indicated frequency.

Power Rating: 200 watts PEP input and CW input at 13.6 VDC input. 50 Ohm non-reactive.

Power Output: 100 watt PEP and CW @ 13.6 VDC input. An ideal power output level for driving most grounded grid linears.

Unwanted Sideband Rejection: >60 dB down @ 1000 Hz audio.

Carrier Suppression: >50 dB down.

Two Tone Modulation: >30 dB below peak power level.

Harmonic Output: >45 dB below peak power level.

CW Transmit: Semi break-in with sidetone standard. Automatic 1 KHz offset on transmit frequency.

Spurious Output: >50 dB below peak power level.

Transmit Control for SSB: PTT standard, VOX with option.

Microphone Input: Dynamic or crystal, high impedance.

Audio Response: 300 to 3000 Hz ± 6 dB.

Meter: Reads ALC on transmit or forward and reflected power.

Linear Amplifier Control: Auxiliary socket on rear provides for keying of linear.

Cooling: Large capacity heat sink fins supplied. For SSTV, RTTY, and semi-continuous transmit, forced air cooling on heat sink fins recommended.

INTEGRAL OPTION

400 Hz CW Filter: Narrowband 8 pole crystal filter and associated components for ASTRO 200. Order Model NBF-200.

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PETER SCHULZ, VK2ZXL.

VK-ZL OCEANIA Dx CONTEST RESULTS FOR 1976

Some observations . . .

1. For various reasons, VK and ZL results with relevant certificates are being posted out earlier than usual. Overseas results will not be available for at least six weeks or more.

2. Participation Cards — as part of NZART Jubilee — have been sent to all who submitted logs. Unless SASE or IRC was sent, these went via QSL Bureau.

3. Increased ZL support was to be expected but there is also a considerable increase in VK logs compared with 1975. Continuing lack of activity from ZL4 is unfortunate. Tremendous support is already in evidence from Japan — as well as from Czechoslovakia.

4. Publicity in some areas around the world left much to be desired — regrettable.

5. As well as being sent to overseas certificate winners (and major Societies) overseas results will be publicised in "Break-In" and in "Amateur Radio".

6. The manner of scoring for VK and ZL entrants has been raised. The "BERU" system was introduced to provide the most equitable system for VK's and ZL's and from personal experience it has not been too difficult to manage — even when present logs have to be re-scored! Admittedly it does take longer — but it also helps in checking contacts made. Because of the great increase in the number of prefixes available, it is suggested that these could be used as a new basis for scoring . . .

FOR VK/ZL STATIONS: 1 point for each contact on a particular band with the score for that band being the total of contact points multiplied by the total of different prefixes worked on that band. (NOTE: This means that W1, K1, WA1, WB1, etc., would all be different — as would JA1, JJ1, JG1, JR1, etc., etc.) Total "all bands" score would be the sum of the totals for individual bands.

7. Jubilee Plaques will be posted to top VK's on CW and on phone and to ZL's on a district and band basis.

8. A few logs were re-scored while others were so set out that this — while desirable — presented too formidable a task! Such logs have the total score indicated with no component band scores.

9. One log at least was unreadable to the extent that re-scoring was impossible. There should be no need to re-write or type logs — a carbon copy of the operating log is sufficient. For the "speedy" operator this means some preparatory work — and the omission of some mundane details.

10. Whether because of the proliferation of contests — or because of an "apparent" lack of interest, the continuation of VK/ZL/O has been investigated on several occasions and comments by WIA in "Amateur Radio" are noted. Here is one fact which is often overlooked — the number of logs received (on a smoothed average) has steadily increased during the period NZART records have been kept — from a total of 192 in 1954 to the high of 791 in 1969 which was NZ Bi-Centennial (696 in 1970 for Australia Bi-Centennial) to 519 in 1972; 465 in 1973; 511 in 1974; 436 in 1975 and an estimated 500 plus in 1976 (SWL logs not included). A major problem would be lack of consistent interest and activity by VK's and ZL's. From comments received and from observations, overseas interest in "VK/ZL" is high. Another major problem is organisation and costs. Organisation calls for the availability of personnel with time to attend to the very great administrative load expeditiously and with honorary appointments this is asking a great deal — and costs! — these are escalating — each certificate sent out this year would cost NZART at least 50 cents but some values cannot be measured by cost alone. Nevertheless, this is food for thought.

11. My appreciation is extended to all who submitted logs — many of which were obviously not trophy winners. Without the interest and co-operation of such people this contest activity would collapse.

12. NZART sponsors numerous operating awards which might provide some stimulus to your enjoyment of amateur radio. There are grades of difficulty to suit all — from the prestigious "5 x 5" requiring "know-how" on "all bands" to others which require a reasonable degree of activity.

13. Your comments on the organisation of this contest would be appreciated.

73

Jock White ZL2GX, NZART Contest and Awards Manager.

RESULTS

VK — CW

Call	80	40	20	15	10	Total
2APK	450	4210	7565	3465	265	15995
2GW	545	1885	6790	2580	—	11800
2AFG	225	2795	6085	1745	55	10935
2BJL	480	1575	6055	2275	210	10595
2CAX	620	2325	5435	1900	—	10280
2QL	135	55	365	920	710	2185
3MJ	385	1970	5320	2345	—	10020
3QI	—	7265	—	—	—	7265
3VF	410	—	4770	1740	—	6920
3CM*	540	540	3080	1435	—	6325
* plus 730 on 160 m						
RRJ	—	—	—	2470	—	2470
3XB*	2015	55	—	—	—	2125
* plus 55 on 160 m						
3VQ	—	—	—	—	—	1680
3MR	915 on 160 m					915
3AT	—	—	680	220	—	900
3KS	—	110	—	—	—	110
4XA	365	3530	6900	4225	1670	16690
4HE	—	3840	5020	—	—	8860
4DO	—	—	—	5485	—	5485
4LV	—	—	2500	360	—	2860
4XY	—	—	1820	—	—	1820
4KX	—	975	385	—	—	1360
5NO	—	665	6480	2770	705	10615
5QQ	—	—	7135	1580	—	8715
5RX	—	840	3895	910	—	5645
5FM	—	—	3120	1645	—	4765
6DS	—	535	4285	4575	—	9395
7BC	380	950	5740	410	—	7480
7HE	—	—	—	—	—	2625
7RY*	455	535	605	—	—	1705
* plus 110 on 160 m						
7JB	—	—	1110	—	—	1110

VK — SWL

Call	80	40	20	15	10	Total
L3042	—	—	—	—	—	4300

VK — PHONE

Call	80	40	20	15	10	Total
1RM	—	—	7640	—	—	7640
1FT	—	530	4180	850	660	7160
1GB	—	265	3905	—	—	4170
1LF	—	—	1650	420	—	2070
2XT	590	1080	9400	6205	1940	19215
2APK	425	2420	8225	2530	1485	15085
2BJL	165	420	6615	1975	—	9175
2ABC	—	—	4475	—	—	4475
2PT	—	—	785	2065	—	2850
2BEL*	135	55	675	645	165	1730
* plus 55 on 160 m						
2AKV	—	—	970	165	—	1135
2OW	—	—	270	215	—	485
3AMK	—	—	6610	3200	—	9810
3AKK	—	1155	4620	3670	—	9445
3BHN	—	—	7180	1615	—	8795
3SM	255	265	3625	2090	430	6665
3AIE	—	—	3990	1900	—	5890
3HE	100	—	2825	1490	—	4415
3WT	—	—	1700	1675	485	3860
3XB	—	670	2210	910	—	3790
3CM*	100	410	2815	—	—	3500
* plus 175 on 160 m						
3BBF	55	55	1025	635	—	1770
3ZD	—	—	1310	—	—	1310
3WW	—	—	1190	—	—	1190
3AT	—	—	375	720	—	1095
4AAU	—	—	6685	2725	1000	10410
4TE	675	—	4640	2175	—	7490
4EZ	—	—	5655	1825	—	7480
4PJ*	110	—	1525	2880	—	4570
* plus 55 on 160 m						
4UG	360	—	1815	—	—	2135
4AM	—	—	—	—	—	check
5NO	—	1300	7675	2600	—	11575
5ZZ*	—	1405	3435	1860	—	6960
* plus 160 on 160 m						
5RX	—	345	2350	1920	—	4615
5ZX	—	—	1215	200	—	1415
5ND	—	400	325	—	—	725
6II	—	110	7460	2235	—	9985
6BV	—	—	3225	3500	—	6725
6PD	—	—	2435	1315	—	3750
6RU	—	—	1040	—	—	1040
6TU	—	—	110	—	—	110
7BC	210	490	4860	1190	—	6750
7HE	—	—	—	—	—	1940
7MC	750	—	—	—	—	750

ZL — CW

Call	80	40	20	15	10	Total
1BOK	1035	3335	6515	3600	840	15325
1AIZ	1205	4550	3310	2910	1090	13065
1NG	—	855	4190	3450	790	9285
1BJH	255	1450	2965	3665	—	8335
1AMO	—	7620	—	—	—	7620
1AFW	320	1160	2860	1470	870	6680
1AIH	—	6640	—	—	—	6640
1HV*	520	1545	1705	765	—	4725
* plus 190 on 160 m						
1AMM	55	900	335	—	—	4310
1MT*	420	55	975	600	—	2315
* plus 265 on 160 m						
1AXX	1590	—	—	—	—	1590
1MT	420	55	975	600	—	2315
1MQ	510 on 160 m					510
1BII	—	—	—	—	—	check
2UW	400	8335	4570	2160	—	15465
2BR	460	4635	5735	3135	55	14020
2AGY	—	5355	4575	2235	210	12375
2GW	365	1005	2790	1430	—	6255
2ACP	—	5300	—	—	—	53?
2KX	—	3365	—	935	—	43.
2AUP	165	815	2230	—	—	3210
2MM	—	—	2305	—	—	2305
2AHD	—	—	—	155	—	155
2GX	—	—	—	—	—	check
2AHC	—	—	—	—	—	check
2AWH	—	—	—	—	—	check
2BGE	—	—	—	—	—	check
3GQ	—	11840	1805	2125	—	15770
3GG	1120	5815	5920	1410	—	14365
3BK	420	3635	5710	3290	—	12055
3PJ	1410	—	—	—	—	1410
3ABC	—	—	600	—	—	600

ZL — SWL

Call	80	40	20	15	10	Total
ZL1-49	—	—	—	—	—	8090
ZL2-129	—	—	—	—	—	2290

ZL — PHONE

Call	80	40	20	15	10	Total
1BKX*	320	4480	9995	4605	—	19580
* plus 180 on 160 m						
1AXB	—	—	12795	—	—	12795
1AIZ	780	3260	4285	2915	110	11350
1AGO	—	—	8755	—	—	8755
1AKY	110	920	2120	4365	110	7625
1BOQ	—	6560	—	—	—	6560
1BOK	—	—	—	6400	—	6400

ZL — PHONE (continued)

1IB	310	—	5115	890	—	6315
1AMM	55	165	3670	1400	—	5290
1HE	320	—	2575	—	—	2875
1TB	—	—	1710	480	—	2435
1BJH	—	—	1230	990	—	2220
1PN	750	—	—	—	—	750
1AQO*	453	—	—	—	—	745
* plus 290 on 160 m						
1AXX	—	—	—	—	—	check
1BII	—	—	—	—	—	check
2ACP	55	3410	6880	3505	—	13850
2RP	—	—	6210	1940	—	8150
2AHC	245	1425	2480	2410	—	6560
2AH	—	—	4090	1380	—	5470
2BCX	—	—	5055	—	—	5055
2QY	575	210	1605	1600	—	3990
2AWH	1280	—	—	—	—	1280
2AHD	—	55	1020	190	—	1265
2AJB	—	—	660	—	—	660
2NW	—	—	275	—	—	275
2HE	265 on 160 m					265
2GX	—	—	—	—	—	check
3GG	595	3495	6335	1390	—	11975
3BK	420	805	5610	1570	—	8405
3ACS	265	110	2550	960	—	3885
3ABC	165	—	1875	—	—	2040
3TX*	545	55	—	—	—	820
* plus 220 on 160 m						
3ACC	525	—	—	—	—	525
'J	320	780	1130	55	—	2285

VK AND ZL INDIVIDUAL BAND SCORES

All Band —

CW		PHONE	
VK4XA	16690	VK2XT	19215
VK2APK	15995	VK2APK	15085
VK2GW	11800	VK5NO	11575
ZL3GQ	15770	ZL1BKX	19580
ZL2UW	15465	ZL2ACP	13850
ZL1BOK	15325	ZL1AXB	12795

160 m —

VK3MR	915	VK3CM	175
VK3CM	730	VK5ZZ	160
VK7RY	110	VK2BEL, VK4PJ	55
ZL1MQ	510	ZL1AQO	290
ZL1MT	265	ZL2HE	265
ZL1HV	190	ZL3TX	220

80 m —

VK3XB	2015	VK7MC	750
VK2CAX	620	VK4TE	675
VK2GW	545	VK2XT	590
ZL1AXX	1590	ZL2AWH	1280
ZL3PJ	1410	ZL1AIZ	780
ZL1AIZ	1205	ZL3GG	595

40 m —

VK3QI	7265	VK2APK	2420
VK2APK	4210	VK5ZZ	1405
VK4HE	3840	VK5NO	1300
ZL3GQ	11840	ZL1BOQ	6560
ZL2UW	8335	ZL1BKX	4480
ZL1AIH	6640	ZL3GG	3495

20 m —

VK2APK	7565	VK2XT	9400
VK5QQ	7135	VK2APK	8225
VK4XA	6900	VK5NO	7675
ZL1BOK	6515	ZL1AXB	12795
ZL3GG	5920	ZL1BKX	9995
ZL2BR	5735	ZL1AGO	8755

15 m —

VK4DO	5485	VK2XT	6206
VK6DS	4575	VK3AKK	3670
VK4XA	4225	VK6BV	3500
ZL1BJH	3665	ZL1BOK	6400
ZL1BOK	3600	ZL1BKX	4605
ZL1NG	3450	ZL1AKY	4365

10 m —

VK4XA	1670	VK2XT	1940
VK2QL	710	VK2APK	1485
VK5NO	705	VK4AAU	1000
ZL1AIZ	1090	ZL3GG	160
ZL1AFW	870	ZL1AIZ	110
ZL1BOK	840	ZL1AKY	110

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

AN SSB FILTER FOR THE YAESU FRG-7 RECEIVER

Since the introduction of the Yaesu FRG-7 receiver only a short time ago, it has established itself as one of the finest low cost communications receivers ever marketed. However, initial low cost must impose restrictions on available facilities and one of these is the lack of a suitable filter for SSB reception. A compromise degree of selectivity has been incorporated in the original receiver for all modes.

Phil Williams VK5NN has come up with the answer and the work involved should not be beyond the scope of the average enthusiast. Over to Phil.

"It is easy to fit a 2.5 kHz filter in the FRG-7 to improve its reception of amateur SSB and CW signals. Suitable Murata filters are listed in the catalogue but are not readily available, so it was decided to use the filter designed by Ian Pogson VK2AZN, employing four of those little red ceramic IF units type SFD 455B, coupled with small 47 pF ceramic capacitors. It is necessary also to adjust the BFO frequencies for this filter and the procedure adopted, requiring no test equipment, is as follows. Fig 1 shows the method of mounting and wiring the filter. There is a spare bank of the mode switch S3, which may be used to switch to the output of the existing kHz filter for AM, or the 2.5 kHz filter for SSB or CW. The total cost of the new filter parts is about 6 or 7 dollars. The attenuation of this filter is a little more than the Murata filter, but the results are not impaired by this and the overall receiver sensitivity is quite adequate.

The filter is so small and light that it will mount on the base of the PCB with the two earth wire tails from the centre terminals of the SFD 455B's. A piece of paper masking tape 6 mm wide around the four units will keep them together. Bell wire was used to connect between the filter outputs, switch and following stage input, keeping the wires well apart to avoid coupling. The copper connection on the PCB was cut with a sharp pocket knife. A strong light behind, that is above the board, will help to locate it.

To retune the BFO it is necessary to first remove the black (earth) and yellow wires from the PCB near TC404, and from the rough loom in the set, and run them around the edge of the PCB via the corner of the chassis. Keep the yellow wire about 3 mm from the chassis — a loop of tape will do this. This avoids coupling from the BFO into the IF strip and ensures that the BFO will not change when you put the set back into its case.

To adjust the BFO, temporarily connect the wide filter in circuit and then tune the set to zero-beat on a carrier such as a broadcast station. Changing sidebands from one to the other should produce a 3 kHz beat which, musically, is near the third octave above middle 'G' on the piano.

Adjust TC404 until this is achieved. Now put the narrow filter into service on S3 and adjust T406 only until changing sidebands on the mode switch, while listening to noise, produces a similar pitch on the noise spectrum. Finally check the receiver for LSB on 7 MHz and below and for USB on 14 MHz and above.

Another method of switching the BFO using a biased diode was sent to me by Ron VK5KS. It is shown in Fig 2, which is self explanatory. Ron suggests a small extra capacitor of 6.8 to 10 PE across TC404 may be nedeed. The diode cathode goes to earth and the anode to TC404 and the new 30K resistor.

It is also proposed to explore the addition of a noise blanker for the FRG-7.

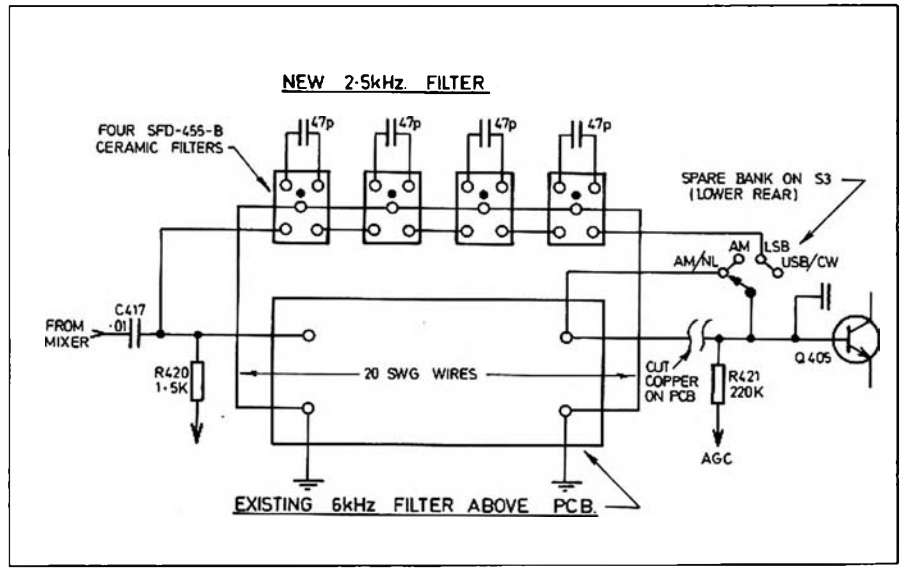


FIGURE 1

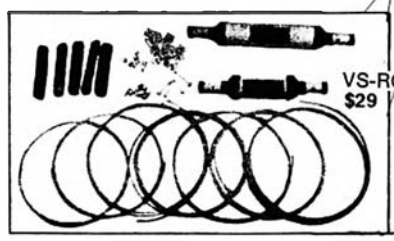
Hy-Gain's Incomparable HY-TOWER

for 80 thru 10 Meters Model 18HT

- **Outstanding Omni-Directional Performance**
- **Automatic Band Switching**
- **Installs on 4 sq. ft. of real estate**
- **Completely Self-Supporting**

By any standard of measurement, the Hy-Tower is unquestionably the finest multi-band vertical antenna system on the market today. Virtually Indestructible, the Model 18HT features automatic band selection of 80 thru 10 meters through the use of a unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical ¼ wavelength (or odd multiple of a ¼ wavelength) exists on all bands. Fed with 52 ohm coax, it takes maximum legal power . . . delivers outstanding performance on all bands. With the addition of a base loading coil, it also delivers outstanding performance on 160 meters. Structurally, the Model 18HT is built to last a lifetime. Rugged hot-dipped galvanized 24 ft. tower requires no guyed supports. Top mast, which extends to a height of 50 ft., is 6061ST6 tapered aluminium. All hardware is irIdite treated to MIL specs. If you're looking for the epitome in vertical antenna systems, you'll want Hy-Tower. Shpg. Wt., 96.7 lbs.

$346



VS-RG $29

$102

HIDAKA'S VS-41/80KR

for 10 thru 80 Meters

- **An Individually Tuned High-Q Trap for Each Band**
- **Takes Full Power**
- **Rugged Total Performance Construction**
- **Easily Installed Using Minimum Space**

Now . . . a modestly priced easily erected all-band vertical that delivers outstanding omni-directional performance on each band . . . HIDAKA'S Model VS-41/80KR. It is ruggedly constructed of heavy gauge, taper-swaged aluminium . . . uses four separately tuned High-Q air dielectric traps . . . each trap factory tuned to provide maximum performance 80 through 10 meters. Uncompromised performance for short haul or DX communication is ensured by the low angle radiation pattern developed by the VS-41/80KR. SWR is 2:1 or less on all bands. If mounted in an elevated position a radial wire system should be used. An accessory TRAPPED radial wire kit is available, the Model VS-RG. The VS-41/80KR comes complete with Terelyne guying cord.

TECHNICAL DATA

Power Rating	1 kw AM, 2 kw SSB
Feed Line Required	50-70 ohm coax
Minimum Ground Required	8ft. Ground Rods or VS-RG
Overall Height	28.4 ft.

NEW . . .

Special hinged base assembly on Model 18HT allows complete assembly of antenna at ground level . . . permits easy raising and lowering of the antenna.

The Versatile Model 18V for 80 thru 10 Meters

The Model 18V is a low-cost, highly efficient vertical antenna that can be tuned to any band . . . 80 thru 10 meters . . . by a simple adjustment of the feed point on the matching base inductor. Fed with 52 ohm coax, this 18 ft. radiator is amazingly efficient for DX or local contact. Constructed of heavy gauge aluminium tubing, the Model 18V may be installed on a short 1⅝ inch mast driven into the ground. It is also adaptable to roof or tower mounting. Highly portable, the Model 18V can be quickly knocked down to an overall length of 5 ft. and easily re-assembled for field days and camping trips. Shpg. Wt., 5 lbs.

$49

Above prices include S.T. Freight and Insurance is extra.
90 day warranty. Prices and specifications subject to change.

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Distributors in all states and N.T.

FRED BAIL VK3YS
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JAS7677—18

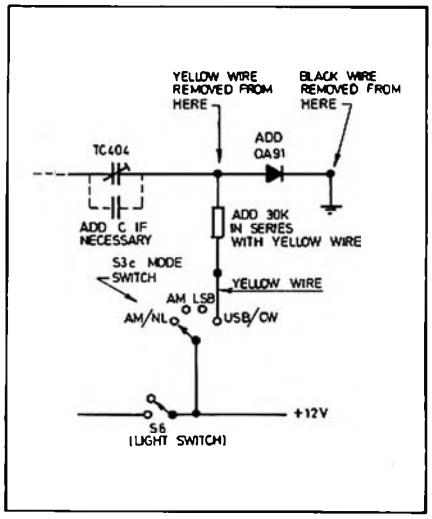

FIGURE 2

We are looking at a version of the one used by VK2AZN in his solid-state Deltanet Receiver. There is plenty of room in the receiver for six and two metre converters and a separate FM IF strip similar to the VK3ZMU unit from "AR" of June 1970 could be a useful adjunct. The AM/ANL position on the mode switch could be used to switch the latter, as the existing diode noise limiter is not very useful for amateur reception. As a final note of warning to all owners of FRG-7 receivers, I suggest that you see that yours is fitted with a 3-wire power cord. Mine, as delivered, had a 3-pin plug on a 2-wire cord. This is certainly unsafe to you and members of your family. Many amateurs leave the wall switch on at all times and control the gear by front panel switches. A fault could make the case alive.

I had to file out the plastic cord grip to take light duty 3-core flex, and soldered the earth wire to the lug which is pressed into the chassis for this purpose. It is just behind the transformer, easy to find and use."

I am sure all owners of the FRG-7 will be grateful to Phil for his ideas which make a good receiver better. ■

NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG
David Down, VK5HP

AN AMATEUR RADIO TRANMISSION TIMER

Why do you need a device to time your "overs"? You never exceed the 5 minutes allowed between callsigns and you have never been timed out by the local 2 metre repeater — OR HAVE YOU? This device will automatically time your overs from the time you press the button or hit the morse key until such time as there is a break in transmission exceeding 20 seconds. Timing is set to give a 2 second burst of tone just before the expiry of either 2 minutes or 5 minutes total transmission time. The tone burst reminds you to let go the button when you are using the 2 metre repeaters so that you will not be timed out, or to remind you that 5 minutes is up and you should give your callsign.

TECHNICAL DESCRIPTION

The timer consists of three timing circuits interconnected so that the timer will function not only on AM and FM transmissions, but on transmissions where interruptions to the transmitter RF output are normal such as CW or SSB, or where the backwards and forwards operation of the communications does not give a break in transmission longer than 20 seconds. If a gap of greater than 20 seconds occurs the timer will reset.

DC is applied to TR1 via a resistor-capacitor combination, this combination forming a timing circuit with an operate time of between 1 and 2 seconds. TR1 is normally turned off until DC is applied to the input. This input will be about a volt or more but at a very low current. The input can be provided by DC output from a SWR bridge, a crystal set tuned to the transmission frequency, a relay contact within the transmitter switching a small voltage to the input, or from a field strength meter. When TR1 is turned on, TR2 is also turned on and in the short conducting time of TR1 the capacitor in the collector circuit of TR2 is fully charged. The charge on this capacitor gradually discharges through the base-emitter junction of TR3 and this transistor is held on for approximately 20 seconds. TR3 is saturated when it is turned on and its collector is only 0.1 volts positive with respect to earth, which means that TR4 is turned off. TR4 requires about 0.6 volts to turn it on. When the timer is not operating TR4 is normally turned on as TR3 is not conducting and the current through the base of TR4 is enough to saturate it and pull the collector down to 0.1 volts positive with respect to earth. However, when timing, TR4 is non-conducting and pin 4 of IC1 is several volts positive with respect to earth which enables IC1 to commence its timing cycle. At the commencement of the cycle pin 3 goes high in voltage and causes TR6 to conduct heavily pulling its collector down to 0.1 volts which being connected to pin 4 of IC2 inhibits its operation and no tone is heard.

After a period of time the voltage on pins 2 and 6 of IC1 reach two-thirds of the supply voltage causing the discharge circuit via pin 7 to commence operation. Whilst this discharge is taking place pin 3 of IC1 goes low in voltage and TR6 is cut off which means that full supply voltage is applied to pin 4 of IC2 via a 10k ohm resistor. IC2 now starts to oscillate at about 1 kHz and the output is heard in the high impedance miniature loudspeaker. Suitable 2 in. speakers are available from Ham Radio Suppliers or Radio Parts. After a period of 2 seconds IC1 has discharged the capacitor at pins 2 and 6 of IC1 to one-third of supply and at this voltage the discharge cycle concludes and the charge cycle recommences. At this instant pin 3 of IC1 goes high causing TR6 to conduct heavily so that the voltage on pin 4 of IC2 once again goes low cutting of the oscillator. As long as the voltage on pin 4 of IC1 is kept above 1 volt positive IC1 will maintain its timing cycle of either 2 or 5 minutes capacitor charge and 2 seconds discharge. IC2 is keyed *"on"* (oscillates) only during the discharge time of IC1.

The timing plus oscillator operation is not quite as straightforward as the description above would seem to indicate. Problems which are peculiar to the LM555 (NE555, etc.) timing IC had to be overcome before it would time accurately and sound the timing tone only at the end of the timing cycle. If pin 4 of IC1 is earthed as it is in the standby mode, pin 3 is also low which means that TR6 is cut off and pin 4 of IC2 is supplied with full voltage via a 10k ohm resistor, which will turn it on and it will oscillate. This is undesireable as tone would be heard when the timer was not working. D2 was therefore wired in so that pin 4 of IC2 would always be at or near earth whenever pin 4 of IC1 was at or near earth. However, the voltage at pin 4 of IC2 has no control over the voltage at pin 4 of IC1. So when the timer is not operating both pin 4s are to earth or nearly so and neither of the ICs is working. At the instant that the control line to pin 4s goes positive pin 3 of IC1 goes positive saturating TR6 which takes pin 4 of IC2 immediately to earth and no tone is generated.

Another problem with the circuits used with the 555 timer is that the first timing cycle is always longer than subsequent periods. This is due to the fact that the capacitor from pins 2 and 6 of IC1 to earth must be charged from zero volts to two-thirds of supply before the discharge cycle commences. The discharge cycle drops the voltage across this capacitor to one-third of the supply, and it then commences to charge from the one-third supply level instead of the initial zero supply condition. To overcome this prob-

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The Kenwood world of amateur radio equipment is one of quality and outstanding performance.
As an amateur you have the ability to evaluate communications equipment specifications and design features.
You may have heard other radio amateurs talking about Kenwood "Transmitted voice quality", "excellent receiver performance" and "well engineered and rugged construction": From HF to VHF Kenwood technology is outstanding. We suggest that you ask your Kenwood dealer for all the facts before making your carefully considered decision.

TS-820*

TS-520

VFO-820

TR-2200

TR-7200

TS-700A

TV-502
TRANSVERTOR

* DUE TO UNPRECEDENTED DEMAND SOME DELAYS HAVE BEEN EXPERIENCED IN THE SUPPLY OF TS820 HF TRANSCEIVERS

lem a separate charging circuit consisting of D1, a 5k ohm trim pot and a 5.6k ohm resistor places pins 2 and 6 at nearly one-third of supply immediately the timing commences. This is a fairly touchy adjustment, but can be set so that the timing of initial and subsequent cycles is accurate to within a few seconds. If the pot is advanced too far the audio oscillator will be keyed on continuously whenever the pin 4s line is positive with respect to earth.

TR7 and the circuitry around it form a simple regulated power supply. The supply is regulated to ensure that no variation in timing cycles occurs due to variations in the supply voltage. This regulator is capable of handling up to 100 mA with a total regulator dissipation of 300mw. The transistor should be fitted with a small clip-on heat sink to dissipate heat. In this particular unit the regulator has only to supply about 30 mA average. The supply voltage can vary from 10 to 15 volts quite safely.

TR5 and the circuitry around it, including the light emitting diode, form an indicating circuit to show when the circuit is actually timing a transmission. The LED is on whenever the line to pin 4 of IC1 is above earth. The LED is wired into the emitter lead so that the voltage on IC1 pin 4 line is not heavily loaded by TR5's base current. The maximum voltage on the pin 4 line will be about 5.5 volts.

The time constants for the timer are selected by switch S1a and select 2 minute time, 5 minute time, or for test purposes a 2 second on 2 second off timing mode. Switch S1b switches in a capacitor which due to the voltage drop when this capacitor is charging through resistors in the 8.5 volt line causes TR2 to conduct and set up a 20 second testing routine. In the test position the timer gives 2 second duration bursts of tone every 4 seconds for about 20 seconds until the capacitor in the collector circuit of TR2 is discharged. This test circuit tests all sections of the timer with the exception of the input circuit. Switch S2 is designed to switch the timer from automatic to manual operation. In the manual mode the unit times every 2 or 5 minutes whether there is a transmission or not. Switch S3 is used to reset the timer back to the start position and would probably be used only in the manual mode. It must be pressed for about 2 seconds if the timer is to reset completely. The manual timing feature would be useful for timing old windbag on channel 50 — use it to wake yourself every 5 minutes of his over.

The ability to continue timing for 20 seconds in the absence of an input in the automatic mode is not used when the manual mode is selected. If manual operation only is required the first 5 transistors can be deleted and S2 wired between pin 4 of IC1 and earth. Position 1 of the switch would be timer off and position 2 would be timer on. The LED indicator could also be deleted.

COMPONENT VALUES

Electrolytic capacitors have a rather wide tolerance of something like +100 per cent of nominal value to —50 per cent of nominal value. For this reason it is suggested that the timing capacitor from pins 2 and 6 of IC1 should be the Tantalum type. Use a 22 uF and 33 uF tantalum capacitor in parallel, 10VW rating or higher. Other components within the timer are not unduly critical with the exception of the timing resistors in the charge circuit of the tantalum capacitors. The resistors can be ¼ watt, and neither these or the other capacitors are critical, a preferred value up or down should cause no problem.

SETTING THE TIMING PERIODS

Switch the unit to manual so that it commences timing, with S1 set to test. All being well the oscillator will be pulsed on for 2 seconds every 4 seconds. Advance the 5k ohm trim pot until the oscillator runs continuously, and then back it off until the oscillator just stops and then comes on again in 2 seconds. Now set S1 to 2 minutes, press the reset button S3 for a couple of seconds, release and commence timing the unit with your watch. After a period of time the oscillator will be pulsed on for 2 seconds. Let the unit run for a further period and record the times between first and subsequent tone bursts. Now set S1 to 5 minutes and repeat the process. If the variation is within about 6 seconds or 15 seconds for the respective settings of S1, setting of the 5k ohm trim pot is sufficiently accurate.

Reset S1 to 2 minutes and set the 2 minute trim pot at mid travel. Note the elapsed time obtained over a timing cycle, If the time is longer than 2 minutes reduce the value of the appropriate trim pot, and try again. After a few timing cycles and judicious adjustment of the trim pot the timing between tone bursts should be near enough to 2 minutes. The same procedure is used in setting the 5 minute timer. Unless you are most fortunate the adjustment of the two timing cycles will take about an hour to accomplish.

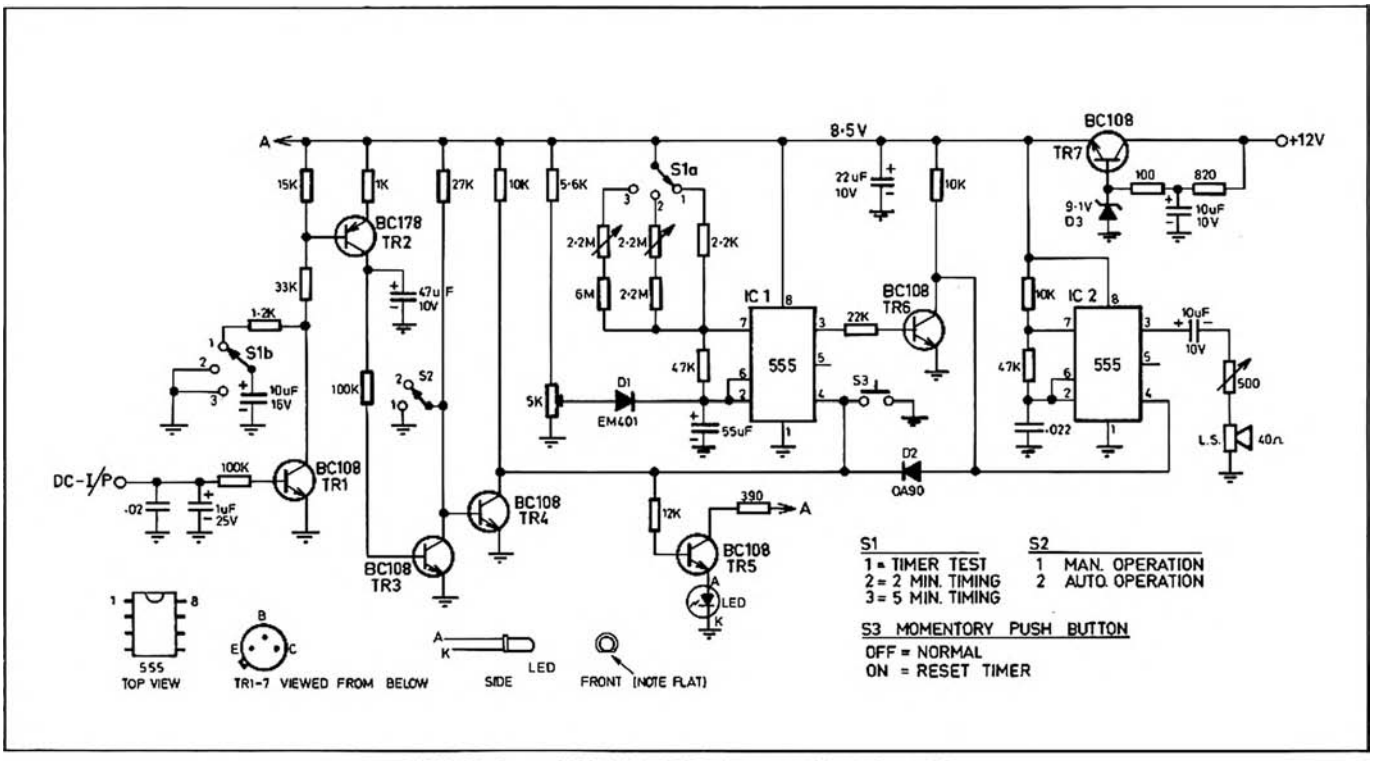


FIGURE 3 — AMATEUR RADIO TRANSMISSION TIMER

GO MOBILE HF MOBILE ANTENNAS

HUSTLER MOBILE ANTENNAS
Quality Hustler Resonators, precision wound with optimum design for each band, adjustable rod for lowest vswr:

RM80 (80 metres)	$26	RM20 (20 metres)	$22
RM40 (40 metres)	$25	RM15 (15 metres)	$22
RM10 (10 metres)	$22	RM11 (11 metres)	$19
MO2 Mast for above	$26	RSS-2 Spring	$11.50
BM-1 Bumper Mount	$19		

MARK HELICAL WHIPS
Quality 6' Helixwhips providing 50 ohm match at resonant frequency:
HW20 (20 metres) Resonant freq 14.2MHz, bandwidth 250KHz $31
HW40 (40 metres) Resonant freq 7.07MHz, bandwidth 100KHz $31
HW80 (80 metres) Resonant freq 3.60HMz, bandwidth 50KHz $31
Chrome plated spring base Model LDS $13
Moulded base mount $17.50

SWL's

- BARLOW WADLEY
  The famous portable Barlow Wadley Communications Receiver with crystal controlled reception of am/lsb/usb/cw:
  Standard model $319
  With FM $339
- ANTENNAS
  Listener-1 "V" type covers 3-30MHz with special trap for DX reception $22
  Listener-3 long range wire dipole antenna 3-30MHz complete with balun, feed wax, VHF plug, insulators. Ideal for the serious SWL $49
- SWL ANTENNA COUPLER
  For matching receiver to the antenna line, this quality product handles signals from 2-30MHz with an output impedance from 50 to 600 ohms.
- RECEIVER BOOSTER
  This preselector improves the selectivity and sensitivity of your short wave communications receiver. It covers four bands from 2-30MHz with a gain of 15dB! $35 + P&P

ATLAS

SEVEN POUNDS OF DYNAMITE!
The famous ATLAS solid state transceiver is totally broadbanded – no transmitter tuning or load controls, no receiver preselector controls. Modern design makes these unnecessary! Superb sensitivity and selectivity gives maximum operating pleasure.
ATLAS 210X transceiver $940

IC215 FM PORTABLE

This is ICOM's first FM portable and it puts good times on the go. Change vehicles, walk thru the park, climb a hill, ride a train (if you dare), the ICOM quality FM communications go right along with you. Long lasting internal batteries make portable FM really portable while accessible features make connection to external power fast and easy. $199

- Fully collapsible antenna
- 15 channels (12 on dial and 3 priority)
- Dual power - 3 watts high/400 mW low
- Lighted dial and meter
- 36 transistor, 3 FET, 2 IC, 51 diodes
- super sensitive receiver
- Crystal specifications identical to IC22a

Your new IC215 comes complete with three popular channels, handheld mic with protective case, shoulder strap, connector for external power and speaker, 9 long life C batteries, English manual and VICOM 90 day warranty.

2M ANTENNAS

NEW JAYBEAM ANTENNAS
2 METRES

5Y/2M 5el, 7.8dBd, 1Kw peak	$26
8Y/2M 8el, 9.5dBd, 1Kw peak	$29
10Y/2M 10el, 11.4dBd, 1Kw peak	$57
10XY/2M 10el crossed yagi, 11.3dBd	$66

70cm

D8/70 twin 8el, 12.3dBd, 1Kw	$46
PBM18/70 18el, 14.9dBd, 1Kw	$57
MBM48/70 48el, 15.7dBd, 1Kw	$55
MBM88/70 88el, 18.5dBd, 1Kw	$66

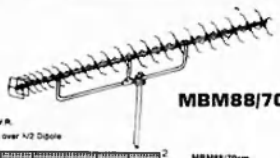
MISC

RINGO RANGER ARX-2	$45
Lindenow 5/8 2m mobile whip	$26

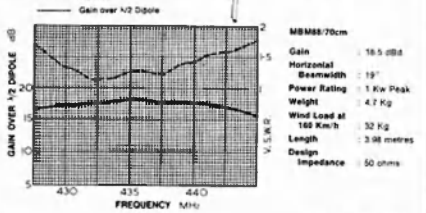
ASAHI
AS210BN twin 2m 10el,18dB gain, F/B 20dB, boom length 4m $119
AS210AN 2m 10el single boom 11.5dB gain, F/B 20 dB S 54

JAYBEAM

new!



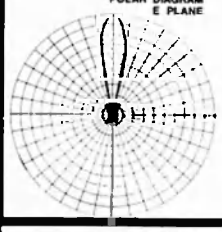
MBM88/70cm



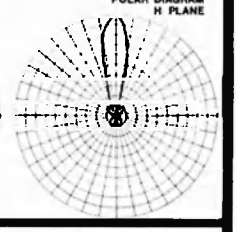
MBM88/70cm

Gain	18.5 dBd
Horizontal Beamwidth	19°
Power Rating	1 Kw Peak
Weight	4.7 Kg
Wind Load at 160 Km/h	32 Kg
Length	3.98 metres
Design Impedance	50 ohms

POLAR DIAGRAM E PLANE



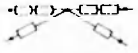
POLAR DIAGRAM H PLANE



RAK ANTENNA

RAK TRAP DIPOLES

AL48DXN (40/80 metres)	$47
AL24DXN (20/40 metres)	$45
MIDY IIN (80/40/20m)	$48
MIDY IIIN (40 thru 10M)	$48
MIDY VN (80 thru 10m)	$58



Midy-V N

BALUNS

BL50A quality heavy duty dipole (4kW model), 1.8 thru 38MHz, 52 ohms, vswr better than 1.2 at 30MHz. Housed in sealed cycolac which will withstand 250Kg tension. $24
ASBL model for beams, 3-30MHz, max 1Kw. $30

LOW PASS FILTER

TVI FILTER
$20

Superb quality low pass filter (32MHz cutoff) for transmitters 1.8 to 30MHz. Insertion loss under 0.5dB, input/output impedance 50 ohms. Supplied with S0239 sockets. Will handle 200W pep (max). $20
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COUPLERS

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CL66 500w pep, 3.5 thru 29MHz, input imedance 50-70 ohms, output impedance 10-600 ohms unbalanced. Includes 4 position coaxial switch. $139
CL65 500w pep, 2.5 thru 29MHz, input impedance 50-70 ohms, output impedance 10-600 ohms unbalanced. $128
CSW216, includes quality swr/pwr meter which operates up to 150MHz. The coupler cover 3.5 thru 28 MHz at 500w pep. $210
CL99 for two meters. Max power 200 pep, output 10-200 ohms unbalanced. $59

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2. QUALITY KEY, smart appearance, chronium plated keying mechanism, spring adjustment $19
3. HEAVY DUTY DELUXE KEY, fully adjustable, ball bearing shaft, plastic protective cover $32
4. MANIPULATOR (Side swiper) for an electronic keyer. Accurate and restful keying operation assuring owing to heavy metal plate and frictional rubber belt beneath the periphery of the main base $36

SWR/PWR METER

POPULAR VC2 SWR/PWR METER
The popular VC2 covers 3-150 MHz with power measurement 12/120 watts. Will handle up to 1000w, 50 ohms impedance, twin meters. This quality tru-line instrument is ideal for the shack or for permanent mobile installation. $36
$36 + P&P

The new Oskerblock SWR200B Deluxe is a professional SWR bridge using the thru-line principle, covers 3-200 MHz, 52/75 ohms. Each unit individually calibrated. Four power ranges: 2, 20, 200, 2000 watts. $79

NEW OSKERBLOCK DELUXE

CONVERTERS

Utilising modern technological design features and built to demanding specifications, this range of Converters has been produced to meet the increasing requirements of Ham Performance Equipment.

144/28 CONVERTER
- 116MHz Crystal Oscillator. Maximum Frequency Error 1 kHz
- Mosfet RF Amplifier Inductively Coupled to Mosfet Mixer
- All Signal Path Inductors utilise Printed Stripline for long term performance stability
- Gain = 28 db (typical)
- Noise Figure = 2.5db (typical)
- Power Requirements 12V DC Negative Earth @ 18mA (typical)
- I.F. = 28-30 MHz
- Aerial and I.F. Sockets both BNC as Standard

$45

432/28 CONVERTER
- 101MHz Crystal Oscillator. Maximum Frequency Error 1 KHz
- Two R.F. Amplifier Stages in cascade using Printed Stripline to all circuits before AND after each Stage
- Dual Gate Mosfet Mixer for excellent cross modulation immunity
- Gain = 30 db (typical)
- Noise Figure = 3.5 db (typical)
- Power Requirements 12V DC Negative Earth @ 35 mA (typical)
- I.F. = 28-30 MHz
- Aerial and I.F. Sockets both BNC as Standard

$49

1296/28 CONVERTER
- 105.66 MHz Crystal Oscillator
- Hybrid Ring Mixer utilising Schottky Diodes
- Dual Gate Mosfet I.F. Head Amplifier
- All UHF/SHF Tuned Circuits are Printed Striplines
- Gain = 25 db overall
- Noise Figure = 8db (typical)
- 12V DC Negative Earth
- I.F. = 28-30 MHz
- Aerial and I.F. Sockets both B.N.C. as Standard

$59.90

All Units housed in attractively finished and sturdy Die Cast Boxes

TRANSVERTERS

2M High Power

28/144 HIGH POWER TRANSVERTER. A 10 m to 2m hybrid transverter offering up to 200w pep input. Excellent FET receive converter with two IF outputs fitted as standard. Master oscillator is doubly stabilised and the pa section is well ventilated. Takes all drive and switching from your 10m rig. Built in antenna change over relay, metering and power on warning neon. Complete with harness and plugs for connection to your 10m rig.

$225

2M/432 FM Transverter
This small unit obviates the need for the expense of a second transceiver or the complexity of numerous add on units with multiple connecting leads. By simply inserting the unit in the antenna lead of your 2m fm transceiver you are ready to transmit and receive on either 2m or 70cm AT THE FLICK OF A SWITCH! The unit has its own 70 cm to 2m receiver converter built in and all switching is carried out within the unit. Size 105 mm x 40 mm x 180 mm. Supplied complete with power cord and mobile mounting bracket.

$125

LINEAR FOR TWO $119

All solid state 70w pep (ssb) output linear amplifier (for 14w pep input), 12 vdc operation and internal automatic RF sensing switch means that you only need to connect this unit in your 2m antenna line together with a source of 12 vdc for 10w pep OUTPUT. Accepts ssb, fm, am, or cw with switchable hang time for ssb and cw operation. Supplied complete with dc power cord and fitted with S0239 sockets.

UNIDEN .... the best value

HF PLL Transceiver

Surely the best value, this ssb transceiver provides an unbeatable combination of advanced engineering and unique operating features.
Standard features include–
- * cw filter
- * vox and cw semi-break in
- * extraordinary receiver sensitivity (0.3uV S/N 10dB) and oscillator stability (100Hz 30 min after warm-up)
- * cooling fan
- * dual RIT
- * rugged 614B finals with screen grid stabilisation for minimum distortion products.
- * pcb's for easy servicing

A comprehensive range of spare parts is available together with back-up service support.

Uniden 2020, complete	$772
Digital VFO	$145
Matching speaker	$ 46

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Adelaide:	Graham Stallard, 27 White Ave, Lockleys. Ph: 43 7981
Perth	Netromics, 388 Huntriss Ave, Woodlands. Ph: 46.3232
Brisbane	Elite Electronics, 69 Wardell St, Dorrington. Ph: 38 4480

Prices include sales tax but exclude freight and insurance. For insurance allow $1 per $100, min $1. Freight sent Kwikasair (freight "collect") unless otherwise specified. Prices and specifications are subject to change without notice.

The loudspeaker used for the oscillator output is a small replacement 40 ohm job selling for under a dollar. The output volume is set by the series 500 ohm pot (another miniature trim pot). 9.1 volt zeners are not always exactly 9.1 volts. The one used in this project zenered at 8.5 volts so a small silicon diode was added in series with the zener in the conducting direction, and this brought the reference voltage back to 9.1 volts.

Having set the timing on manual switch back to automatic, then turn S1 from 5 minutes to test. The unit should now commence the test routine previously described and should cease after about 20 seconds. Place S1 onto 2 minutes timing and touch the active lead of the input pair to the 8.5 volt supply line, the LED should light to indicate that the timer is operating. If the active lead is left connected to the supply line the timer/oscillator will operate after about 2 minutes and will continue to operate for 20 seconds after removing the lead from the supply line.

If the timer is to be operated off a higher voltage than about 9 to 9.5 volts the resistor in series with TR5 should be increased to 470 ohms, so that the LED does not draw above 20 mA.

OPERATING CONDITION TABLE

With TR1 conducting TR2 is also conducting as is TR3, but TR4 is not. TR5 is conducting, IC1 is timing, TR6 is conducting and IC2 is not oscillating. This is the initial start of the timing cycle. When TR1 is off and TR2 is off, TR3 will conduct for 20 seconds after they are switched off. TR4 is off still and the other sections of the timer are as before. When TR3 ceases to conduct due to the discharge of the capacitor in its base circuit, TR4 conducts, TR5 is off, IC1 ceases timing, TR6 is off, and IC2 is not oscillating. Consider now that IC1 has been timing for some time, then the timing period expires. TR6 ceases conduction and voltage is applied to pin 4 of IC2 and it oscillates until IV1 recommences timing after 2 seconds, when TR6 is again conducting with the oscillator control terminal (IC2 pin 4) returned to earth. The timing is done with resistance — capacitance networks and with the exception of TR7, all transistors and integrated circuits are either switched off or switched on hard — this is a digital type of circuit.

SUMMARY

The timer is built on a piece of 0.1 inch pitch veroboard approximately 7 cm square. Some of the features could be omitted if the device were intended to fit inside an FM transceiver — for example. Only one timing cycle would be required and the transceiver speaker could be used for the tone output. The regulated supply for the timer could be taken from a regulated line within the transmitter. The application of voltage from the transmitter itself would initiate the timing so making redundant transistors TR1 to 5 and TR7. Built in a simplified form for some specific purpose it could be made very compact as well as serviceable. The layout of the unit is not critical. Another feature of the timer is that when it automatically resets itself a short burst of tone is sent out. This is caused by TR4 switching slowly from non-conduction to the saturated condition. If as a newcomer you feel that the circuit is too complex for you to attempt, it can be built in 5 sections, the regulated supply centred around TR7, the audio oscillator IC2 with pin 4 strapped to the positive line, the timing circuit IC1 and TR6, the timing indicator TR5, and the automatic timing and 20 second hold circuit TR1 to 4. The break up of these 5 circuit sections is shown by dotted lines in the circuit diagram. Once each section is operating the next section can be built onto it.

If the timer is built "full circuit" as shown in the circuit diagram, it can assist in the following ways — (1) avoid being timed out on the 2FM repeater, (2) ensure that you do not get a note from the P. & T.D. for exceeding 5 minutes between callsigns, (3) ideal as an egg timer when a quick snack is needed during a contest at 4 am, and (4) remind WIA broadcast personnel to give regular callsigns, so setting a good example to other amateur stations. ■

VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, 5233

AMATEUR BAND BEACONS

VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL8WI, South Korea	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

The Brisbane beacon on the 70 cm band was omitted from the last list so it is now included. Originally set up on 432.000 MHz, by the time you read this it should be operating on its permanent frequency of 432.400.

Aub VK6XY advises all the four beacons in Albany are now located at Mt. Adelaide, about 1 km south of Albany. They are VK6RTW on 52.950 and 144.500, plus the two commercial beacons on 135.5 and 1700 plus MHz. This should prove an interesting exercise for those taking note of propagation characteristics.

SIX METRES

It was not very long into the New Year before six metres ended its run; in fact the DX as noted here seemed to fade out quickly. However, it was a very good season, and most operators should have had enough interesting contacts to have made their time spent on 6 worthwhile . . . 26/12 sent birthday greetings to Rod VK2BQJ (for 25/12, but not heard that day!) Rod reckoned the DX this year provided the best circuit between VK6 and VK2 or vice-versa he could recall in 17 years. Could not wish Wally VK2ZNW at Orange birthday greetings for 1-1-77 as he was not on. In fact, very little was heard of Wally at all this year — perhaps too much Channel O QRM after all! . . . 27/12 Allan VK4ZRF heard the Adelaide FM station on 92.1 MHz at 0200 . . . 3-1-77 Malcolm VK4ZMH who lives 60 miles south of Rockhampton reported hearing a station in Fiji signing 3D2?? calling a P29 at 0830Z with signals S 8/9 for half a minute on 52.049, while Garry P29GR was almost sure he heard JA Language on 52.050 at 1410Z on 1/1. This seems possible as Ross VK4RO reported JA's calling on 52.050 at 0130Z in Darwin, but too weak to work . . . Peter VK5ZPW reported hearing a beacon or similar signal on 30/12 on 50.150 about 0130Z. I have heard this signal myself on Peter's tape and it was signing 1RS5, signals S4/5. At the same time TV sound signals could be heard on 50.680? Anyone any clues to identities?

Mac VK2ZMO writes from Raymond Terrace with some news of 6 metre activity in that northern part of N.S.W., where 6 metres opened for the first time on 12/11 to VK3, after which the band was open nearly every day, with all areas except VK1 being worked. YJ8KM was worked twice by Mac while Bill VK2BMX worked him on 3 watts with an IC502. ZL's were scarce and only worked by Tony VK2ZCT who returned to the band after some years with an FT620B (more news from Mac in 144 MHz segment).

Doug VK4ADC writes advising working between 25/12 and 1/1 the following call areas: VK1, 2, 3, 4, 5, 6, 7, 8, P29, ZL1, 2, 3 and 4 while YJ8KM was worked on 5/12. On 30/12 Doug heard VK7ZAE on SSB at 0200Z at 5/5 on 144 MHz but not having rig tuned up could not work him!

144 MHz SCENE

The 144 MHz band has let its head go to quite a degree during the December/January period and the following is a resume as seen from the VK5 point of view. 23/12 Col VK7LZ worked John VK1ZAR . . . 26/12 Peter VK5ZPS worked Ross VK6ZED in Perth sigs. 5 x 2 . . . 27/12 Jim VK5ZMJ worked Wally VK6WG and Aub VK6XY — not an easy path for Jim. Ray VK3ATN 5 x 5 at VK5LP, while John VK5ZJP worked Aub VK6XY. Barry VK2ZAY worked Mario VK4MS at 0800Z, but signals weak. Mario then worked David VK2ZVW with signals to 5 x 9. Gerry VK5ZZZ worked VK5ZBH at Ceduna 5 x 7. Reg VK1MP now has 300/400 watts on 144 — should help him to be heard! . . . 144 MHz path open between Adelaide and Albany all the time between 24/12 and 27/12 . . . David VK5KK heard by Peter VK7PS on 31/12 but unable to break in . . . 2/1/77 Aub VK6XY copying VK5VF beacon all day . . . 23/1 Col VK5RO worked VK3AFR, VK3ZJP, VK3ZHY, VK3AKC etc. . . . on 10/1 Col VK0RO worked a heap of VK3's, and heard VK7ZAH but not worked . . . Peter VK5ZPW hearing Frank VK2ZI in Broken Hill on Channel 40 on 21/1, 22/1 and 23/1, almost out of the noise . . . Steve VK5ZIM returning from Melbourne advised having 3 pages on contacts on 2 metres while there, reports a lot of activity in VK3, and worked three stations in VK7 while at Wilson's Promontory on SSB . . . 144 open again to Albany on 24/1, 25/1, 29/1 and 30/1 . . . Col VK5RO worked more than 30 stations in VK3 on 29/1 and 30/1 with stations worked east of Melbourne; Roger VK5NY and others in on that opening too, even VK5LP worked 10 stations which is not bad for my location — Les VK3ZBJ was the strongest peaking to S8 for over two hours on 29/1.

Probably pride of place for happenings on 144 MHz SSB would have to go this time for the sporadic E opening at about 0740Z on 31/12 when for a period of about 45 minutes the band opened to VK2 first of all and then to VK1. Signals mainly favoured David VK5KK and myself, VK5LP with an odd contact being available to a few stations

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.80	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA30900	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	**MISC**	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458	LM1458	TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488	LM1488	UAA170	3.25		
CD4025	.55	CD4720	12.60								

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7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
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7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	**SEMICONDS**		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3.20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	.90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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PLENTY OF PARKING AT REAR

STD 02

in Adelaide. I worked VK2BOJ, VK2ZHT, VK2ZJP, VK2ZZI, VK2ZRH, VK1MP (twice), VK1ZAR and VK1ED, and I believe David worked along similar lines. The VK2 signals were up to S7/8 while the VK1 signals were up to S9. My first contact with Reg VK1MP took exactly 12 seconds for us to exchange Ross Hull numbers both ways, so we did not waste any time — no one ever wastes time with unnecessary chatter on a 144 MHz Es opening!

There have been quite a number of openings in other States but as I have no specific details I cannot say much about them. One interesting observation I would like to make is that this season VK1, VK2, VK3, VK4, VK5, VK6 and VK7 have all been worked on 144 MHz SSB from VK5. This would not have been thought possible some years ago, and surely indicates a greater awareness by many operators of the part that 144 MHz plays during the summer 52 MHz DX season, and with increasing numbers of better SSB rigs now coming on the air, this trend must surely increase. There are quite a few operators around Australia who now only require a VK8 for Worked All States on 144 MHz — how long before that can be achieved? And, despite the long distances which can be covered with the nominal 10 watts output of many transceivers, it is still the stations who feed this 10 watts into good linears who take the cream of any opening, and are always worked first, so if the opening is short, the small station operator may miss out — it's unfortunate but true!

432 MHz JOTTINGS

The 70 cm band has come in for its own share of long distance contacts, and these too seem to be on the increase. Again very little has come to hand on what has been achieved in other States, but from the angle of the southern States, VK3, VK5 and VK6, the following is a resume of what has happened.

27/12 David VK5KK worked VK6WG, VK6KZ, VK6ZED and VK6ZBW with signals to 5 x 5 . . . About 2030Z Ray VK3ATN peaking to S9 at Keith VK5SV and S6 here at VK5LP . . . Peter VK5ZPS worked Wally VK6WG on 26/12 and 27/12 5 x 4 etc. Roger VK5NY involved also . . . 25/1 Peter VK5ZPS 9+ in Albany . . . 29/1 Roger VK5NY worked Les VK3ZBJ, and VK5LP was hearing Les to S2 with carrier running, but no contact made.

1296 MHz RECORD . . see special box.

Looking back, who could but say it had not been a great "DX season". On 52 MHz on 26/12 and 27/12 I worked over 100 stations on that band, and there were plenty of others in other areas who worked considerably more judging from their Ross Hull scores. On 144 MHz we can look at the great area coverages firstly by Es openings, and then some good inversion and ducting openings along the southern coastline. 432 was enjoyed by many again along the southern coastline, while 1296 really opened its heart to provide what is likely to be a world record.

GENERAL NEWS

Dealing with 2 metres, Mac VK2ZMO in his letter is concerned at the possible side effects stemming from the change over of the Newcastle TV station on Channel 5 to 5A. He reports the 144 MHz band is very dead in his area and could be worse still when 5A gets going at full power. Already tests indicate problems with other commercial gear in the same area and grouped around the same transmitting mast. Mac joins with our Riverland boys in hoping 5A operating will not entirely kill 144 MHz activity as VK5 have a Channel 5A up Luxton way on the Murray.

Doug VK4ADC is the Publicity Officer for the Brisbane VHF Group and advises some details of the UHF beacon in Brisbane, which is a solid state transmitter delivering 8 to 10 watts output through a single cavity filter and via heliax to a clover leaf type aerial to give omni-directional radiation with horizontal polarisation. Frequency at the time of writing was 432.000 MHz and will eventually be changed to 432.400 (which is presently listed at the start of this column . . . 5LP). Location is Wilston Heights on the north side of the city centre and gives coverage to almost all of the greater Brisbane area. Call sign VK4RBB.

Doug also gives details of their repeater VK4RBC which is not yet in operation at its site (time of writing). Solid state Rx/Tx and integrated circuit control logic. Tx delivers 10 watts via filters to 3 dB gain vertical and Rx also fed from separate vertical via filters. Eventually a complete duplexer will be fitted. Channel 352/852 operation. Planned location is Red Hill, just out of centre of the city on northern side. The repeater is expected to be in its final site and in full operation by late March.

Winston VK7EM writes to advise that the north-west Branch 70 cm beacon is off the air until further notice. Almost six months to the day after going into service, the transmitter was damaged when 22 kV power lines fell across the 240 volt-line to the shack. It appears the transmitter has only minor damage, but the wiring inside the hut as well as the switchboard, power points etc. are a charred mess.

Winston remarks however, they were a bit lucky in that the hut and equipment was not totally destroyed as one of the corner studs supporting the fuse box caught fire. All this happened during a wind storm in early December. It may be some time before VK7RTW is back on the air, and advice will be forwarded when again operational.

I note from the pages of the Gold Coast Radio Club Monthly Newsletter that Martin VK4ZIL had more than 1000 contacts in 3 months to January. That's better than 10 a day every day, and apparently the voice is still holding up! Also noted VK4KP having made 2 metre contacts to Bundaberg and MacKay — the latter would be very good at over 400 miles, and indicates the north-south path is not a dead loss!

1296 MHz CONTACT

On 25th February, 1977, at 0100Z, Reg VK5QR in Adelaide contacted Wally VK6WG in Albany on the 1296 MHz band for a two-way QSO. Reg copied Wal who used CW at 547, and Wal gave Reg 5 x 4 for his SSB. Present rough calculations indicate a distance of about 1800 km or 1100 miles, and it seems likely to be a world record.

Equipment used: VK5QR: 1296 mixer without pre-amp, to 28 MHz IF amp. Transmitter used home brew 9 MHz crystal filter, giving a processed 9 MHz signal (QST Oct. 1970) which includes tripling to allow for SSB readability, to 28 MHz, then straight into normal home brew transceiver. Output to 2C39A at 432 MHz at 24W into varactor tripler 10 watts output at 1296. 60 feet of coaxial cable giving about 4 to 5 watts output to a 3 foot dish at 35 feet.

VK6WG: Receiver a Microwave Module converter with pre-amp feeding into FTDX100 transceiver, transmitter being a tripler using a 3CX100A5 with 500 volts on anode at 70 mA, output unknown, fed to 3 foot dish on tower. (Probably about same power at dish as Reg).

Both Reg and Roger VK5NY copied call signs from Wally the previous evening, but were unable to make it for two way contacts. So Roger would really have to be counted as one of the unluckiest people around at the moment!

The amateur fraternity congratulate the operators for this outstanding contact, particularly for Reg to place SSB on 1296. An enormous amount of hard work went into the whole operation, not only at the time, but for much time beforehand by both parties, and when the final details come out, it will rank as a great achievement.

Graham VK6BY after a trip to Victoria confirms former mention of the high level of SSB activity on the lower part of 2 metres in Melbourne, with 144.1 being the calling frequency, and once contact is established then moving to another frequency. He mentions also ORM on 70 cm ATV due to amount of activity, and reports on the excellence of the ATV equipment being used. But after going all that way he found proof of just how isolated VK6 is for general Dx activity on VHF/UHF even with the active VHF Group . . . from VK6 VHF Group Newsletter.

The following table sets out the Terrestrial Two-way Records for VHF/UHF operation and originating in the January 1977 issue of QST.

6 metres: LU3EX — JA6FR, 12,000 miles — 24/3/56.
2 metres: WA6JRA — KH6GRU, 2591 miles — 29/7/73.
1¼ metres: W6NLZ — KH6UK, 2540 miles — 22/6/59.
70 cm: W0DRL — K1PXE, 1210 miles — 16/8/71.
23 cm: K5LLL — K4NTD, 847 miles — 27/1/75.
13 cm: G3LQR — OZ9QR, 472 miles — 30/6/76.
9 cm: ZL2WB — ZL2TWI, 278 miles — 2/2/75.
5 cm: W6IFE/K6HIJ/6, 214 miles — 18/6/70.
3 cm: G4BRS — GM3OXX, 324 miles — 14/8/76.
1.25 cm: G3BNL — G3EEZ, 96 miles — 14/9/75.

It is interesting to observe the 70 cm record as being 1210 miles. I was of the opinion that for years this had been held by W6NLZ and KH6UK at 2540 miles, in company with similar distances and contacts they accomplished on 144 and 220 MHz. It seems the 70 cm record at that figure may have been disallowed and is presently set at 1210 miles. Notwithstanding however, in the 70 cm Standings List in QST of January 1977 there are no less than 12 stations listed as having worked 2000 miles or more, with W1JAA and K2CBA heading the list with 2670 miles, and three others on 2600 miles. Maybe none of these people have claimed records, but if any of them do they will eclipse the distance set between Les VK3ZBJ and the boys in Albany, which on present actual listings is well above the current world claimed record.

The distance of approximately 1100 miles as recorded in these notes for the 1296 MHz (23 cm) contact between VK5QR and VK6WG will however surely be a world record, if the 847 miles of the present listing are any guide.

A letter has arrived from Ray Clark K5ZMS, No. 1 SMIRK, advising of a 24 hour a day beacon to operate from the north coast of Brittany, France, signing F3THF, operating 50.1 MHz with 100 watts (to be increased to 400/500 or 1 kW if no big interference problems crop up).

Keying FSK, 100 Hz shift, call sign transmitted every 50 seconds. It is to start mid-April to mid-August of this year, and will be repeated during following years if possible. Antenna will be centred on Central America. Any station copying this beacon in VK or ZL in particular are asked to pass on date, time, RST, location and call sign of station receiving it to any US station on any amateur band you can. Ask the US station to pass that info to K5ZMS via phone patch, collect. Landline number is Area code 512-674-5781 . . . nothing seems to be impossible these days on six metres, so you keen Dx operators might look for the beacon, particularly if it gets into the higher power bracket.

Ray also requests me to notify any VK or ZL stations who have worked JA's and collected 3 of their SMIRK numbers to submit details to him, Ray Clark, K5ZMS, 7158 Stone Fence Drive, San Antonio, Texas, 78227. It only requires 3 contacts with foreign SMIRK members. There are now about 18 SMIRK members in Japan, plus HL9WI, a couple of KG6's and Peter VK6ZDY. If in contact with JA stations ask them about a SMIRK number.

In keeping with VK operations on 6 metres which have been very good this year, Ray mentions their 1976 season in the US as being outstanding. Many stations worked their 50th State. Ray worked 7 countries, Canada, Mexico, Caymen Is., Bahamas, Guatamala, Peurto Rico and US. Others also worked YVZZ, PJ2DW, VP2LAW, KH6, 12 JA's worked KH6IJ. He concludes on a note that much Middle East TV was being logged in France. So those 50 MHz signals sure get around. Thanks for the news Ray.

Well that's a pretty fair coverage of what has taken place around the countryside for the past month or so. If I go on too far there will be nothing left for next month. I conclude with the thought for the month: "Liberty is always dangerous, but it is the safest thing we have". 73.

The Voice in the Hills ■

QSP

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Hopefully you have renewed your WIA subscription for 1977 already. For those who have not yet renewed please note that address labels for AR will cease automatically for unfinancials. Missing AR's may not be available after the month of issue because the financial situation does not permit too many "overs" being printed.

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

PREDICTIONS

It would appear that there is sufficient evidence to suggest that the long awaited Cycle 21 is finally starting to evolve. Increasing numbers of the new spots (in the higher latitudes) are appearing and the older cycle 20 spots are slowly disappearing. The 2800 MHz flux measurements are also slowly moving upwards. Daily figures around the 80 are now (in late January) more common and there are significant improvements over many paths on 20 and 15 metres, with 10 metres showing a fair amount of improvement.

One interesting event was late in the evening of December 29, 1976. A magnetic storm of moderate y severe activity commenced at 2037 UTC on December 28th. The first recordings (at 3 hour interva:s) were K6, K5, K6, K6 periods 00-03, 03-06, 06-09, 09-12. The results on 21 MHz were quite noticeable in the period 09-12 UTC.

Signals from around Melbourne normally S3-5 were within seconds transformed in S9 + 20-30 dB on S meter scales. Very short skip up to 250 km was very pronounced with up to 1000 km not far behind. The next phase was up to 7000 KHz into Central Europe with one Maltese station providing plenty of competition to the novice segment of 21 MHz. Things were so hectic below 21.200 MHz that I omitted to listen above to find out what was going on there.

Still later, on January 29, 1977, another storm commencing at 2013 UTC on January 28th had the opposite effect, causing very severe attenuation on signals over a 50 km path across Melbourne for a period of about 10 mins. around 1000 UTC.

Having spent such a large amount of time on 21 MHz I am surprised at the regularity of path openings over the period Oct. onwards. Have now discovered a cycle of openings into Melbourne which the astute amateur can well utilise. The cycle is at this stage reliable for at least 3 out of 4 weeks, though not necessarily in rotation.

For the novice operators, it is proving quite a boom and the occupancy of the portion 21.150-21.200 MHz is very full, often to the complete exclusion of the portion around 21.300 MHz. Some of the more active ones are up around the 40 countries worked with their QRP and often simple antennas.

Summary of 1976 Sunspot Data

Monthly Mean: 1/76 — 8.5; 2/76 — 4.6; 3/76 — 23; 4/76 — 19.5; 5/76 — 12.7; 6/76 — 12.4; 7/76 — 2.1; 8/76 — 16.9; 9/76 — 13.4; 10/76 — 21.8; 11/76 — 5.5; 12/76 — 15.

Running Smoothed Mean: 15.5; 13.4; 12.4; 13.0; 12.7; (9); (7); (9); (9); (9); (8).

Predicted Running Smooth Mean: 1/77 — (9); — (8); 3/77 — (8); 4/77 — (8); 5/77 — 6/77 — (9).

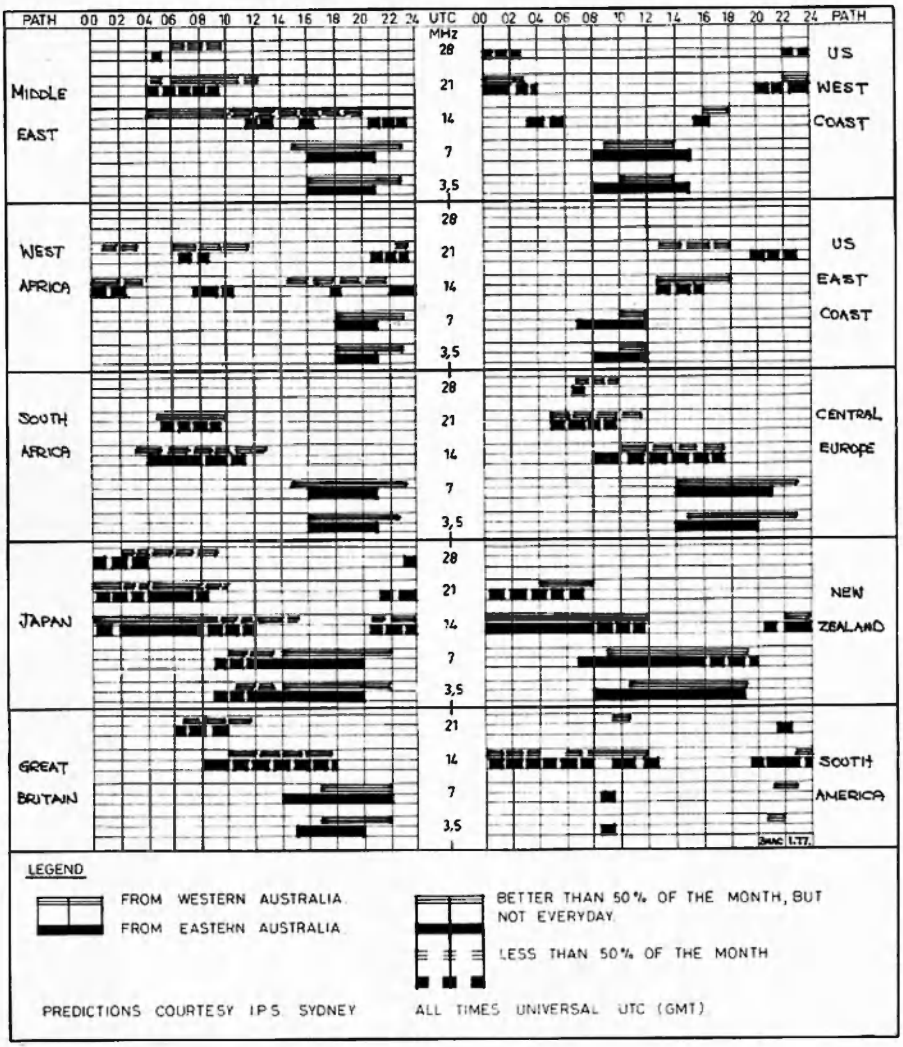
1976 2800 MHz Solar Flux: 1/76 — 74; 2/76 — 70; 3/76 — 77; 4/76 — 76; 5/76 — 71; 6/76 — 71; 7/76 — 67; 8/76 — 75; 9/76 — 73; 10/76 — 76; 11/76 — (77); 12/76 — (79).

Predicted 1977: 1/77 — (81); 2/77 — (82); 3/77 — (83); 4/77 — (84); 5/77 — (83); 6/77 — (82); 7/77 — (82); 8/77 — (83); 9/77 — (85); 10/77 — (88); 11/77 — (90); 12/77 — 92).

On predictions it would appear that to reach the 8 the remainder of the year will have to produce very low activity on a monthly basis through to the end of 1977. Given an average similar to 1976 the running mean might remain somewhere about the 10 mark before lifting off again — providing sunspot activity does in fact improve during 1977.

With a predicted top of 40 for the next two maxima does not raise much enthusiasm from those who worked through the 1958 and 1968. peaks. Guess the newcomers will have to learn a little more about the "tricks of the trade" to fully utilise the higher frequency bands.

Y3's VK3ZGP/NAC ■



LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Amateur Radio,

Dear Sir,

On behalf of the members and Council of the WIA (S.A. Division) I wish to express deep disappointment at the way in which the results of the 1976 Remembrance Day Contest were published in the December issue of Amateur Radio. The fact that VK5 and VK8 had won the contest was given no mention at all, except in the results table, and that it was our 5th successive win was ignored altogether.

We in the S.A. Division are justly proud of our record in the R.D. Contest, and it is a pity that the publication of the results was done in such a low key manner. Our success does not come by accident but as a result of careful planning and adequate publicity leading up to the contest.

Contrary to some comments heard, the scoring system does not favour us in any way; the secret of our success is the high participation we are able to achieve. VK4 made an effort this year and came very close to toppling us. I hope that next year all Divisions will make a maximum effort and by thus doing help to keep the "R.D." the premier contest on the Australian calendar.

Yours sincerely,
Garry H. Herden VK5ZK, President
(S.A. Division). ■

(Sorry — our slip was showing.—Ed.)

The Editor,
Dear Sir,

We in VK7 have almost become resigned to not ever winning the RD contest again, especially after the selfish attitude of other Divisions disallowed the use of Repeaters by our VHF operators.

The placing of VK6 above VK7 in the 1976 results started a study of the present award score calculation. In the 1976 results VK7 participation was higher than VK6, the top six logs average was higher, average score of all logs was higher, but we ended up 1000 points below in the final calculation. How come?

The calculation of the trophy score is done by adding the average of the top six logs to a bonus calculated by dividing the number of logs entered by number of licences in call area multiplied by total points from all entrants. This last factor can be simplified to average score of all entrants times number of logs submitted. This means that the final result depends on the square of the logs submitted. How can the smaller Divisions ever win? with the same average log scores, to equal VK5, VK7 participation would have had to be 48 per cent and VK1 would have needed 63 per cent.

The problem is, then, this so-called bonus score, which is not a bonus as in the VK5 score it accounts for 92 per cent of final score. A more realistic method would be to derive this bonus by dividing total points by number of licences. This

would remove the square factor of logs submitted and still depend on participation. If we apply this method to the last contest VK4 would have won due to high top six logs with participation only slightly less than VK5. Another possibility would be to allocate points to the various sections — participation, top six logs average, average of all logs, and derive the final result from these points.

It is not my object to derive a new system. This is up to the contest manager. A VK7 agenda item will be submitted to the next Federal Convention that he do this.

P. D. Frith VK7, Federal Councillor. ■

S.A. MICROPROCESSOR GROUP

During the second half of 1976, it became evident from contacts on the 2 metre repeater that a growing number of members of the South Australian Division of the WIA were involved or interested in the amateur applications of microprocessors. In October enthusiasts were invited to attend an informal meeting at the S.A. Division's Headquarters Building in West Thebarton Road and the attendance of 20 people encouraged the formation of a Microprocessor Group. We believe that this is the first such group within the Wireless Institute of Australia.

At the October meeting, it was decided to convene the Group regularly on the second Friday in each month and a small steering committee was elected to start the organisation of meetings and group construction projects. Since then, technical lectures have been held in November (on Numbering Systems by Roger Marks VK5) and in December (on Microprocessor Architecture and Bus Interfacing by Howard Harvey VK5ZBE) while the committee has met to formulate plans for group construction of television terminals, cassette interfaces and standardised microprocessor systems. A constitution has been drawn up for the Group, approved by the Council of the S.A. Division of the WIA, and was adopted by the Group at the December meeting.

Group membership has grown rapidly to just over 50, which has generated interest in its activities within trade circles in Adelaide. The February meeting will consist of the first AGM (hopefully short) followed by a technical lecture and equipment demonstration by the Intel agents, A. J. FERGUSON P'y. Ltd., while the Motorola distributors (Total Electronics) have asked for a similar session with their range of equipment at the May or June meeting. Two other manufacturers agents are also interested in providing technical lectures, which while free of charge to the Group would normally be quite expensive for individuals.

Happily, the Group consists of amateurs with a broad spectrum of interests and knowledge of microprocessor systems, ranging from those who feel that they wish to learn more about this new and exciting field of activity to those who are actively engaged professionally in engineering applications of microprocessors and computers. We are able to draw upon the strengths already existing within our membership for what promises to be a very full programme of meetings in 1977.

In March and April, the Group will hold elementary programming seminars, which with small groups, group tutors and working microprocessor systems will enable a majority of members to gain some hands-on experience of programming and operating. Following further technical lecture meetings, it is proposed to repeat the programming seminars later in the year.

Some critics of the Group have questioned where microprocessors fit into amateur radio activities (which sounds very similar to early criticism of transistors, SSB, RTTY, commercial transceivers, bug-keys, solid-state keyers and any other new-fangled device that makes operating easier or more interesting) but in fact the potential applications of microprocessors by amateurs are limited only by the imagination and ingenuity of the user. The following list of applications is by no means exhaustive, and any amateur who can't think up a couple more should join the Group (if he lives in South Australia) to have his imagination stimulated:—

Silent, static RTTY

Speed and code conversion for RTTY

High speed CW transmission and reception

Antenna tracking for EME and Oscar

Station monitoring and control for SHF meteor-burst comms.

VHF repeater supervision and control

Automatic station contest logging and scoring

SSTV signal processing and caption generation

There are potentially major benefits to members in forming a microprocessor group in shared learning, programming, bulk purchasing and leverage on manufacturers. We would like to think that groups will be formed by other Divisions of the WIA so that the benefits may be shared. If you are interested, have your Divisional Secretary write to the Microprocessor Group, Wireless Institute of Australia, Box 1234 G.P.O. Adelaide, 5001, and we will be pleased to send a copy of our constitution, newsletters, lecture programme and precis notes to help you get started — you will be surprised how many fellow-amateurs will want to join.

S.A. Division members should address enquiries about Group membership to VK5MG or VK5PE. Meetings are held in the Burley Griffin Building (at the rear of the West Thebarton Council Depot) in West Thebarton Road on the second Friday of each month. The February meeting will commence at 7.30 p.m. but other meetings start at 8 p.m. — Clive M. Pearson VK5PE, Box 207, P.O. Gawler, 5118. ■

INTRUDER WATCH

Alf Chandler, VK3LC

1536 High Street, Glen Iris, 3146

Further to my previous reports regarding the pulse transmissions so well documented by our Observers over the past few months I quote two sources of information and hope that this will be the last time I have to talk about this interference.

The following quotation was received from K6KA, and was sent by telex from Moscow to the FCC — "Radio installations operated in the high frequency bands are being experimented with in the Soviet Union, and these experiments could possibly cause interference of short duration to your radio facilities. We are now taking action in order to decrease the eventual interference. Your **reports** (my underline) will be attentively studied by Military or Postal Telecommunications of the USSR". What an understatement!

On the same subject I quote from "Radio Communication" of January, 1977 — "The powerful interference from the USSR noted previously has, at the time of writing, become less frequent in appearance but has not yet ceased. The signal caused a half-page report in the "Washington Star" which was picked up by most of the USA press outlets. This report extensively quoted the IARUMS co-ordinator. Feedback from the Home Office following reports by the RSGB Intruder Watch organiser, shows that telex messages have been sent to the USSR, China and Egypt asking for the cessation of interference in exclusive amateur bands. In several cases the USSR based interference has ceased but there has been no success following representations at Peking. In addition to its primary function, the Intruder Watch is a source of valuable information which is being prepared for WARC 1979. Any administration unwise enough to refer to the 7 MHz band as an exclusive amateur service allocation can be given an answer backed by facts and evidence".

As well as the USA and European countries, that is Region 2 and Region 1, we in Region 3 have systematically reported this QRM as well as other types of interference, notably broadcasting in the 7 MHz band, but we still need more Observers. I don't know why I have to re-iterate this plea so often. It baffles me completely why so many members will not take just a few minutes occasionally to scan the bands for intruders, or at least, when they hear an intruder, not report the occurrence to their appropriate co-ordinator. Is it apathy or just plain forgetfulness? ■

PROJECT AUSTRALIS

David Hull, VK3ZDH

NEW SATELLITES

Approximate launch dates have been announced for the next breed of Amateur satellites. AO0 is another low altitude satellite designed to provide continuation of the ARRL Education program which is used as the justification for so much of AMSAT's funds. It will have a period of 102 mins and inclination of 99° and a 915 km apogee. It may fly as early as June 1977 but will probably be launched in the latter half of the year. The first of the phase 3 elliptical orbit satellites should fly from the European Test Range in French Guiana aboard the second test flight of the ESRO "Ariene" satellite in December 1979. Another intriguing possibility is the chance of a ride aboard a geostationary satellite over the south Pacific. More on this as details come to hand.

PROBLEMS

AO7 experienced a period of mode switching over the Christmas-New Year period attributed to climatic conditions in the northern hemisphere. Bob Arnold VK3ZBB reports that it seems to have settled down since this period. It is hoped that this "disease" was only temporary.

Of a more serious nature we have noticed a change for the worse in the condition of AO6's battery. Telemetry indicates that one of the Nicad cells in the upper half of the battery has failed and is not accepting charge as well as it should. This has meant a more tighter control over the on/off cycle and the bird has had to be switched "off" occasionally when it should be "on". Apologies for any inconvenience.

APRIL 1977

OSCAR 6

Date	Orbit No.	Time Z	Long °W
1	20391	01.22	80.80
2	20403	00.22	65.80
3	20416	01.17	79.55
4	20428	00.17	64.55
5	20441	01.12	78.30
6	20453	00.12	63.30
7	20466	01.07	77.05
8	20478	00.07	62.05
9	20491	01.02	75.80
10	20503	00.02	60.80
11	20516	00.56	74.55
12	20529	01.51	88.30
13	20541	00.51	73.30
14	20554	01.46	87.05
15	20566	00.46	72.05
16	20579	01.41	85.80
17	20591	00.41	70.80
18	20604	01.36	84.55
19	20616	00.36	69.55
20	20629	01.31	83.30
21	20641	00.31	68.30
22	20654	01.26	82.05
23	20666	00.26	67.05
24	20679	01.21	80.80
25	20691	00.20	65.80
26	20704	01.15	79.55
27	20716	00.15	64.55
28	20729	01.10	78.30
29	20741	00.10	63.30
30	20754	01.05	77.05

OSCAR 7

Date	Orbit No.	Time	Long °W
1	10866	00.52	65.99
2	10879	01.47	79.61
3	10891	00.46	64.49
4	10904	01.40	78.11
5	10916	00.39	62.99
6	10929	01.34	76.61
7	10941	00.33	61.49
8	10954	01.27	75.11
9	10966	00.27	59.99
10	10979	01.21	73.61
11	10991	00.20	58.49
12	11004	01.15	72.11
13	11016	00.14	56.99
14	11029	01.08	[illegible]
15	11041	00.07	5[illegible]
16	11054	01.02	69.11
17	11066	00.01	53.99
18	11079	00.55	67.61
19	11092	01.50	81.23
20	11104	00.49	66.11
21	11117	01.43	79.73
22	11129	00.43	64.61
23	11142	01.37	78.23
24	11154	00.36	63.11
25	11167	01.30	76.73
26	11179	00.30	61.61
27	11192	01.24	75.23
28	11204	00.23	60.11
29	11217	01.18	73.73
30	11229	00.17	58.61

COMMONWEALTH CONTEST 1977

A reminder is given that this contest will run from 1200Z Saturday, 12th March, to 1200Z Sunday, 13th March 1977.

Rules are as published in last month's AR. There are medallions to be won by the VK winner and VK middle placing.

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

March

5/6	ARRL DX Phone contest
5/6	YL-OM CW contest
12/13	RSGB Commonwealth contest CW
12/13	South Dakota QSO party
12/14	Virginia QSO party
19/20	ARRL DX CW contest
26/27	CQ WW WPX SSB contest
26/27	BARTG Spring RTTY

April

2/3	Polish "SP" CW contest
2/4	ARCI QRP contest
12/13	DX YL to W/VE YL CW
16/17	Bermuda contest
16/17	Polish "SP" Phone contest
16/17	ARRL CD CW party
16/17	Florida QSO party
23/24	ARRL CD phone party
23/24	PACC DX contest
23/24	Swiss "H-22" contest
26/27	DX YL to W/VE YL phone

Commonwealth Contest
Starts 1200 GMT March 12 and finishes 1200 GMT March 13. Eligibility is limited to RSGB residents in the UK and amateurs licensed to operate within the British Commonwealth or British Mandate Territories. Activity is on CW only, in the lower 30 kHz of each band. Exchange signal report only. Each QSO is worth 5 points, with a bonus of 20 points for the first 3 contacts with each Commonwealth area.

Send logs to D. J. Andrews G3MXJ, 18 Downview Crescent, Uckfield, Sussex, England. Logs to be received by May 16 to be eligible.

CQ WW WPX SSB Contest
Starts 0000 GMT March 26 and finishes 2400 GMT March 27.

Contacts between stations on different continents count 3 points on 14, 21 and 28 MHz, and 6 points on 7, 3.5 and 1.8 MHz. Contacts are permitted between stations in the same country for the purpose of obtaining a Prefix multiplier, but have no QSO point value. The multiplier is the number of Prefixes worked. Each Prefix may be claimed only once, not once per band.

Exchange RS report and a serial number starting at 001. Only 30 hours may be claimed for scoring. The 18 hours of non operation may be taken in up to 5 periods. This is for single operators, who must show at least 12 hours operation to be eligible for awards. Multi operator stations must show at least 24 hours, with no time limit.

Mailing deadline is May 10th. Logs to go to CQ WPX SSB Contest Committee, 14 Vanderbilt Ave., Port Washington, N.Y. 11050 USA.

[illegible]h DX Contest
CW — April 2/3, and Phone on April 16/17. Starts 1500 GMT Saturday and finishes at 2400 GMT on Sunday.

This year's contest has a few changes from past years. The contest is now on two weekends Phone and CW, each independent of each other. The districts (Powiats) have been replaced by 49 Provinces (Wojewodztwo). The new abbreviation, two letters denoting the WOJ, will be sent in the exchange.

Exchange RS(T) and a 3 figure serial number starting at 001. Polish stations will send RS(T) and their WOJ, i.e. 579KA etc. Each QSO with an SP/SQ/3Z counts 3 points. Each different province (WOJ) worked counts as a multiplier, but can only be claimed once, regardless of the number of bands used. (Maximum of 49).

Final score is the total QSO points times the number of Provinces worked. The same station may be worked on each band for QSO points, but only once for the WOJ.

Certificates will be awarded to the top scorers in each category and mode (i.e. single operator single and all band, Multi operator all band only, and SWL) in each country and each call area of Australia, Canada, USA and USSR.

Use a separate sheet for each band, and a summary sheet showing scoring, and your name and address in block letters. The usual signed declaration is requested.

Entries must be postmarked no later than April 30 for CW and May 15 for Phone, and go to PZK Contest Committee, P.O. Box 320, 00-950 Warszawa, Poland.

ARCI QRP Party
Starts 2000 GMT April 2, and finishes 0200 April 4. This contest is sponsored by the QRP Amateur Radio Club International, and this activity is open to all Amateurs. Stations may be worked once per band for QSO and multiplier credit. Exchange RS(T) and state, province or country. Members will include their QRP number, non members their power input. Contacts with a member count 3 points, and non members count 2 points. Stations other than W/VE 4 points. Each State, province or country worked on each band counts as a multiplier. There is also a power multiplier as follows: Over 100 watts input — x 1; 25 to 100 watts, x 1.5; 5 to 25 watts x 2; 1 to 5 watts x 3 and less than 1 watt x 5.

Final score is QSO points x States, provinces and countries per band x the power multiplier. Frequencies CW — 3540, 7040, 14065, 21040, 28040. SSB — 3855, 7260, 14260, 28600 (21360?). Include a summary sheet with your entry with a breakdown of scoring, bands used, equipment, antennas and power used. Your name and address in block letters and the usual signed declaration. Logs must be received before May 30 and go to E. V. "Sandy" Blaize, W5TVW, 417 Ridgewood Drive, Metairie, LA 70001. ■

20 YEARS AGO

Ron Fisher, VK3OM

The first transistorised transmitter to be featured in Amateur Radio was described by Hans Albrecht, VK3AHH, in the March 1957 issue. Perhaps the term "transmitter" might have been a little ambitious as the unit was little more than an oscillator built into a match box. Hans claimed an output of 1.65 milliwatts. It was however a starting point. In a second article in the same issue, Hans described his experiments stabilising transistor oscillators.

"Meet Donald Duck" by Stan Bourke was not a description of a guided tour of Disney Land but an introduction to the benefits of single sideband. While SSB activity was slowly increasing, most of the big AM boys were still sure it was just a passing fad.

Television DX reception made big news in the newspapers of those days especially when the BBC (London) was received by two SWL's. In Sydney, Norm Burton received the sound carrier on 41.5 MHz with his modified SX 28 receiver. George Palmer of Melbourne also heard the sound carrier on both an English TV receiver and also with a converter into a communications receiver. In both cases no picture was received. A low power transmitter or exciter for two metres using a 6V6/6V6/6BW6 driving a 2E26 in the final designed by K. Mitchelhill, VK2ANU, was also featured in March 1957 Amateur Radio.

Other articles were, "Combining 6V and 12V Filament Operation" by W. Howse, VK6ZAA, and "A Suggested New Reception Report System" by YO3RD. It seems that most reporting systems evolve rather than just appear and it would appear that YO3RD's system has disappeared.

"Subdue That Over-Modulation and Increase Your Readability" or how to apply negative peak clipping to an AM transmitter. Bud Pounsett VK2AQJ showed you how to do it. The Federal Executive Editorial page told readers just how a Federal Convention is arranged. With a Convention due to be held in Melbourne the following month, they no doubt hoped to raise more interest and support for this. ■

LARA

Ladies Amateur Radio Association

"DOINGS AND WANDERINGS"

For this month, we will take a look at the activities of some LARA members over the summer. Wanderings include Norma VK3AYL who set off for a glorious holiday in New Zealand in December and hasn't been heard of since. She is meeting some members of WARO on her travels and has probably joined in their skeds. YL activity in ZL is quite widespread and WARO membership lists include a large number of licensed YL's.

So much for the international scene. If Norma hasn't fallen into a fjord or off a volcano we expect to see her back to teach the novice classes in the new term. Interstate travels include Myrna VK5YW, who visited VK3 in late January. She met some of the VK3 LARA members who know her as the net controller on the LARA skeds. Unfortunately there wasn't time to organise a formal meeting for the occasion.

Doings amongst members over the month of course include that enthralling activity examsitting. Some of us enjoy this so much that we do it again and again. Anyway, best of luck for those awaiting results this time.

Doings on the organisational side in the month have included steps towards the first 1977 newsletter edition. Contributions from members will, of course, be warmly welcomed. Members are asked to return copies of the referendum in the last edition, as a vote in the national "meeting".

A list of coming events is a possibility in the newsletter if people will let us know when, what and where.

Finally, mention should be made of all the doings and wanderings of members locally in each area. Most of us are quite busy enough and it is always a shock to find another month going each time a meeting comes around, but not to worry, just come up on the sked and share your troubles.

33's LARA ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

WAB AWARD (BERMUDA)

1. The award is available to licensed amateurs.
2. QSL cards must be submitted with the application.
3. There is no fee.
4. Address for applicants is —

   Awards Manager,
   Radio Society of Bermuda,
   Post Box 275.
   Hamilton, Bermuda.

Rules: Contacts made during the annual Bermuda contest may be claimed for credit without submission of QSL cards provided that —

1. the applicant has submitted a valid contest log, and
2. application is made within one year of the contest.

Only one mobile or portable station may be claimed for credit.

The city of Hamilton is in Pembroke Parish and not Hamilton Parish.

Requirements: One confirmed contact is required with each of the nine Parishes.

1977 CAPE TOWN FESTIVAL AWARD
The award is available to all licensed amateurs. Contacts must be made during the period 0000 SAST 2nd April 1977 to 2400 SAST 30th April 1977 (2200 GMT 1st April - 2200 30th April). Stations are required to work ZS1CTF or ZS1CTM plus 2 other ZS1 stations. QSL cards are not required for this award. Submit an extract of your log certified as being correct by either your local awards manager, or two licensed amateurs. Any mode or combination of modes may be used. Any band or combinations of bands may be used. Closing date for applications is 31st July 1977. Certificates will be posted after this date only. Fee for the award is SA Rand 1.00 or US$2.00. A special endorsement will be available for VHF contacts. This may be applied for as an additional award. Applications should be addressed to

Derek Siegel ZS1DP,
SARL CT Branch,
P.O. Box 5100,
Cape Town 8000, South Africa. ■

QSP

NEW PREFIX

The ITU announe the provisional allocation of the callsign series S8AA—S8ZZ to the Transkei in response to a request by the Republic of S. Africa. Radio Communicatlon January '77.

BEACONS

It is interesting to note the beacon situation in the UK as published in Radio Communication (November '76) and IARU Region 1 News. The listings show the following:—

Band	Number	Remarks
28 MHz	1	GB3SX
	7	rest of world; 28.165 MHz to 28.195 MHz
70 MHz	2	in G land*
144 MHz	4	in G land*
432 MHz	2	in G land*
1296 MHz	1	in G land*
	2	G licensed
2300 MHz	1	licensed in G.
3456 MHz	1	licensed in G.
10 GHz	2	in G land* plus 1 licensed

* Means operational.

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Shack Cleanout: HRO, six coil sets 480 kHz to 40 MHz; VFO 3.4-3.7 MHz; Command Rx 3-6 and 6-9.1 MHz; Tx 3-4 and 4.5-5.3 MHz; R1124A Rx; Bendix TA12 Tx; BC625A VHF Rx; Xtal cal. No. 10; metrix 742 VTVM CW VHF probe, Palec VCT; Loran APN4 Rx and indicator; relays 12, 24, 48, 240 volt; many other components incl. VAR caps etc. Best offers accepted. VK3ASC, QTHR (03) 45 3002 (priv.), (03) 698 5393 (bus.).

Lafayette KT320, general coverage Rx with manual, goes well, $60. Ken KP202, hand-held 2 m transceiver with repeaters 2, 6 and 8. Simplex "A" 40 and 50. Nicads and charger, manual, $140. All offers considered, VK3BAX, QTHR. Ph. (052) 9 5949 bus., (052) 9 7401 A.H.

Estate late VK2YB. Hansen TV circuit tester, capable of 700 AC/DC V, 17,500 V EHT, mA, resistance, output meter, capacitance, inductance, RF indicator, tube GM test and transistor testing etc. $15, plus any delivery cost. Contact VK2QL, QTHR.

AWA 1.25 KVA auto 240 V line transformer, $10 plus freight. Power transformer 220/260 V input 1250 V output tapped at 600, 750, 1000 V rated at 250 mA, $10 plus freight. Core held by ¾ angle iron and bolted. AR7 dial and ganged condensors. Best offer. VK2QL, QTHR.

Microwave Dish Aerials: 3 ft. diameter, aluminium mesh construction, with centre feed mounting, commercial manufacture, good condition, ideal for Dx or satellite reception, $30 or offer. R. Brown, Sydney. Ph. (02) 638 2880.

FT 200 with home made PS, speaker, all 10 m xtls in working order, but may be improved by tuning, $295. MFJ Super Logarithmic Speech Processor LSP 520 BX, see QST, $49. VK2BMI, QTHR. Ph. (02) 771 1657 A.H.

Two Barlow Wadley Rx under warranty. One faulty, $175, the other $200. D. Deerman, 222 Parry Street, Charlesville, Qld., 4470.

Teletype ASR 35, heavy duty model, ASCII, in exc. cond., with all manuals, service log, tape and paper, $365. Icom IC20, exc. cond., ch. 2, 6, 8 rep. and ch. 40 and 50 simplex, $130. Asahi 5/8th 2 m whip and car mount $15. Simon Rosenbaum VK3ZUI. Ph. (03) 51 1156 A.H.

Morse Cassettes: C60's with ITU standard speeds, 5, 6, 7, 8, 9, 10, 11, 12 words per minute, practice before exams to (past exam) standards. Contact Peter Dodd, Fed. Exec. Office.

Cubical Quad 7'9" boom, 1" wood dowel spreaders. Can be used to make a 144 MHz "BL mini-quad" or supply details to copy high gain 3 band quad. Any reasonable offer near $40. Graeme VK3ZR, A.H. (03) 89 4645.

Atlas 180, mike, 2 batt. leads, little used $A360. G whip helical 10 thru 80, $60. 2 m FM digital II, VK version, as new, $260. P29KE, Box 840, Rabaul, PNG.

Heath SB500: 2 metre SSB transverter, 140 W PEP 2 x 6145B's with 10m input/output, $175, like new condition, had very little use. Poly-comm 2 144-148 AM tunable transceiver with inbuilt separate Tx and Rx VFO's and super sensitive Rx with squelch, effective NL. Tx easily convertable to FM, Rx copies FM FB. Inbuilt AC/DC power supplies, $135. VK3BGW, L. Kubis, QTHR, Ph. (03) 561 3555 (bus.) (03) 232 6528 (A.H.).

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SILENT KEYS

It is with deep regret that we record the passing of —

Mr. C. CASE	VK3ACE
Mr. C. R. McNALLY	VK3CE

IVOR MORGAN — VK3DH

January 4th 1977 was a sad day for the radio fraternity when it learned of the sudden death at his home of one of Australia's best known and popular amateurs — Ivor Morgan VK3DH.

Although officially retired, Ivor was still working at the HSV-7 transmitter on relieving duties with no hint of any trouble. He had, in fact, taken part in the regular mid-morning chat on 7 MHz with his radio friends and after sign off had come in to have a cup of tea with his wife when he collapsed.

Ivor operated a superb station with a complete Collins "S" line on all HF bands, even his car was equipped with an Atlas 210 mobile set which he used extensively whilst travelling to and from the HSV transmitter on Mt. Dandenong.

VK3DH was well known for activities associated with the Pacific DX net on 20 metres as well as taking the call-back after the WIA broadcasts on Sunday mornings on 3.6 MHz. Ivor was a Vic-Div WIA councillor and liaison member with Community Radio 3CR. As secretary of the "Old Timers" association, he was busy with the final arrangements for the annual dinner to be held on March 10th.

Ivor was never idle, radio was his livelihood as well as his hobby and he had a stream of friends and others seeking his advice which was always so freely given.

VK3DH was first licensed in March 1930 and commenced transmission in the then popular 200 metre band with experimental musical broadcasts on Sundays. Even as a schoolboy, Ivor acquired an interest in radio and constructed his own equipment. His first job was in the radio department of a large store in Melbourne and he followed that vocation ever since, having his own shop at one stage.

As commercial broadcasting developed, Ivor took a keen interest in this field and obtained his Broadcast Operator's Certificate in 1936 and worked with Ray Shortell (3SR) on the installation of a new transmitter at 3SR Shepparton. He subsequently joined 3AW in Melbourne and was A/g Chief Engineer during the war period. With the advent of television he obtained his Television Operator's certificate and joined HSV where he worked until the end. The Radio World has lost a virile and enthusiastic member and was represented by a very large gathering at St. John's Church of England, Camberwell, in a tribute to Ivor's wife, Ilse, and two sons, Vincent and Christopher.

Alf Kerr VK3JQ.

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MARCH 1977
Vol. 45, No. 3

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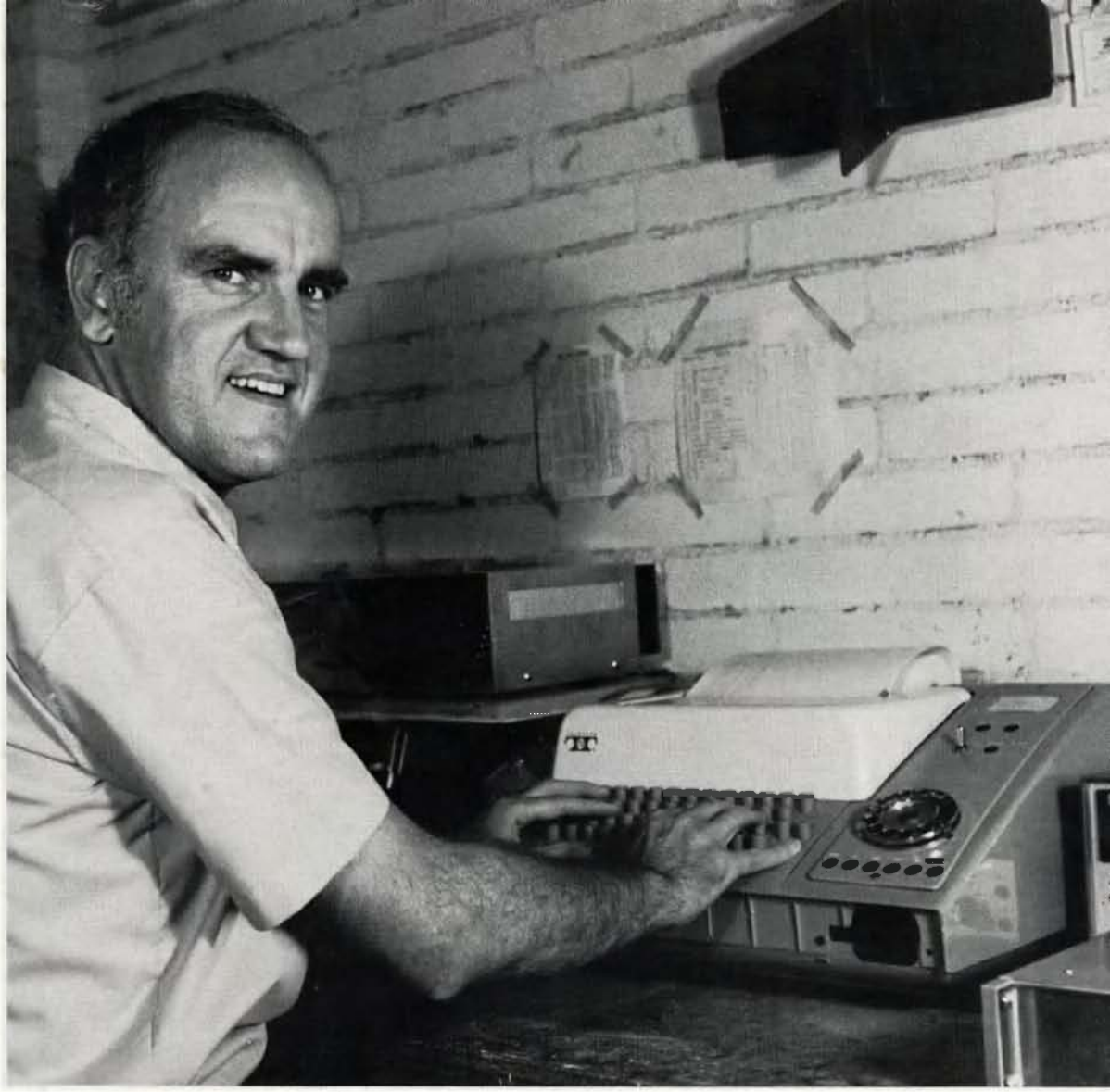
amateur radio



VOL. 45, No. 4 APRIL 1977

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COVER PHOTO

Dave Hull VK3ZDH is well known for his work as a control station for Oscars 6 and 7 and for AMSAT co-ordination in Australia. Dave is also a member of executive and in his spare moments keys up his extensive array of RTTY equipment.

Photo by Reg Goudge.

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QSP NOVICE TENURE DISCUSSED

At one of the regular meetings with the principal officers of the RFMD early in March, discussions were held on a range of current affairs of interest to the WIA representing the amateur service in Australia.

The Institute representatives were informed that the two year tenure on Novice licences is not a condition of the licence as was believed the case.

It was gratifying to be told that Novice Licensees will be authorised the use of a segment of the 10 metre band as early as this can be arranged. The Institute has asked for years that the segment 28.1 to 28.3 MHz should be allocated to Novice Licensees.

At the present time nobody can say if there will be any changes to the 11 metre amateur band in the foreseeable future. This must depend upon decisions on a "CB" service. The Department recognises that Novice licensees, in particular, possess an equipment investment in this band.

The reduction of licence fees for aged and invalid amateur licensees is still in the system awaiting the necessary legislation. ■

WIA CORRESPONDENCE

25th February, 1977.

The Minister for Posts and
Telecommunications,
Parliament House,
CANBERRA, ACT 2600.

Dear Sir,

1. I am instructed to refer to the Report to the Minister for Posts and Telecommunications on the introduction of a Citizen Band Radio Service to Australia.

2. In relation to paragraph 82 of the Report, attention is drawn to correspondence of 16.7.1974 with the Postmaster-General relating to this Institute's general views about a "CB" service, together with the following letters:—

My letter of 4.2.1976. Reply 315/1/63 of 18.3.1976.

My letter of 6.4.1976. Reply of 25.5.1976.

My letter of 15.9.1976 relating to the possible 68 per cent loss of frequencies if the amateur band (11 metres) is withdrawn from the Australian Amateur Service allocation. Interim reply of 21.9.1976.

3. This Institute, consistently and for as long as it has existed, has been concerned about illegal operations within the Amateur Service frequency allocations. These may be caused by intruders or pirates or by any other unlawful or unauthorised activity within Australia or emanating from any other country and affecting the lawful use of those frequencies here.

4. The illegal use being made of the Australian Amateur Service 11 metre band shared allocation (26960 to 27230 kHz) by unlicensed operators in recent times is of concern to this Institute.

5. The Institute believes that as these illegal operators are demonstrating a need for personalised communications for the public it is essential that this need should be seriously considered without unnecessary delay. The three options set out in the Report are considered to be useful for discussion purposes but should not eliminate the necessity for considering such other variations as would satisfy international obligations, acceptable administrative methods of regulation and control and the removal of illegal operators from spectrum usage.

6. If a "CB" service is to be introduced into Australia this Institute, in common with other interests representing users of the frequency spectrum, has no option but to insist upon the following paramount priorities —

(a) proper and effective control measures must be observed and enforced at all times;

(b) the detection, apprehension and conviction of illegal stations and operators must be vigorously pursued both now and at all future times; and

(c) adequate compensation is necessary if any existing Amateur Service allocation is withdrawn or reduced, or rendered virtually useless for ordinary amateur communication purposes.

7. This Institute commends for the most serious attention those parts of the Report relating to the numerous problems experienced in the USA and elsewhere on the operations of the CB services in those countries. It should be added that as Amateur Service licences were suspended in the public interest during the two World Wars any intended "CB Service" must also be capable of being closed down on immediate notice. Any deployment of manpower to achieve this objective at a critical time should receive consideration.

8. The Institute also wishes to set out what may be termed secondary considerations relating to the introduction of any new or expanded service. These are —

(a) real and potential interference to other services, equipment and facilities;

(b) the unlawful use of equipment for overseas communications;

(c) the ease of converting existing equipment for use on other adjacent, close or related frequency allocations;

WIANEWS

WARC 79

Two meetings of the Executive were held during February. At the first one, the WIA submission, on WARC 79, to the chairman of the APG's Committee No. 2, was finalised.

As might be expected this runs into a great many pages and would be much, too lengthy to publish in AR. Copies will be supplied to Divisions, as soon as they have been completed including the appendices.

It is understood that the Australian amateur radio case will be prepared by Committee 2 drawing freely on the WIA submission.

As a matter of interest the submission took many months to prepare and several drafts were made before final acceptance. It has drawn freely on material supplied by the IARU, both of a general nature and specifically referring to individual countries such as the USA, UK and Canada.

CB

The second meeting of the Executive discussed the WIA submission to the Minister about "CB". This is published elsewhere in this issue.

1977 CALL BOOK

WIANEWS in February AR reported developments about the 1977 Call Book. Representations were made to the Australian Government Publishing Service early in February concerning the material supplied for the call book and various other aspects of the proposed contract.

As a result further discussions will be held with the RFMD. The delays are such that the publication of any call book is unlikely to occur before mid-year. The Institute has everything ready for the call sign data to be processed. Negotiations began as long ago as January 1976.

Readers will be aware of the intention to produce the call book using our EDP membership details in conjunction with the P & T Department's records for non-members. Members recorded as unfinancial at the chosen date will be listed from non-members data. The "chosen date" can only be determined when the contract negotiations have been finalised.

1977 FEDERAL CONVENTION

A number of purely organisational agenda items have been submitted as Agenda Items by the Executive. Additionally other items are being submitted on various outstanding policy questions.

One recommends the adoption of ± 7 kHz as the maximum deviation for FM transmissions in the VHF/UHF amateur bands.

Two more propose the adoption of band plans for the 52-54 MHz and 144-148 MHz bands. These were originally published in AR for August 1975 and are almost wholly unchanged.

Yet another will require the WIA to seek approval from RFMD for F5 transmissions in amateur bands from 1215 MHz upwards.

WICEN

The proposal to hold a State WICEN Co-ordinators' meeting (see WIANEWS Jan. '77) has not materialised. It is likely that the Federal Convention will discuss this important activity however.

REPEATERS

Latest information is that the VK3 Division will be hosting a repeater meeting early in April with visiting VK1 and VK2 repeater representatives to discuss mutual problems relating to RTTY repeaters and additional channels. This does not exclude attendance by other Divisions but the problems for discussion seem to affect only the three participants. It is to be expected that recommendations will thereafter be prepared for Federal Convention discussions. The expense involved in attending such meetings is considerable and this may influence decisions in the more distant Divisions.

GENERAL

Early in April the Federal President, Dr. Wardlaw, will attend the opening of the VK5 Divisional Headquarters in Thebarton and hopes to hold discussions with as many groups and individual members in Adelaide as possible during his visit.

The Federal Convention will be held in the Brighton Savoy Motel from 09.00 hours on Saturday, 23rd April, concluding on Monday, Anzac Day. By the end of February no Agenda Items had been received from Divisions. The Executive would greatly appreciate offers of assistance by members for the Convention. In particular assistance with the recordings would be most welcome. Even apart from this, come along to the Convention and see what goes on for the benefit of amateur radio in Australia. ■

WIA CORRESPONDENCE (continued)

(d) the exercise of intelligently administered controls over the importation and/or acquisition of equipment for any new or expanded service; and

(e) the establishment of any new or expanded service should be so designed as to create the minimum diversion of staff.

These considerations relate in general to technical criteria. Both (a) and (b) as well as (d) have received mention in the Report. In relation to (e) the relevance of paragraph 51 of the Report must be noted particularly as Amateur Service affairs have been accorded such a low priority for some years because of the staff situation within the Department. All offers of help by the Institute in specific areas have also been consistently rejected although consistently re-affirmed.

9. It is the considered view of this Institute that a service for a "CB" type of operation could be evolved which meets all the priorities listed in paragraph 6 above and most of the considerations outlined in paragraph 8.

10. If a decision is reached in favour of establishing any new or expanded service it is recommended that a technical committee should be appointed to determine the essential parameters, specifications, limitations and controls. It would be the wish of the Institute that it should be officially represented on such a committee.

Yours faithfully,
P. B. DODD,
Secretary. ■

QSP

NEW 3.4 GHz RECORD

The Chairman VHFAC advises a new Australian record of 70.9 miles for the 3400 MHz band between VK2AHC/P at Terrey Hills and VK2SB/P on Mount Gibraltar, near Mittagong on 16.1.1977.

ANOTHER GOLDEN JUBILEE

The ARI announces it will be celebrating its 50th anniversary in Florence during September this year. There will be an international Home Constructions Contest as well as a radio historical exhibition. Station IK50ARI will be operational.

SPECIAL CALL SIGN

In March approval was obtained from the RFMD for the use of the suffix HRH only with official WIA stations whilst the Royal Party is in the State concerned. Thus the call sign AX4HRH will have been aired and possibly one or two others in other States.

IARU NEWS

An interesting little item was recently noticed. It suggested that using CW in the USA on a repeater might be somewhat ludicrous.

During December a visitor to Melbourne was DJ8XW on his world tour outlined in December AR, page 48. Peter writes for DARC in their amateur magazine and was a source of many little news items.

Another interesting visitor was G2YS, John Swinnerton, in the shack of VK3XB.

Worldradio for January 1977 contains an article by K4NSS listing the USA FCC proposals for the amateur service for WARC 79 contained in lengthy docket 20271. Because of the excellent work of the IARU the proposals are similar to — but differ in a little detail because of referring to Region 2 — those now being submitted to the Australian authorities — see WIANEWS in this issue.

A telegram of condolence was despatched by the Federal President to HRH King Hussein JY1 to which he replied "I am deeply grateful to you and the members of your organization for the heartfelt expression of sympathy at the loss of our Queen Alia. May God keep you all." ■

RTTY LINE GENERATOR

Ron Catmur VK5FY
142 Woodlord Road, Elisabeth North, S.A., 5113

There have been a number of circuits in Amateur journals for RTTY Message Generators of the electronic variety, but they all seemed to suffer from a number of shortcomings, in that:

(a) They were too short — just a Call Sign.

(b) They required the message to be typed in, and it was lost if the power was removed.

(c) They used "exotic" devices, and the message was permanent.

To overcome these shortcomings, the unit to be described was constructed with the following basic specification:

(a) A capability of at least 65 characters — almost a full line.

(b) Uses standard TTL devices with a single 5 volt supply rail.

(c) Messages are pre-programmed on plug-in circuit boards, making changes from one to another easy.

(d) The message content of any board can be changed later if desired.

GENERAL DESCRIPTION

Figure 1 shows a block diagram of the system. The input is 800 pulses per second (derived from a crystal controlled speed converter unit) which is divided by 16 to produce 50 pps. (50 Baud rate, which is down converted by the external speed converter unit.) The 50 pps now drives an 8 Bit Counter, the output of which is fed to the 8 Bit Multiplexer. Now the Multiplexer accepts parellel data and converts it to series at the 50 pps rate. If you are not familiar with multiplexers, they can be likened to a cobbler putting a handful of nails in his mouth — parallel input — and pushing them through his lips one at a times — series output. The 8 Bit Counter acts like the cobbler's tongue, it determines the rate at which the information bits are fed out. To go one stage further, if the nails were of two different lengths, then the cobbler's tongue would sort them out as he required them by length. That brief explanation should have the Multiplexer action licked, as it were.

The Multiplexer has bits 1, 7 and 8 permanently wired as the Start and Stop pulses required by the Baudot Code. Bits 2 to 6 inclusive are the information bits, which determine the required character, or function. These 5 bits are produced from a diode matrix, which has 30 inputs — A to Z, plus Space, Figs., Carriage Return, and Line Feed. An earth, or low level on any one input will produce the required Marks and Spaces for that character on the 5 information lines.

Thus, we have so far managed to produce the correct Code for each character, and all that remains is to determine *when* the character is to be transmitted.

This is done by the Slot Counters and Decoders. Every 8th pulse from the 8 Bit Counter is fed to a Slot Counter, which is really a divide by 10. The Binary Coded Decimal (BCD) output of this Counter is fed to a Slot Decoder, which has 10 separate outputs, each of which goes low sequentially. The Slot Decoder is in fact a BCD to Decimal Converter. So, one Slot Counter, and its associated Decoder, produces 10 slots sequentially, each slot being 8 bits wide. These slots are connected to the diode matrix inputs as required. The example at the bottom of the Block Schematic shows how the slots are connected to produce CQ de VK5FY.

In order to generate 65 slots, 7 Slot Counters and Decoders are required, plus a 10's Slot Counter and Decoder, which, in a similar manner to the operation of the Slot Counters, allows the Slot Counters to operate in sequence — 0-9, 10-19, 20-29 and so on.

A selected Line Stop signal can be switched to stop the generator after one line, or to allow the line to be repeated as often as desired.

Figure 2(A) shows the output waveforms of the Bit and Slot Generators. The input to the Slot Counter is the same as the "C" output of the 8 Bit Counter (Waveform 1). The negative going edge occurs at every count of 8 (or 0). The output waveforms (2) A, B, C and D of the Slot Counter are fed to the Slot Decoder which has 10 independent outputs (3) designated 0 to 9. Each of these outputs is normally high, and goes low for one input count progressively. Starting at 0, the Decoder output 0 is low until the 8th pulse from the 8 Bit Counter occurs, then the 0 output of the Decoder goes high, and the 1 output goes low. After the second count of 8 bits, 1 goes high, and 2 goes low, and so on as the count progresses. It will be seen that in the Reset condition, Slot 0 is held low, so it is not used in the Code Generation. However no input to the diode matrix results in the "LTRS" function being produced which is always desirable at the commencement of a line.

The example at the bottom of Figure 2(A) shows Slot 0 as LTRS; Slot 1 as C; Slot 2 as Q; and so on until Slot 9 gives FIGS prior to the required figure 5 in the Call Sign.

Figure 2(B) shows the waveforms of the 10's Slot sequence. Each time the last slot of a Slot Decoder is generated, output 9, (4) a positive pulse appears at the output of the 10's Detector (5). This pulse falls low at the end of the output 9, and it is

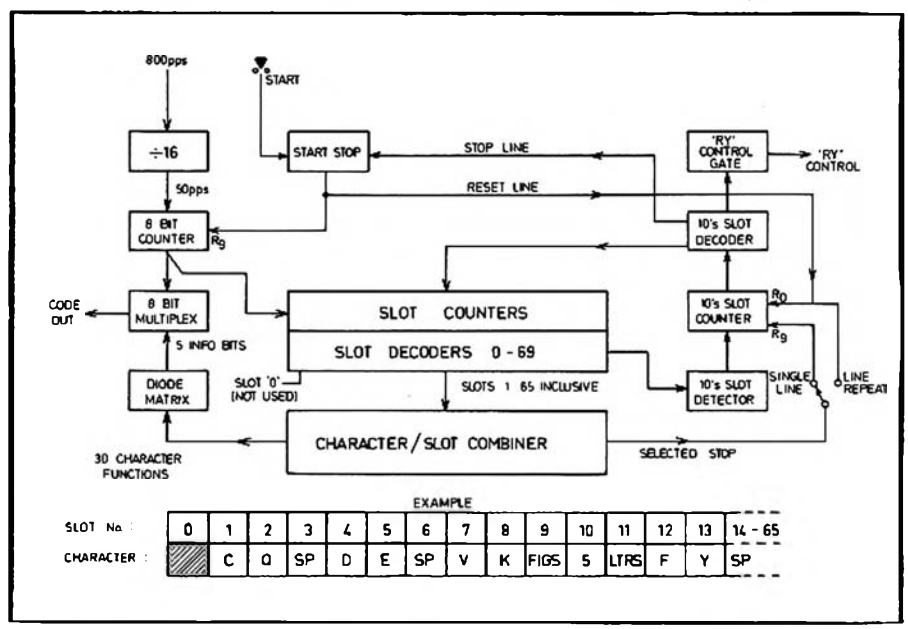

FIG. 1. RTTY LINE GENERATOR BLOCK SCHEMATIC.

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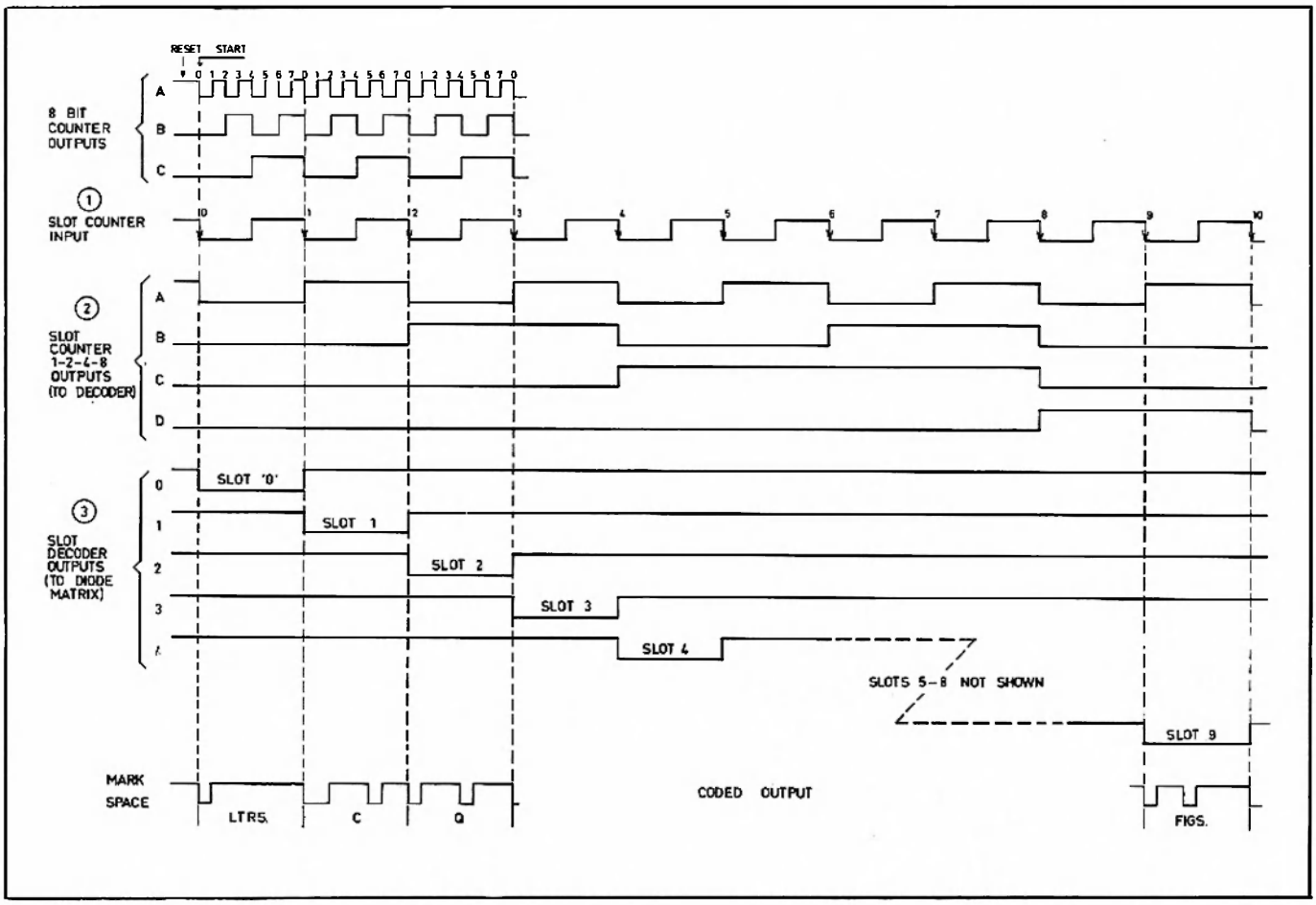

FIG. 2A. BIT AND SLOT WAVEFORMS.

this negative transition that drives the 10's Slot Counter. The 10's Slot Decoder,, being driven by the Counter produces a series of low outputs each of which is 10 slots long. At the commencement of the count, output 0 is low (6), and remains so until the end of the ninth slot, when the 0 output goes high, resetting the 0-9 Slot counter. At the same time, output 1 goes low, removing the reset from the 10-19 Slot Counter, so the count proceeds. At the end of slot 19, Slot Counter 10-19 is inhibited, and 20-29 is activated, and so on.

It will be seen that with the 7 Slot Counters/Decoders used a total of 70 slots are available, however, because a 50 + 50 pin connector was used, a total of 100 pins were available, and these have been allocated as follows:

2 for power rails (0 and 5 volts), 3 for RY control, and one for a Line Stop function. This leaves a total of 95 for the message generation. Now, out of these, 30 are required for inputs to the diode matrix, leaving 65 available for slot allocation. Since the accepted number of characters per RTTY line is 69, we haven't lost many. Of course, non-print functions are included in the 65, but that goes for any TTY message.

An RY generator board uses a Flip-Flop (driven by output "C" of the 8 Bit

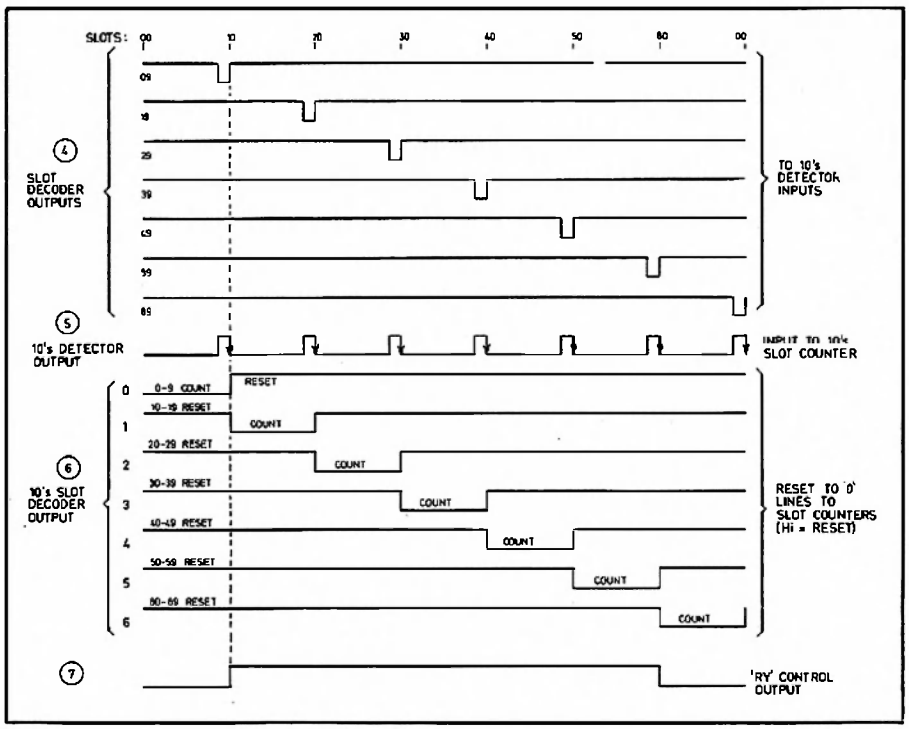

FIG. 2B. 10 SLOT SEQUENCER.

Counter) to produce alternate R and Y slots. A Control signal (7) derived from the 10's Slot Decoder, allows the Flip-Flop to operate only from Slot 10 to Slot 59 inclusive. The "RY" board allows Slots 1-9 for a Call Sign, 10-59 for RY, 60-65 for Carriage Returns, Line Feed and Line Stop functions.

CIRCUIT DESCRIPTION

Figure 3 shows the circuit diagram of the Code Generator and Control section. Consider the unit to be in the Reset condition. 800 pps are being applied to the input of U1, which divides them by 16, the resultant 50 pps being fed to:—

(a) The 8 Bit Counter, U2.

(b) Via an inverter, U5c, to the Count Pulse input of Flip-Flop 1 (part of U4, a Dual D Flip-Flop).

Now, because the unit is reset, output Q2 of U4 will be high, and as a result, U2 is held in the "Reset 9" condition. Q2 is low, and this is fed to the Slot Generator section as a reset level, and to SD1 of U4. The Truth Table for either section of U4, shows that a low on SD will force the Q output high, thus, since SD1 is low, Q1 will be high, activating the Strobe input S, of the multiplexer, U3. If S is high, then the output W will be high, irrespective of what information is present at the Data inputs 0-7. The Code output is therefore high, the Mark condition.

When the START switch is operated, input RD2 is taken low, which forces Q2 low (and Q2 high). When Q2 goes low, the "Reset 9" condition of U2 is removed, and U2 will commence counting upon the arrival of the first falling edge of the 50 pps input signal. At this stage, there could be up to 20 milliseconds delay, depending on just when the Start switch was operated . . . however the Mark signal at the output must be maintained until U2 commences counting. This is achieved in the Flip-Flop 1 section of U4. The removal of the low level on SD1 now leaves FF1 ready to accept an input pulse at CP1. The Data input D1 is held low, which will cause Q1 to go low when the first *positive* pulse is received at CP1, and this will remove the Strobe signal from U3. Because the 50 pps has been inverted to the CP1 input, it follows that the falling edge, which activates U2, will become a rising (or positive going) edge at CP1. Thus, as U2 commences counting, the Strobe condition of U3 is removed, and the output bits will appear. Output W gives an inverted version of the Data bits, so, Bit 0 will be low, the Baudot Start bit. Bits 1-5 will follow in sequence, then Data inputs 6 and 7 being held low, will appear as Marks, the Stop bits. It should be noted that the SN74151 also has a Non-Inverting output, but the Truth Table shows that the Strobe input when activated, gives a low output at this point which would be a Space condition on reset.

U2 is connected as a divide by 8, instead of a divide by 10, this is achieved

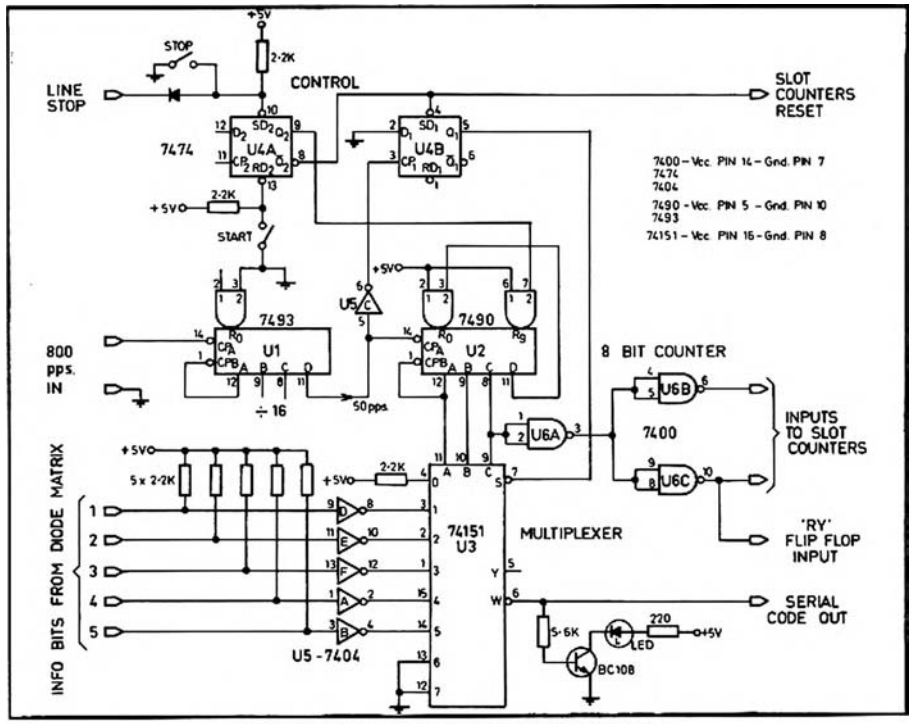

FIG. 3. CODE GENERATOR AND CONTROL.

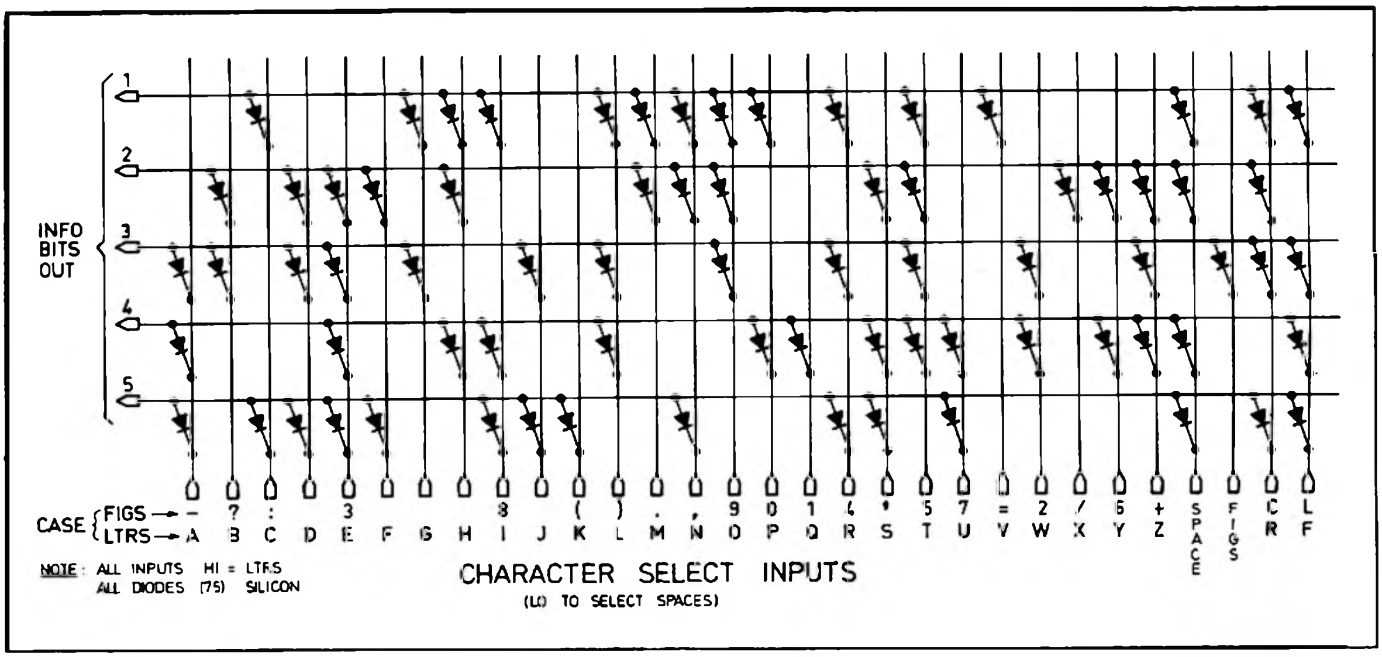

FIG. 4. BAUDOT CODE MATRIX.

by connecting the D output of U2 to its "Reset 0" input. As soon as D goes high (which it does on the count of 8), the counter resets itself to 0. Output C, as well as going to the multiplexer U3, also passes via an inverter U6a, to two inverter buffers, U6b and c, which provide Count Pulses to the Slot Generators. Two outputs are necessary to keep the loading within the prescribed fan-out limits for TTL devices.

The info (or Data) bits 1-5 are fed to U3 via individual inverters, the inputs to which are held high by virtue of the 2,200 ohm resistors. Whenever a Space bit is required, these input(s) will be taken low, which in turn will present a high to the Data input(s) of U3.

Figure 4 shows the Baudot Code Matrix. It uses 75 silicon diodes wired in such a manner that a low on any one of the 30 Character Select inputs, will cause the info lines to go low *wherever a Space bit is* required. For example, if a low level is applied to the Character Select "C", the 5 lines will present Low, High, High, high, Low, respectively 1-5. This will appear at the Code output as Space, Mark, Mark, Mark, Space. When no low is present on any of the Character Select lines, all Mark will be generated, which corresponds to the "LTRS" function.

When a STOP is required, SD2 of U4 is taken low, causing Q2 to go high, resetting U2 to "9". Q2 goes low, forcing Q1 high which activates the Strobe of U3 and the Code output goes to steady Mark. At the same time the Slot Generators are reset.

Figure 5 is the circuit diagram of the Slot Generators. Count pulses from U6b are applied to the inputs of Slot Counters 0, 1, 2 and 3 (U7, 8, 9 and 10) whilst those from U6c go to Slot Counters 4, 5 and 6 (U11, 12 and 13). For convenience, Slot Counters/Decoders 2, 3, 4 and 5 have been omitted from the diagram, but their wiring details are the same as 1 or 6 (U8 or 13).

The "Reset 0" Input of each Counter is controlled by the appropriate output of the 's Slot Decoder, U23. That is Slot Counter 0 from output 0 of U23, Slot Counter 1 from output 1, and so on.

The outputs of the Slot Counters feed their associated Slot Decoders, the decimal outputs of which are designated by Slot Number. It will be seen that with the exception of the first Slot Decoder, U14 (Slots 0-9), the remainder have their "0" outputs fed via a 2 Input NOR Gate, and then inverted. The other input of the NOR Gate is wired to the "Reset 0" line of the associated Slot Counter. This prevents a low output from appearing on Slots 10, 20, 30, 40, 50 and 60 when the Slot Counters and Decoder are in the Reset 0 condition. The NOR Gate will give a high out to the inverter *only when both inputs are low*, thus a low output can only appear at the Slot numbers previously mentioned when the Reset 0 has been removed, and the Slot Counter is in the 0 count segment.

Slots 9, 19, 29, 39, 49 and 59 are also wired to the inputs of an 8 input Gate, U21, the 10's Slot Detector. The output of U21 goes positive every time one of these slots occur. The falling edge of the output pulse drives the 10's Slot Counter, U22, arranged as a divide by 7. The 10's Slot Counter U22, drives the 10's Slot Decoder U23, the decoded outputs of which sequentially control the Slot Counters. Outputs 1-5 are also fed to the inputs of an 8 input Gate U24, the "RY" Control Gate. The output of U24 is high from Slot 10 to Slot 59 inclusive. Details of the "RY" Generator board are given later on.

A LINE STOP signal derived from a selected slot, can be applied to either:

"Line Slot *STOP* Input", U27c, on to "Line Slot *REPEAT* Input", U25d, via a diode. In the first condition (input to U27c), U22 becomes reset to 9, and therefore U23 output 9 goes low. This low is applied to the Stop input of the Control section (U4). The Code Generator section is reset as previously described, and a low output from Q2 of U4 is fed to the input of Gate U25d, via an isolating diode. This causes U22 to go from Reset 9 to Reset 0, similarly the Decoder U23 presents a low on its 0 output, which resets the Slot Counters. Thus, one Line only is sent.

In the second case, the selected LINE STOP signal is applied to U25d, again via an isolating diode, which resets U22 and U23 to 0, which in turn resets the Slot Counters to 0. However in this case the Generator section is still operating (since it requires an output from U23 "9" to reset it), so the line is repeated without a break in the transmission. The line will continue repeating until such time as the LINE STOP signal is switched through to U27c, then the transmission will cease at the selected time.

MESSAGE FORMAT BOARDS

The information required to be transmitted as a line, requires the connection of the appropriate Slots to the Character/Function input of the matrix. To make the system flexible, in terms of changing the message formats, plug-in boards are used. A 50 + 50 pin socket has wired to it the 30 matrix character inputs, plus Slots 1-65, and 5 other sundry services. Figure 8 shows the wiring arrangements of the socket used. The plug-in board is used to make the necessary connections between the Slots and the Character inputs. One small problem presents itself here, when

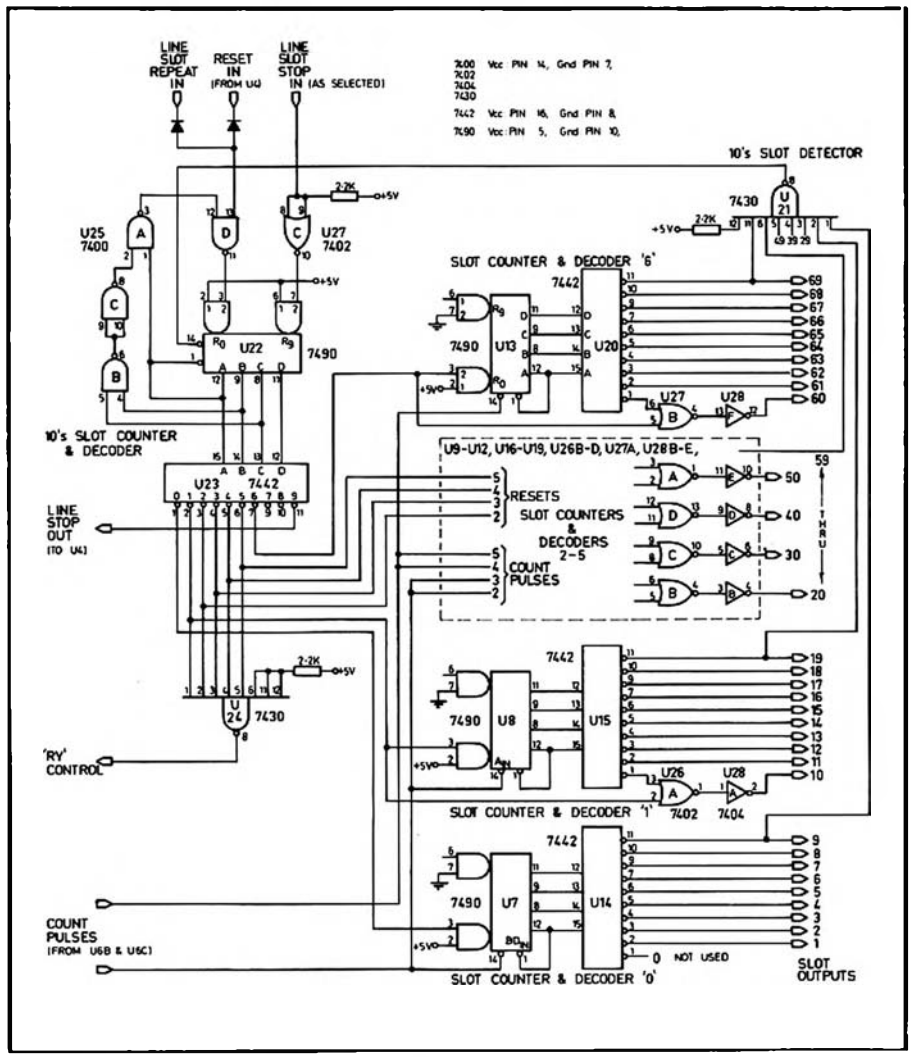

FIG. 5. SLOT GENERATOR.

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EK-150D $106

FEATURES
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- Plug in Circuit Board.
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Number of Filter Crystals	5	8	8	8	8	4	8
Bandwidth (6dB down)	2.5 kHz	2.4 kHz	3.75 kHz	5.0 kHz	12.0 kHz	0.5 kHz	0.5 kHz
Passband Ripple	≤ 1 dB	< 2 dB	≤ 2 dB	≤ 2 dB	≤ 2 dB	< 1 dB	< 0.5 dB
Insertion Loss	≤ 3 dB	≤ 3.5 dB	≤ 3.5 dB	≤ 3.5 dB	≤ 3.0dB	≤ 5 dB	≤ 6.5 dB
Input-Output Z_t	500 Ω	500 Ω	500 Ω	500 Ω	1200 Ω	500 Ω	500 Ω
Termination C_t	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF
Shape Factor	(6:50 dB) 1.7	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:40 dB) 2.5 (6:60 dB) 4.4	(6:60 dB) 2.2 (6:80 dB) 4.0
Ultimate Attenuation	≥ 45 dB	≥ 100 dB	≥ 100 dB	≥ 100 dB	≥ 90 dB	≥ 90 dB	≥ 90 dB
Price	$33.55	$47.75	$51.40	$51.40	$51.40	$35.95	$67.15

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XD-9-03	+12 kHz	—50 mV/kHz	$25.30

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characters have to be duplicated in a line, such as "Space" as an example. The Slot outputs cannot be paralleled directly because when one slot is low, the others are high, and a HIGH is parallel with a LOW = Short Circuit = disintegrated Circuit! It is not possible to use diode isolators directly in series with the matrix inputs because the info lines would not go low enough. It becomes necessary to isolate the matrix from the parallel slots by means of either NAND Gates plus Inverter, or Diode Isolators and Non-Inverting Buffers. Both types are shown in Figure 7(A) and 7(B).

"RY" GENERATOR BOARD

Most operators like to have an "RY" generator to test their machines, and such a circuit is shown in Figure 6, together with the important waveforms. This board provides slots 1-9 for a Call Sign, 10-59 for RY's, 60-65 for Carriage Returns, Line Feed, and Line Stop functions. A total of 25 RY's are sent. The Flip-Flop U1, when operating, has its Q and Q outputs fed via control Gates to the R and Y matrix inputs. During slots 0-9 inclusive the RY Control waveform is low, which:

(a) Holds U1 inhibited with Q high, and Q low.

(b) Holds gates U2a and b inhibited, both their outputs being high.

When the 10th slot occurs, the "RY" Control line goes high, and the Gates U2a and b give an inverted output of the levels present at Q and Q of U1. In this case, U2a is low, and U2b high. Since U2a is connected to the "R" input of the matrix via a non-inverting buffer, an "R" is transmitted. When the next pulse from the 8 Bit Counter is received by U1, the Q and Q outputs, and hence the outputs of U2a and b, change state. The "Y" now appears in slot 11. So the sequence progresses until the 60th slot is generated, when the "RY" Control waveform goes low inhibiting Gates U2a and b, and setting Q of U1 high. It will be noted that in the example, another "Y" is required in slot 7

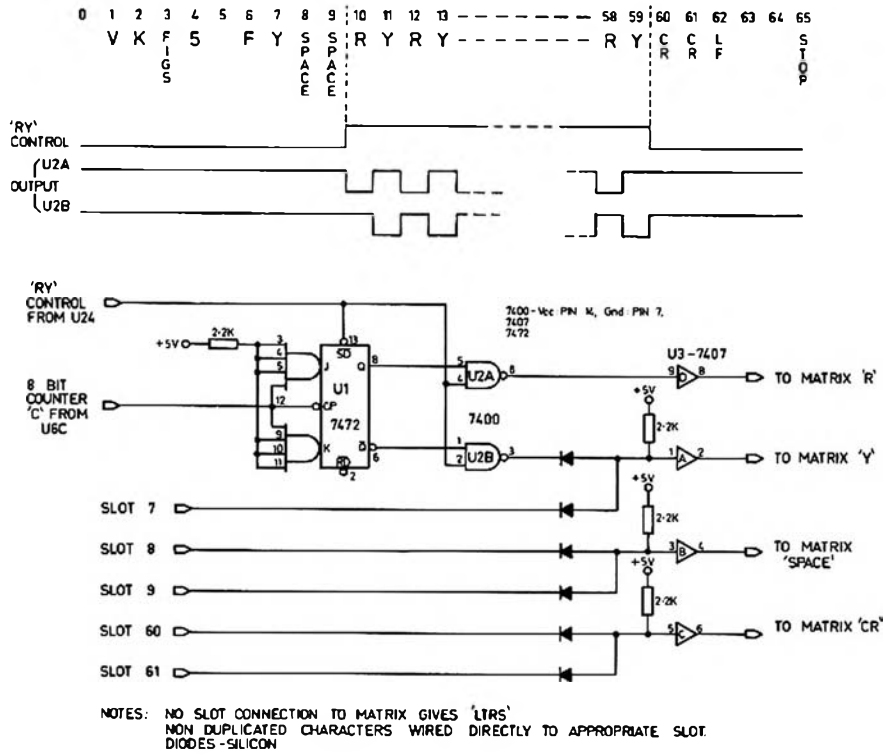


FIG. 6. "RY" GENERATOR.

. . . part of the Call Sign. The paralleling of slot 7 to the "Y" output of U2b is accomplished via the 2 diode gate and the non-inverting buffer U3a. In a similar manner, slots 8 and 9 are parelleled for Space, and 60, 61 for Carriage Return.

LINE GENERATOR BOARD (Using NAND Gates as the parallel slot combiners)

At the top of Figure 7(A) is a typical line message to be generated. Having decided the message format, it is necessary to note the number of times a particular character or function is repeated. These are shown on the diagram. From this information it is possible to determine the required number of Gate/Inverters combinations. As an example, the letter "C" appears three times, in slots 2, 5 and 8. A 3 input Gate has its 3 inputs wired to the appropriate slots, and its output passes via an inverter to the "C" input of the Matrix. Any low appearing at the input of the Gate will appear as a low at the output of the inverter.

An alternative, and possibly more attractive (expense wise) method of doing the same thing is shown in Figure 7(B). In this method, diodes are used as the gates, with a non-inverting buffer following them. In this case, only two packages are required, each one containing 6 non-inverting buffers.

It is therefore possible to make a number of different line messages, and have them available to plug in as required.

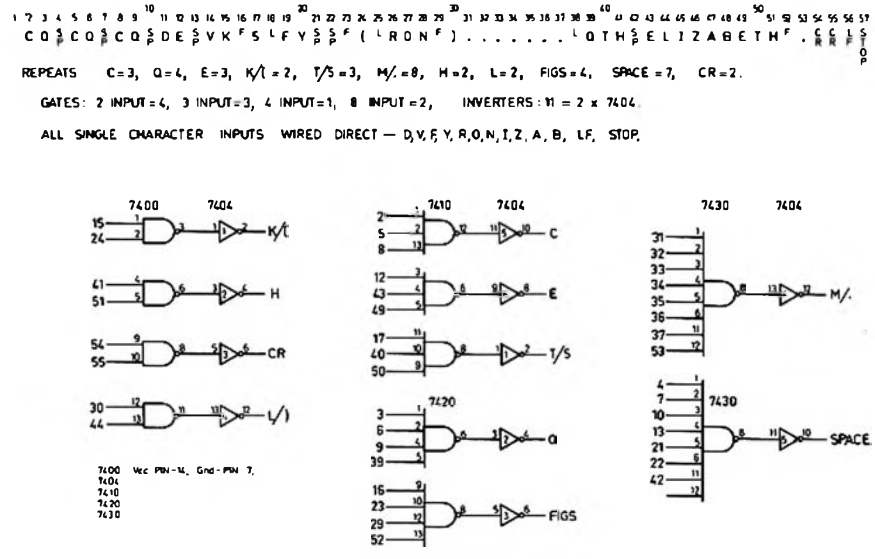


FIG. 7A. LINE GENERATOR — EXAMPLE (USING GATES).

CONSTRUCTION

The Code Generator and Control section, plus the diode Matrix were constructed on one 6 by 4 inch board, and were hard wired. A similar board contains the Slot Generators, the two boards were then mounted back to back, with half inch spacers separating them. There is a lot of wiring on the boards, but it is very repetitious, since in the case of the Slot Generators there are 7 pairs of similarly wired devices. The matrix inputs, and the Slot outputs were then wired to the 100 pin socket. The unit requires about 800 milliamps at 5 volts. As C-MOS devices become cheaper, and more plentiful, a considerable power saving could be achieved by using them. The facilities on the box containing the Generator are:

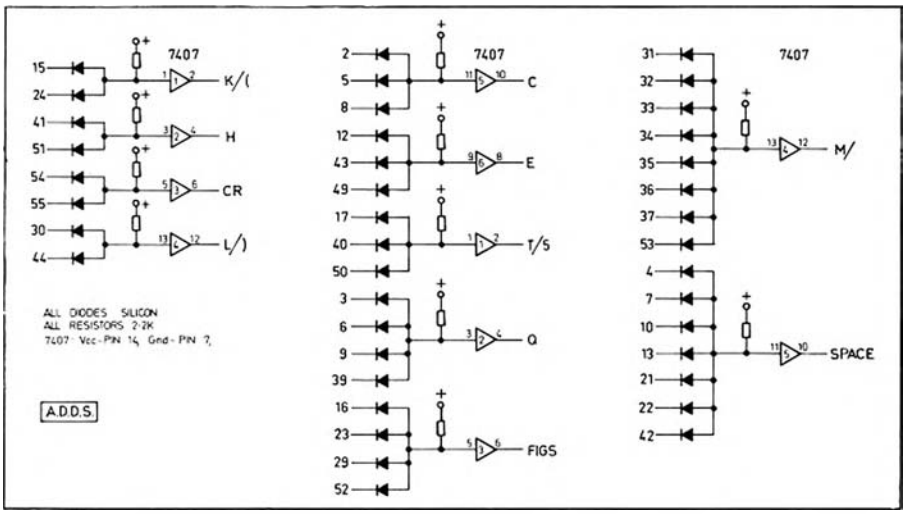


FIG. 7B. LINE GENERATOR — EXAMPLE (USING DIODES).

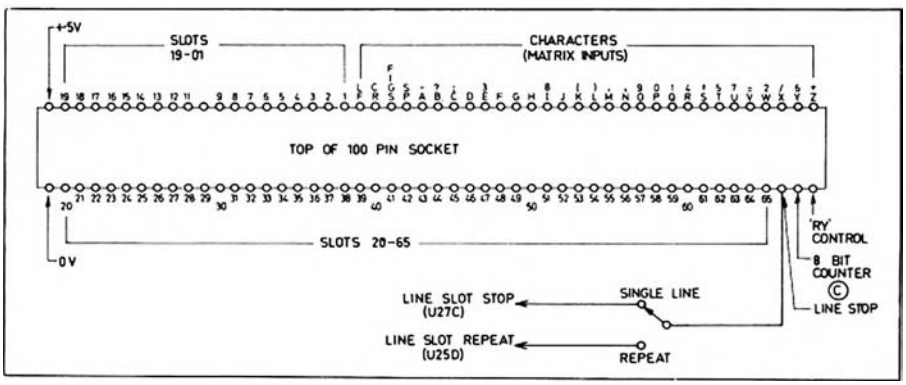


FIG. 8. SOCKET LAYOUT FOR GENERATOR BOARDS.

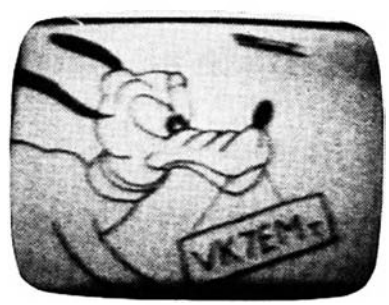
AC on switch, a 3 position switch, which in the central position is the Line Stop condition. In one direction, a single line only is transmitted, and in the other the lines are repeated until the switch is thrown to the central position. The only other control provided is a Stop button, which will cause the unit to reset as soon as it is actuated. A Led indicator connected to the Code output via a transistor, shows that power is on, and whether the Code is being transmitted. The Led is illuminated in the Mark condition. ■

ATV-DX

Kevin J. Callaghan VK3ZVJ
34 Gordon Grove, East Preston, Vic., 3072

On Thursday, January 27th, at about 1930 EA Summer Time, VK7EM Winston of Penguin, made his annual aopearance on Channel "V" 147.63 MHz, the Melbourne ATV group liaison frequency.

He was answered by Peter VK3BFG and Kevin VK3ZVJ. Winston then put up a 10-15 watt Video signal on 426.25 MHz. This was seen by the above two Melbourne stations. Ron VK3AKC then joined the net. Two way pictures were then confirmed between all stations. The 2M signals peaked to S9, and the 70 cm Video signals peaked to about S4 on the BATC scale. Winston then went QRT from about 2030 to 2200.



VK7EM AS RECEIVED BY VK3ZVJ IN PRESTON.

VK3ZVJ STATION IDENTIFICATION SENT TO VK7EM.

During the second contact two way pictures were confirmed between VK7EM and VK3BFG, VK3ZVJ, VK3ZU and VK3ATY. Bob VK3ZU's contact was worth noting as he was only running 600 mW of Vision on 70 cm.

Signals were received from as far west as Keilor to as far east as Wantirna, peaking at some QTH's and at the same time fading at others.

ABOVE: IAN VK3ATY IN CONTACT WITH VK7EM.

BELOW: VK7EM RECEIVED BY THE MELBOURNE ATV GROUP.

Vision signals held up until about 2345 when all parties gave it away for the night.

On Friday night VK7EM's vision signals made a short reappearance but no 2M signals.

On Monday night, 31st January, two way 70 cm vision contacts were made between VK7EM and VK3ZVJ.

How about some more VK7 ATV activity and some Mt. Gambier ATV activity, Melbourne stations are looking for you. ■

RADIO TELETYPE

PART FOUR

Josteln Gjerde, LA7MC

BUILDING AN RTTY DEMODULATOR

To achieve the best performance possible with RTTY it is necessary to construct a more complex demodulator than the one described in the preceding part of this series. This article discusses the design features of different types of demodulators.

KEYING BANDWIDTH

A constant carrier wave without modulation comprises only one frequency. It has no bandwidth. But as soon as keying is used, this is no longer true. The signal now becomes pulse-modulated and the bandwidth depends on how fast it is keyed. Fast CW gives a wider signal than slow CW, ordinary CW consists of off/on pulses and this gives one form of AM.

If the pulses are of completely rectangular form, the modulation will, theoretically, have an infinite number of harmonic frequencies, all a multiple of the keying speed.

It can be shown, mathematically and practically, that when one uses 60 words per minute on teletype (50 baud) the keying speed is 22.2 Hz. Since the key signal has sidebands on either side of the carrier wave, the total bandwidth for this keying speed is 45 Hz.

FILTERING AFTER DETECTION

The detection of RTTY signals changes the signals to separate DC pulses (usually plus and minus) for mark and space. The rectified low frequency component is still present in the detector output signal as are all types of noise and beat tones which have bypassed the channel filter and limiter. In this way, a low pass key filter with minimum bandwidth coupled after the detector will give an appreciable improvement in signal to noise ratio. A single RC filter which is used in many of the common demodulators for amateur use will effectively eliminate the low frequency component, but the roll off rate is too poor for the filter to do a really good job. One uses, therefore, an LC filter in rather more expensive converters and recently, amateurs have begun to use active filters in, e.g. the ST-6. Such a filter should theoretically be set for a boundary frequency of 22.5 Hz which is the keying frequency but practical limiters use one a little broader, mostly 28 Hz.

THE SLICER AND LIMITER

This is a circuit which swings between saturation current and complete cut-off with a relatively small variation in the input signals amplitude. The range of input voltage variation which allows the slicers to operate effectively depends on the slicers' dynamic range. If one uses a pre-limiting stage first, these voltage variations will not be so large. Therefore, the dynamic range of a slicer in a demodulator with limiter need not be large; 20 dB is more than enough. If a modulator is used to receive different shift widths without retuning the filters, a greater dynamic range will be required.

Since the teleprinter mechanism needs on/off DC pulses to work correctly the slicers ability to go from full power to total cut-off at maximum speed will govern the teleprinter's operational ability to receive correctly. The slicer is a very important part of the demodulator and it is important to use well regulated DC current to it. A Schmitt-trigger is the circuit most used as a slicer.

MARK AND SPACE FILTER

Since the transmitted frequency shift signal is a type of frequency modulation, we can treat it as FM in the demodulator. We can also treat it as an AM signal (if you neglect the limiter stage).

If the signal is strong enough so that the limiter comes into operation, the limiter's output voltage will be of constant amplitude. If the mark and space signals coming from the receiver are of the same voltage, one can use a fairly narrow filter before the limiter without introducing too large a distortion because of the transient response of the narrow filter.

If the mark and space are dissimilar, as is usually the case, the limiter will give problems with a narrow filter if the minimum bandwidth filters (55-60 Hz) is used. The time error, because of the dissimilar levels in the limiter, will be too large when one of the two signals "fades" in relation to the other (selective fading). The answer to the problem is to use filters which are broad enough, so that the time error, for example, will not exceed 25 per cent under the worst relationship of selective fading. The distortion now received will fall within the machine's ability to write satisfactorily. This concerns only filters *before* the limiter. Filters which come *after* the limiter are not subject to the limiter's demand.

It is also usual to make pre-limiter filters broad enough to avoid the problem as it is necessary to have exact tuning if you are using a narrow band system.

Instead of using two filters before the limiter, it is usual to use one filter which is about 1 kHz broad (for 850 Hz shift). The filter allows each frequency that falls within these limits to reach the limiter and this allows one to receive other shifts than 850 Hz. Such a filter also has the advantage that it is cheaper than separate filters for mark and space. One must also mention that you can omit the filter before the limiter, but this puts great strain on the receiver's ability to filter out signals near the frequency (selectivity).

The channel filters which follow after the limiter can either be narrow or broad. This depends on many factors, such as which shift variation the demodulator shall control, pace and what type indicator shall be used to adjust the signal. Usually an amateur FM modulator uses a bandpass filter with 1 kHz bandwidth before the limiter and a single but effective filter after the limiter. This is often called a linear discriminator.

LIMITER

The limiter gives out a signal of constant amplitude. This does not mean that the limiter can separate the signal from noise which comes from the receiver. The strongest signal which reaches a limiter will "capture" it. All is well as long as the strongest signal is the required one, but if the signal fades down among the noise, the output of the limiter will be noise which the limiter is trying to raise to the same level as the signal heard. But if the mark and space filter which follow after the limiter are of similar bandwidth, the output from the low pass filter which follows the detector will be only a fraction of the voltage level under normal signal relationships.

This is because the positive noise — ouput voltage from the mark detector will try to balance the negative output voltage from the space detector since noise is present in both outputs simultaneously. The low pass filter will further try to eliminate noise variations.

When an interfering signal which is stronger than the desired one is present (e.g. a nearby CW station), the limiter will be captured by the stronger signal and try to suppress the desired signal. In this way, an interfering signal which is stronger and comes into a demodulator destroys all reception. This signal can be removed by means of a notch filter in the receiver which can then achieve normal reception. If the desired signal is stronger than the other signals at the frequency, it will effectively suppress all the other weaker signals and one will have good reception even though the other weaker signals are audible in the loudspeaker.

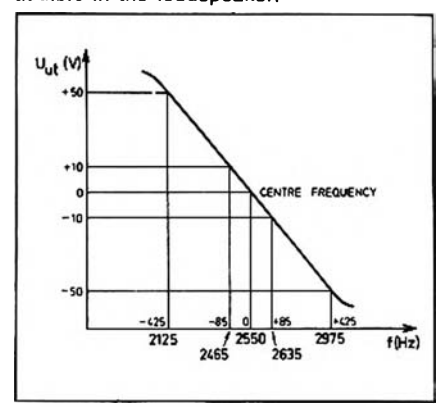


FIG. 1. LINEAR DISCRIMINATOR CHARACTERISTICS.

In this way, one can say that the limiter "capturing" effect can be both good and bad, depending on the strength of the desired signals in relation to the other signals and noise.

THE LINEAR DISCRIMINATOR

A linear discriminator (Fig. 1) gives out plus and minus voltages which are proportional to the divergence from the centre frequency where the output voltage is zero.

If the mark and space filters are made with a suitable Q value, such that the edge steepness is reasonable, it is possible to get a linear discriminator curve.

If the output voltage is plus or minus 50 volts for 850 Hz shift, the output voltage for 170 Hz shift will be plus or minus 10 volts. If the dynamic range of the slicer is such that the mechanism will continue to operate at lower voltages than plus or minus 10 volts, this will make it possible to receive a broad range of shifts without changing filters. If the dynamic range of the slicer is sufficiently large, one can receive shifts of only a few hertz, if one manages to adjust the receiver exactly enough. With such a system it has been possible to receive shifts as low as 4 Hz, but this is of little practical interest.

It must be clear that a discriminator curve as shown in the diagram will have a maximum signal to noise ratio when the shift is exactly 850 Hz. But as long as the incoming signal is stronger than the noise level this does not matter precisely. To make a good linear discriminator, you must have a low Q value in the tuned circuits. Most used today are 88 mH coils wound on toroid cores and these coils will give a fairly high Q value for this purpose. It is therefore necessary to damp the circuits by means of parallel connected resistors.

DEMODULATOR WITHOUT A LIMITER STAGE (AM reception, Fig. 3)

Many things can happen to the RTTY signal between the sender and receiver. One of these phenomena is selective fading, and consists of the mark and space signals fading in different ways. It is possible that one of the two tones can fade down toward the noise level by itself for a short time. Ordinary demodulators cannot always deal with this situation, and one will get many printing errors until both mark and space signals lie above the noise level. The relationship can be much improved by using a so-called "threshold corrector". But the limiter stages have a tendency to strengthen the noise and without a good low pass filter it can be difficult for the threshold correction link to work as it should.

If you do not use a limiter stage, you can use a filter with minimum bandwidth of 55-60 Hz. This gives a very small bandwidth and with powerful QRM from nearby stations one can get a great improvement in reception. But this gives new problems. Firstly, it can be difficult and expensive to make such a sharp filter. In addition the smallest error will cause considerable distortion from the filters, and it is very easy to lose the signal. If the shift at the transmitter station is not exactly 850 Hz (this is seldom so) such sharp filters will not work. It is also difficult to know when the receiver is correctly adjusted. Limiting cannot be used and the tuning dial gives only a rough indication. The signal can either have drifted frequency or faded out. Frequency corrections of 10-15 Hz are in addition a difficult matter with most receivers.

The mark and space signals can be compared with two independent transmitters sending out the same information.

For AM reception one does not use a limiter. Selective fading leads to the output voltage from the two detectors varying greatly from moment to moment, dependent on whether you are receiving mark or space. In FM demodulators this will be dealt with by the limiter. In AM demodulators, the threshold correction circuit must do the same job.

This circuit must supply the following stage (the slicer) with signals that are the same for mark and space. This you achieve by using a storage condenser to even out the output voltages. In this way the slicer will receive the same information for mark and space even if the signals vary mutually in amplitude within the circuit. In one moment it can have plus or minus 60 volts for mark/space and in the next only plus or minus 6 volts.

It is this quality which makes it possible for a good AM demodulator to work well on weak signals, particularly when one of the signals disappears in noise every now and again.

It is also this function which makes it possible for an AM demodulator to receive only one tone when the other is buried by noise or interference (usually in such circumstances one must have the ability to switch out one channel).

There are many variations of couplings for such threshold correction circuits.

One type is called Decision Threshold Computer (DTC). This type is used in the Mainline TT/L2 demodulator. Another type as used in the ST/6, is called Automatic Threshold Corrector (ATC). Slide back detector is another name for the same circuit. Threshold correction circuits are used nowadays in both AM and FM reception. When used for FM reception, the object is to correct for wrongly tuned or drifting signals, whereas the AM reception they serve to give a correct reference level of mark and space signal when these vary mutually in amplitude. 2AM reception is superior when there are powerful stations close to the frequency. Conversely, FM reception will allow the greatest variation in shift and variation because of drift, etc., will be most acceptable when there is little QRM.

COMBINED AM/FM CONVERTER (Fig. 4)

As earlier mentioned both AM and FM reception have their advantages and more expensive converters are made these days usually with facility for both types of re-

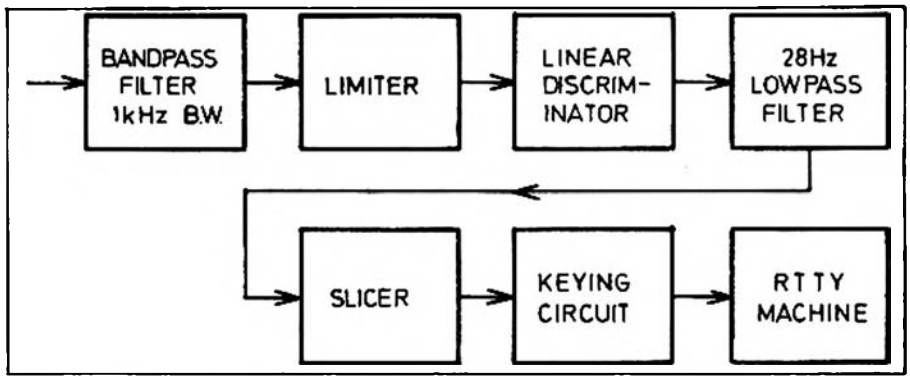


FIG. 2. FM RECEPTION OF RTTY.

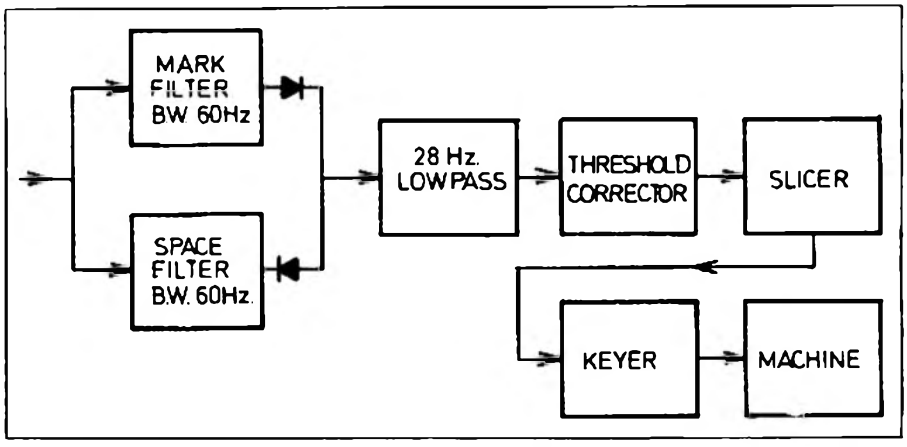


FIG. 3. AM RECEPTION OF RTTY.

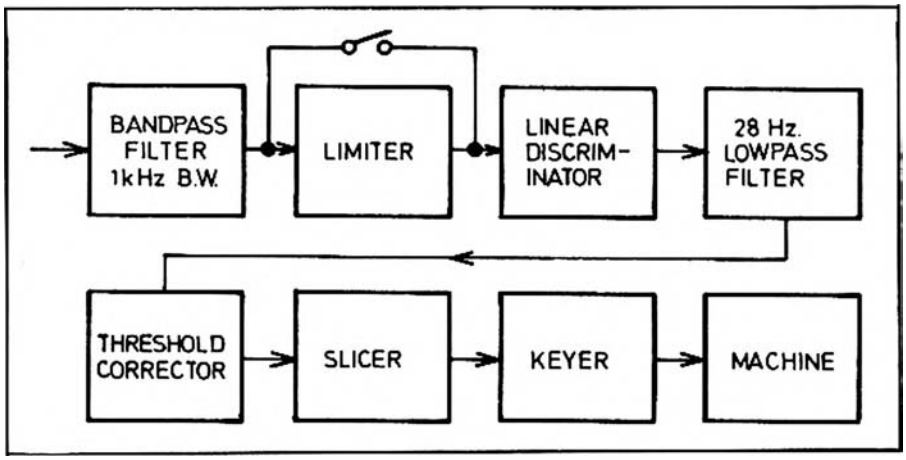


FIG. 4. COMBINED AM/FM CONVERTER.

ception. This is mainly done by being able to couple in or out the limiter circuit. Also, one retains the threshold correction Available in FM reception and uses the band pass filter in the input with AM. The latter can be rather doubtful; one would get useful advantages with AM better if you used a narrower filter here even though it would set greater demand for correct shift and drift freedom.

VALUE OF FREQUENCIES IN RTTY CONVERTERS

It is frequently recommended to use frequencies 2125 and 2975 Hz for mark and space respectively in converters. When occasionally, because of high frequency narrow filters in transceivers 1050 and 1900 Hz are used, you must consider this as an emergency solution.

There is an assumption that signals in one channel will give signals in the other channel. If you send a strong signal on the 1050 Hz mark channel, which has perhaps previously passed through a limiter step, the second harmonic will be fairly strong. That is to say, you have a strong signal on 2100 Hz which is only 200 Hz from the space channel. If the filter is not very sharp, this frequency can easily get into the space channel when it certainly should not. If you had chosen 850 Hz as the lower frequency, the second harmonic would have been accepted by the other filter and this would be completely objectionable.

Other details not directly connected with reception:

AUTOSTART OR AUTOPRINT

The autostart system has many variations; the main purpose is to provide key signals to the machine and start the motor when the converter receives the RTTY signal and only then. This makes it possible to set the receiver to respond to a chosen frequency and set off reception when RTTY is received. It must not react to noise, CW or telephony signals. These demands, one must say, are only partly fulfilled by existing systems.

ANTISPACE CIRCUIT

If you receive a signal coming in on a space tone, the machine will stop and chatter. This is unpleasant to listen to and will lead to a mass of overprinting on the paper. This may well happen frequently. If you take, for example, a sweep of the 80 metre band in the evening, there are carrier waves almost everywhere. It is therefore normal to build in a so-called ANTISPACE circuit, which ensures that the converter goes "mark-hold" (current), when the space channel is supplied with a continuous signal. This circuit must naturally not operate if it acts upon a true RTTY signal. ■

(To be continued)

CB - "WALL TO WALL AND TREE TOP TALL"

Al Shawsmith VK4SS

Man is a co-operating social animal: he also has the universal talent to spoil any good thing. The CB operation is no exception. It started out in the States, in 1947, as a facility for the benefit of ordinary citizens needing assistance of one type or another. The service never really took on until the early 1960s when, in the Deep South, CBers began to multiply like a fast breeding virus. It spread to the lower West Coast and back across the USA to the NE areas. By 1970/1 they numbered approximately 1 million. In 1976, the figure was put at 6.2 million: and now a letter from Prose Walker, W4BW, the FCC man, dated early January 1977 says, and I quote, "We have about 8 million licensed CBers and God only knows how many *illegals*! The FCC has expanded the band from 23 to 40 channels and is thinking of another band at 220 MHz for them — *shared with Amateurs*!" This means that at the present rate of expansion there will be, in 1978, CBers equal to the population of Australia.

But that's only the beginning. The FCC envisages 60 million in the USA in the near future; one for every three or four persons. That's about as close to saturation as one can get. It is estimated that almost half a million per month are now applying for licences. Fill in a simple form (often falsified), pay a fee of $4 and your permit for as many sets as you wish is valid for 5 years.

There is approximately one CB inspector for every 100,000 users, plus the illegals who naturally won't stand up to be counted. This is like allotting one single doctor of medicine to each small city. He hasn't a hope in hell of coping. So the violations grow and the pirates proliferate. One magazine publishes a list of violators and the penalties incurred: $75-$100 is the average fine. The deterrent value of these amounts appears to be minimal.

It is illegal for CBers to QSO over a distance of more than 150 miles. However, reports to hand show that they are buying higher power gear, such as SSB Ham transceivers and hi-gain beams: all in the hope of putting out an S9 DX signal when skip is right of 1,500 miles. So much for the FCC regulations.

So, what started out after WW II as community help and service to travellers, has now grown into the greatest communication pollutions nightmare ever. CB operation seems to follow the rule of Murphy's law: If an electronic gadget can be QRMd, a CBer will do it.

An ABC news correspondent reporting on an "AM" session, described the "stuff" (CB QRM) as pouring out of every conceivable piece of household and business electronic equipment in the country. A little exaggerated maybe, but such a situation could well be near at hand.

Stories of interference are endless. They range from the bizarre and near disastrous, to the funny. Householders, driven to distraction, have formed themselves into groups and simply put the offenders off their air by tearing down antennas, or rendering sets U/S. Others have sold up and moved to the cities outskirts, only to find, to their horror, that the same problem exists.

One of the more humorous, that won't singe the pages of this magazine, might bear telling:—

A minister was delivering a sermon on the decadence of sexual permissiveness, when, from the church's electronic organ came a female voice, wail to wail and tree top tall: "Hi there, boys, this is Rosie; I'm free right now; you got my 10-85 OK (pad No.). Why don't ya come up and see me sometime?"

Soliciting from an armchair sure beats accosting on a street corner.

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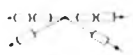

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PRICE

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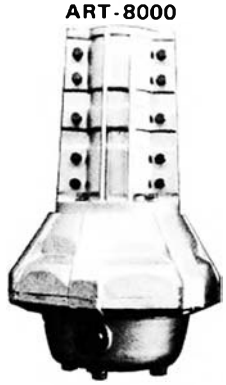
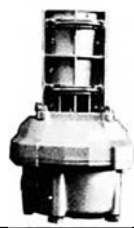
MODEL NO	ART 8000	ART 3000
Rotating Torque	2,500kg/cm	850kg/cm
Braking Torque	10,000kg/cm	1,700kg/cm
Maximum Vertical Load	2,500kg	250kg
Control Accuracy	± 5°	± 5°
Drive Type	Gear	Gear
Power Requirements	May be modified upon request	
Operation Temperature	-40° ~ +80°C	-40° ~ +80°C
Forward/Reverse Delay	3 seconds	3 seconds
Maximum Continued Off	20 minutes	3 minutes
Mast Clamp	48 ø ~ 78 ø	34 ø ~ 55 ø
Cable Requirement	9 conductor	8 conductor
Net Weight	26kg	5.7kg
Shipping Weight	27.5kg	6.5kg

ART-8000



ART-3000



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VSWR	1 : 1.3	1 : 1.3
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Maximum input power	1KW CW	
Maximum wind survival	50m/sec	
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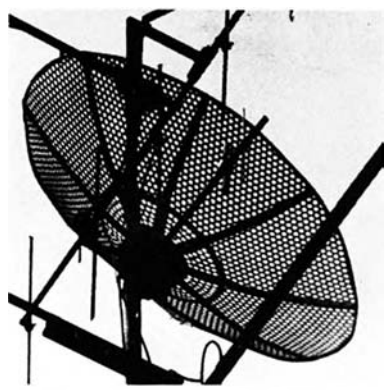
Net weight	4kg	

※ Horizontal polarization



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Available in two models . . . . . the **TET-01** for 1-100MHz range priced at $38 . . . . . the **TET-02** for 1-300 MHz range, priced at $48.

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Canberra:	Daicom Electronics, 29 Colbee Crt, Phillip. Ph: 82 3581
Adelaide:	Graham Stallard, 27 White Ave, Lockleys. Ph: 43 7981
Perth:	Netronics, 388 Huntriss Ave, Woodlands. Ph: 46 3232
Brisbane:	Elite Electronics, 69 Wardell St, Dorrington. Ph: 38 4480

Prices include sales tax but exclude freight and insurance. For insurance allow $1 per $100, min $1. Freight sent Kwikasair (freight "collect") unless otherwise specified. Prices and specifications are subject to change without notice.

It's an ill wind that benefits nobody. To accentuate the positive side of CB, it must be said that the Channel 9 emergency service is a facility whose value is beyond measurement. Any US citizen travelling by car would rather leave his spare tyre at home than his CB mobile. Unselfish teams of operators, numbered in tens of thousands, monitor Channel 9 twenty-four hours a day, providing assistance to broken-down motorists and any other emergency. Thus, all of the States and part of Canada is covered by a protective umbrella of service and succour.

Another positive facet of CB is its ability to dispel loneliness and boredom for the women in the house who suffer from that cut-off, isolated feeling. Thousands of housewives claim to have talked out their neurosis through their set. (Pity the listener at the other end.) But, perhaps its greatest service is to bring the chatter-natter of the outside world to that vast army of handicapped, invalided and bedridden souls whose horizons are the four walls of their room.

Italy, Brazil, Venezuela, Canada, Jamaica, Colombia, all have CB operation. Even Russia has it after a fashion — illegally. The following snippet titled "(Radio) Happenings in USSR", appeared in AWA's reputable OTB:—

"Illegal broadcasting by home-made transmitters has become a persistent and growing youth cult in the Soviet Union. After samizdat (clandestine publishing of dissident writings) and magnitizdat (circulating tapes of unorthodox poetry and music) there is now radioizdat — air-it-yourself programmes of pop music, teenage talk, messages to girlfriends and even dirty jokes. All of which represents a somewhat refreshing contrast to official state-controlled broadcasting, which is apt to be long on lectures about beet growing and the life of Lenin, but short on entertainment.

In the Ukrainian city of Donetsk (population 900,000), youthful would-be dee-jays adopted such sprightly call signs as 'Buzz Saw', 'Green Ghost', 'Graveyard Goon', 'Bullet Hole', 'Spark of Love' and 'The Invisible Man'. The police were not amused. In an effort to make a clean sweep of the cluttered airways, 1,000 amateur Donetsk broadcasters — called 'organ grinders' by the police — were arrested and fined 50 rubles each ($70) for 'violating rules governing the use of radio frequencies'. There have been similar efforts to clamp down on underground broadcasting in other major cities."

The question of banning CB, as advocated by some, is polemic no longer: it's now almost academic. The clay heads, i.e. the ordinary unskilled (in radio) populace have, with the help of science and technology and mass production, claimed what they see as their rightful heritage. In one form or another, legal or illicit, for better or worse, CB, like sex, beer and racehorses is here to stay.

CB, in spite of its population explosion, is still in its early growing pains, worldwide. No one yet knows if it will turn out to be a threat to AR, or a good thing ruined — or, through self-regulation, become a cohesive beneficial social facility. Only time will tell; but, what ever face it assumes, it will, like the telephone, change the way of life for 20th century man. Eventually, its effect will be felt in almost every home. Some of its esoteric jargon will roll off the tongue of the man in the street — and be printed in the nation's dictionaries. ■

TRANSITIONS IN COAXIAL LINES

Alan Moritz VK3ZHU
4 Dugdale Street, Bacchus Marsh, Vic., 3340

A common requirement for amateurs operating on 144 MHz and above is a broadband, low VSWR connection between coaxial lines of different sizes with the same characteristic impedance.

This situation arises, for example, where rigid coaxial lines[1] or test equipment such as directional couplers[2] are used. Although a tapered transition[1] can be used, this approach presents problems for amateurs without access to a lathe and is in any case inconvenient at the lower frequencies because of the length of the taper.

An alternative approach is to provide an offset between the steps in the outer and inner conductors which give sufficient inductance to compensate for the excess capacity in the transition region (Fig. 1). This problem has been examined experimentally by Kraus[3] and on a theoretical basis by Green.[4] Table 1 shows the required values for line impedances of 50 and 75 ohms with air as a dielectric, which, for amateur purposes, are not significantly different. As the problem of calculating the offset required for 50 ohm lines with teflon as a dielectric is equivalent to calculating the offset for a 71 ohm line with air as the dielectric, the figures can be used to estimate the offset required for connectors such as type N. Although the data only apply to coaxial lines, some experimental results indicate that they are at least approximately correct for other types of transition, e.g. the transition between a RG58AU connector and a parallel plate line (circular inner conductor) with a spacing of 0.8 in. requires an offset based on Table 1 of 0.09 in. The figure determined experimentally[5] is 0.11 ± 0.02 in.

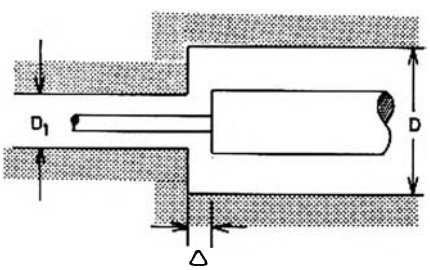

TABLE 1

D/D1	Δ/D1	
	50 ohms	75 ohms
1.2	0.055	0.065
1.4	0.055	0.065
1.4	0.105	0.12
1.7	0.165	0.17
2.0	0.215	0.22
2.5	0.29	0.295
3.0	0.35	0.36
3.5	0.415	0.42
4.0	0.475	0.48

REFERENCES

1. Sandorf H. N., Amateur Radio, **38**, 12 (1970).
2. R.S.G.B. VHF-UHF Manual.
3. Kraus, A., Rhode and Schwarz Mitteilungen No. 8 (1956).
4. Green, H. E., Advances in Microwaves, Vol. 2,327 (1967).
5. Moritz, A. G., Blurb, Vol. 1, 4 (1972). ■

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FORTUNE 30801

MAY 1976 WA6LET TESTS

Article provided by Roger Harrison VK2ZTB

In January 1976 we were making plans for a 1296 MHz EME test at the SRI 150 foot dish. However, by March it became apparent that the 1296 MHz station and feed were not going to be ready in time. Conducting the tests during the summer was ruled out for a number of logistical reasons, and thus we decided to test on 432 MHz again; but to add a number of scientific tests that would demonstrate the characteristics of the EME communications path.

A 20 kW klystron amplifier, used for Government research, at the site could be returned to 432 MHz. This power level would bring EME reception within the range of most 432 MHz DX enthusiasts. It is not practical to use it for two-way communications due to the long time required to bring up the operating voltages. Since the beam current cannot be switched off otherwise; it approximates a 50 kW noise diode. Besides, you can't work em if you can't hear em! One-way propagation tests consisting of two minutes of A0 operation for chart recording the signal strength VS time; 50 microsecond pulse transmissions (at a stable 50 PPS rate) to allow measurements of pulse dispersion; and CW groups sent at variable power levels were planned.

A letter requesting special temporary authority (STA) for these tests was sent to the Federal Communications Commission. Permission to use the 150 foot dish was also requested of SRI and the U.S. Government, and announcement letters were mailed to the 432 MHz gang.

We then considered the possibilities of running on other "new" bands simultaneously with 432 MHz. We had already committed ourselves to running 432 MHz and high power. This meant using the circularly-polarised horn and its six-inch coax feedline. Nothing could be placed in front of the horn. This ruled out 1296 MHz, but it looked like feed antennas for lower frequency bands like 222 MHz or 144 MHz could be placed around the sides of the horn and still illuminate the dish properly.

Sketches that we had used in making the 144MHz feeds used earlier indicated that the mouth of the feed horn was 39 inches in diameter; about ¾ wavelength at 222 MHz, a bit wider than desired (½ wavelength), but perhaps still useable. And so, we decided to add 222 MHz. Two 2-element rear-fed yagis were constructed for a 222 MHz linearly-polarized feed. Equipment was located and borrowed; the exciter and receiver from Karl Lind, WB6TJO; and an 8877 amplifier from Louie Anciaux, WB6NMT.

The week before the test involved a lot of long hours by WB6KAP, WB6TJO, K6OJM, W6YFK, and WA6KKK:

Monday/Tuesday: Built cavity filters for 222 MHz, tested feed impedance of 222 MHz feed — shortened elements to resonate.

Wednesday: Called W1SL at ARRL, "No word from FCC yet, could he check and see who we should call to check on our STA?" Decided to go ahead on the assumption that we had not gotten approval for 20 kW or pulse operation. Took gear up to dish Wednesday night. Since the dish was not being used the rest of the week we could start installation.

Thursday: Mounted 222 MHz feed on the side of the 432 MHz horn. Mounted preamps and changeover relays inside equipment rack at apex in back of feed. Connected equipment.

Friday noon: Tested systems on moon. Echoes were received on 432 MHz but not on 222 MHz. Took feed down, and checked front-to-back ratio (was about unity). Adjusted reflector length to bring front-to-back ratio up to 10 dB.

Friday afternoon: Finally got through to Gary Hendrikson at FCC. He indicated that "Yes, our request for an STA had been approved and sent to the typing pool. Unfortunately it had not been stamped urgent/rush; and the typing pool was swamped".

Unfortunately it was too late to get the SRI engineer-in-charge of the klystron up to the dish to retune it to 432 MHz; and it was needed where it was the next Monday.

Re-installed the 222 MHz feed and worked a number of stations in the Los Angeles area (350 miles) with the dish parked in that general direction. "System must be working — loudest signals anyone had heard out of LA on 222 MHz; and with the radar on too!"

Sunday (very early): "The radar QRM was off, nothing could go wrong!"

Moonrise (1000 UT): Conducted first A0 and variable power tests on 432 MHz (1 kW down to 25 W in 3 dB steps).

1014 UT: First contact on 432 MHz, F9FT. No echoes were being heard on 222 MHz.

1036 UT: Worked K6JKQ on 222 MHz (in Stockton, about 60 miles away), who gave us a 339 report. Since he was 599, we started looking for trouble; and found that the reflected power was up. The antenna changeover relay (mounted at the feed) had failed. Suspended operation on 222 MHz except for listening.

Telephone Calls: "Is WA6LET on 222 MHz?" We never dreamed of the number of stations having almost-EME status on 222 MHz. We didn't hear any of them. After a hurried conference we decided to lower the feed and investigate after sunup.

1400 UT: A0 and variable power tests on 432 MHz. We had missed the scheduled 1200 UT test trying to get the 222 Mhz system working.

1430 UT: Activity slackened off on 432 MHz. The feed was lowered and half a dozen engineers charged out into the brisk morning air with the tools of their trade. They checked cables, fittings, lines, noise figures, and swept the system; discovering that the voltage drop in the line carrying power to the antenna relay coil was sufficient to keep it from closing completely. Raised the supply voltage to 36 volts — and voila, success! Raised the feed.

1530 UT: Back on the air, but still no echo on 222 MHz.

Telephone call from WA5MFZ (XYL of W5LO): They were hand-steering a 28 foot dish lying in their driveway and the moon had just passed out of range. "Would it help if I cried a little?"

1800 UT: Last A0 and variable power test had missed 1600 UT.

1924 UT: Last contact on 432 MHz with JA1VDV, who could not copy our SSB.

1930 UT: End of tracking tape. Dish stopped. Our 432 MHz echoes got stronger, then weaker. Last echoes heard at 1935: 30 UT.

During 8½ hours of operation, WA6LET made 64 two-way contacts on 432 MHz with 53 different stations in 12 countries and 14 States. Of these, five contacts were made on SSB voice. Twenty-eight of the station calls were new to WA6LET on 432 MHz. Below is a list of the station calls worked/heard. An * indicates incomplete contact, † indicates SSB voice contact.

AC1JAA,* WB2GLQ/1, K9AQP/1, K2UYH†, K3SWZ, K3WHC, K3PGQ, K3PGP, W3TMZ, W3CJK, W3CCX, W4FJ, K4VOW, W4NUS, K5LLL, W5HN, WA5IPI, WB5LUA, W5AJG, WA5WCP/5, K5CE,† WA5MFZ, W6ABN, WA6EXV, WA7BBM, WB7BST, K7GZB, WA7AZY,* K9ZGT, WA9HER, W9WCD, K9ZUI/9, WA0FLS/KL7, VE3ONT,

SRI 150 ft. DISH IN THE TESTS.

VE7BBG,† F1FG, F8KJ, F9FT, F2TU,† F5SE, F6CBC, F8QD, F3NQ,† I5MSH, JA1VDV, JA1ATL, JA9BOH, JA0PX, LX1DB, LX1FX, OK1KIR, ON4DY, PA0LMD*, PA0SSB, SM5LE, VK3ATN, VK5MT,* OZ9CR.

In addition, we have received reception reports from the following stations:

WA5IOD/1, W5LO, W7QID, K9ZZH, VE4MA, VE4AS, F1AQC, F6APU, G8AXU, I2KBD, I8CVS, JA1AUH, JA5AOG/3, JH6EQD, JA6CZD, JA0AIF, VK2AMW, VK5ZPS, XE1RCP, ZE5JJ, JA4BLC.

Operators for the May 23, 1976 test at WA6LET were: Victor Frank WB6KAP, Douglas Westover K6TZX, Karl Lind WB6TO, Ronald Panton W6VG, Glenn Tomas WA6KKK, Arne Gjerning K7CAD/6, Brian Westfal K6OJM, Loren Hodapp WA6BMR, Jack Trollman WB6JZY, Douglas Beck K6ZX, Cliff Buttschardt W6HDO, Paul Schuch WA6UAM, and Steven Mieth W6YFK. Dish operator was Bob Foss WA6DIA.

We would especially like to thank.

1. SRI and the U.S. Government for the use of the 150 ft dish and 432 MHz transmitter.
2. Those stations who sent us tapes, charts, reports, and photos. These will become part of a summary technical article and a movie.
3. Those stations who, due to our operations, advanced their schedule for obtaining EME capability; for that's what it was all about.

POSTSCRIPT

A post mortem indicated that the 222 MHz feed antennas were spaced 49 inches, about one wavelength. It is now suspected that this wide spacing, combined with coupling between the feed elements and the horn and supporting structure messed up the pattern.

We should have (and would have, had we had the time) checked the pattern of the dish at 222 MHz to see if it was skewed or multi-lobed. The lesson is clear: you don't just go up to a dish, put in any old feed, and hope for the best, if you want to get moon echoes.

What is In the future for WA6LET at the SRI dishes? More of the same does not appear to be in the cards. The use of a half-million dollar Government - owned facility just to make more radio amateur EME QSOS is not considered good stewardship. We have already conducted tests on 144 and 432 MHz in April/May 1974, February 1975, November 1975 and May 1976. Any future moonbounce tests at the SRI dish must have something new. They may be on frequencies not used successfully before (like 50, 222, 1296, or 2304 MHz) or with new equipment or techniques such as were proposed for the May 1976 tests.

We will try to get more advance notice out so that everyone will have time to make preparations and get the bugs worked out. We cannot promise a "second chance" on the remaining bands, but would like to conduct EME tests on as many of them as possible between now and the World Administrative Radio Conference to be held in 1979.

Conducting these EME tests is somewhat like having a baby. There is some joy, some suffering, and a lot of work involved. About the same length of time is involved. "Two" per band is probably more than enough. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN November 1976
A 1926 Amateur Radio Station; Northland Branch 28; The Vern Roberts Story; Understanding FM; Mobile Refinements for the Climie Transceiver.

December 1976
Amateur Radio Emergency Corps; SAR Operations in the Tararuas; AREC Field Days; Emergency Radio Equipment; Looking Back; The Radio Emergency Scheme; Biological Pressures; Transistor Oscillators; A Simple Dial Marking Stencil; Notes on a Panoramic Monitor; Simple Impedance Bridge; An Outline History of Hornby Branch 56 NZART; A Simple Versatile Long Wire Array; Transformer Bridges; EDMD Keyer.

CQ MAGAZINE December 1976
Results of the 1976 CQ World Wide WPX SSB Contest; Why Radio Frequency Clipping; A Low Profile Three-Band Quad Mk. IV; The Famous 210 Tube: Its Birth, Life and Death; Power Input and Output.

QST December 1976
A Fast QSK System Using Reed Relays; Optimum Ground Systems for Vertical Antennas; Improving Earth-Ground Characteristics; The Log-Yagi Array; A Simple TTL Test Panel; Adapting the KWM-2 for Radioteletype Operation; PEP Wattmeter - a la Heath; Measuring Transmitter Power; FM-27B S-Meter; Oscar Goes to Schools; Is it Like CB, Mrs. Johnston; What's a Lysco Transmaster 600; The Rip Off; Marine Mobile Revisited; 5-Band WAS, the Hard Way; Checking into Slow-Speed Nets; W4OZF on No Name Key; Lonely Island.

RADIO ZS October 1976
Electronic Morse Keyer; An Active Filter for HF Transceivers; CW Sidetone.

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Improving the Outboard VFO for the FT75 and FL50; Low Cost 2M Colinear.

73 November 1976
Cordless Iron Tips; Bicycle Mobile; Build a Simple "Lab" Scope; Get on Six with Surplus; The Beam Saver; Updated Universal Freuency Generator; Who, Me? A Pioneer?; The Shirtpocket Touchtone; Put Your Name in Lights; Liquid Crystal Display Guide; Self Powered Mike Preamp; See the World and Get Paid; The Wind Counter; The S38 is not Dead; ID with a PROM; The Inverted L; Battery Chargers Exposed; How Do You use IC's; Thirty Years of Ham RTTY; Big Noise Burglar Alarm; Dandy Digital Dial Decoder; Weather Satellite Display Control; Ham Time-Sharing in Here for You; The Soft Art of Programming; Oscar Orbits on Your Altair; ASCII/Baudot Converter for Your TVT; The Smoke Tester; The Coffee Flipper; The Man Who Invented AC—Tesla; Baudot to ASCII; Baudot and Basic; Toward a More Perfect Touchtone Decoder; Using a Wireless Broadcaster; The Quiet Spy; The Benefits of Sidetone Monitoring. ■

NOVICE LICENCE SYLLABUS

The syllabus is almost wholly the one drawn up by Roger Davis VK4AAR, after consultation with VK2YA, VK2AKX and VK2AKH and others.

It is intended to submit this syllabus to the Radio Frequency Management Division during April. Comments on this syllabus would be very welcome but should be sent to the Executive office at once.

G. Scott VK3ZR,
Fed. Educ. Co-ord.

SYLLABUS

1. **BASIC ELECTRICITY**
   - The electronic structure of matter
   - Conductors and insulators
   - Current, potential difference, resistance
   - Electrical units
   - Magnetism
   - Permanent magnets and electro-magnets
   - Solenoid, relay, headphone
   - Other practical applications of magnetism as may be found in handbooks

2. **DC CIRCUITS**
   - Cells and batteries
   - The simple cell
   - Lechlanche or carbon-zinc dry cell
   - Wet cells, lead acid, nickel cadmium
   - Potential difference
   - OHMS LAW E = I.R
   - Resistors in series and parallel
   - POWER P = E.I.
   - Calculations of E, I, R, P
   - Voltage dividers, potentiometer and use as volume control
   - Internal resistance and regulation of voltage sources
   - Care of lead-acid batteries

3. **AC CIRCUITS**
   - Alternating current
   - Generation of alternating current
   - The sine wave and its generation
   - The importance of the sine wave "a pure frequency" to electronics
   - Average value of sine wave
   - RMS value of sine wave, power
   - Period and frequency of sine wave
   - HARMONICS, complex waveforms
   - ELECTROMAGNETIC INDUCTION
   - The motor effect
   - The generator effect
   - INDUCTANCE
   - Factors affecting inductance
   - Permeability of iron cores, and of ferrites
   - CAPACITANCE
   - Factors affecting capacitance dielectrics, properties
   - Practical choice of dielectric with respect to stability losses, voltage capability, capacitors in series and parallel
   - Inductance, capacitance, resistance
   - Reactance qualitative, IMPEDANCE
   - TUNED CIRCUIT — RESONANCE
   - The relation between "Q" and bandwidth
   - Acceptor and rejector circuits
   - TRANSFORMERS
   - General theory of operation
   - Energy transfer, impedance transformation
   - POWER TRANSFORMERS
   - Turns ratio, current/voltage
   - Losses: core and copper
   - Mains transformers: electrostatic shield

4. **THE THERMIONIC VALVE**
   - Thermionic emission, space charge, cathodes, conduction in vaccum
   - Characteristics of diode
   - The triode
   - Control grid
   - Amplification
   - Operation of triode as a Class A amplifier, bias load
   - Pentode, characteristics and comparisons — elementary facts only for Novice

5. **SEMICONDUCTORS**
   - Conduction in a semiconductor
   - Doping, the PN junction
   - Conduction and non-conduction
   - Reverse current-leakage
   - Diode characteristics
   - Germanium versus silicon
   - Variation in capacitance—"VARICAP"
   - Ratings of diodes, PIV
   - Current ratings of power diodes

6. **TRANSISTORS**
   - BIPOLAR TRANSISTORS
   - Control of current
   - Amplification
   - Leakage current
   - Bias stabilisation

7. **AMPLIFICATION**
   - AF amplification
   - Voltage, current, power gain
   - RC coupling
   - Transformer coupling
   - Preamplifiers, power output amplifiers
   - Class A, Class B, Class C
   - Class AB, AB_1, AB_2
   - RF amplifiers
   - Tuned circuit coupling
   - Application to sine wave OSCILLATORS

8. **POWER SUPPLIES**
   - Design of power supplies
   - Transformer ratings, power transformers
   - Need for filters, choke input filter, capacitor input filter
   - Size of filter capacitors
   - Zener diode and calculations
   - Voltage regulator tubes
   - Regulated power supplies

9. **RECEIVERS**
   - Definitions of selectivity
   - Basic receivers, crystal set
   - TRF set
   - Superhet design — mixers
   - Comparison between TRF: Superhet
   - Regenerative, Super-regen design
   - Single and double conversion — simpler than AOCP level
   - BLOCK DIAGRAMS of all designs
   - Automatic gain control — *function* of AVC only, not circuits
   - Beat frequency oscillator — but not product detectors
   - AGC or AVC Automatic volume control — the function and purpose of AVC, AGC but not circuits and not audio derived AGC

10. **TRANSMITTERS**
    - Generation of signal
    - Xtal oscillators
    - Amplification of RF
    - NEUTRALISATION, STABILITY*
    - PARASITIC SUPPRESSION*
    - HARMONIC SUPPRESSION*

    * Knowledge of the existence of these problems. Full details of their detection not needed at this level.

11. **MODULATION AND KEYING**
    - Microphones, theory of operation, characteristics of carbon, dynamic, crystal, capacitor microphones
    - Methods of generation of
      - FM — Nothing on FM for Novice
      - AM — Modulation and low modulators
      - SSB — Elementary principles of FILTER ONLY
      - CW — Keying but not full-break keying
    - AM by low level, high level modulation problems to avoid, methods of measuring modulation percentage
    - Methods of generating SSB — a brief look at Filter
    - Filter*
    - Phasing*
    - Savings in transceivers
    - Station integration
    - Transmit receive switches
    - Antenna changeover systems

    * A knowledge of the existence of the various methods but not circuits.

12. **PROPAGATION**
    - Nature and propagation of radio waves — elementary knowledge only

13. **AERIALS, TRANSMISSION LINES**
    - Relation between wavelength and frequency
    - Common types of receiving and transmitting aerials
    - Marconi quarter wave vertical
    - Hertz half wave horizontal
    - An elementary knowledge of

transmission line matching to achieve correct matching between TX and line, line and aerial
Use of SWR meter
Use of "DUMMY LOADS"

14. **TRANSMITTER INTERFERENCE**
Knowledge of the undesirability of harmonic radiation
Dangers of over-modulation
Low pass filters in feeder
High pass filters in TV sets

15. **MEASUREMENTS**
What accuracy means
DC moving coil meter
Voltage, current, resistance
Multimeter, digital multimeter
AC measurements, volts, amps
Wheatstone bridge for resistance
Resonant frequency of tuned circuits
The DIP OSCILLATOR
Frequency measuring
RF measurements — elementary
Dummy loads for transmitters
RF POWER
SWR meters
Measurement of power input to final stage of transmitter

16. **VHF and UHF**
Nothing on VHF or UHF for Novice.

17. **MATHEMATICS**
Arithmetic
Fractions
Decimals
Arithmetic with fractions
Arithmetic with decimals
The DECIBEL
Use of decibels

A. **THESE SUBJECTS SHOULD BE OMITTED FROM ANY NOVICE SYLLABUS:**
(These topics should be excluded from the Novice theory exam.)
(a) High Power RF amplifiers, modulators
(b) Variable frequency master oscillators
(c) Frequency modulation
(d) Pulse and other specialised modes
(e) Measurement of RF Power, Frequency measurement
(f) VHF and UHF and all topics connected with bands outside HF
(g) Transmission line theory

B. **ELEMENTARY DETAILS ONLY SHOULD BE REQUIRED FOR:**
(a) Propagation
(b) Aerials
(c) Power supplies
(d) Single sideband generation

Frequency measurement is a complex topic and while Novices have to be crystal controlled, the technique is to read off the printing on top of the crystal.

EXAMPLE
A question on VARICAPS as tuning diodes would be permitted. A question on the VARACTOR as a UHF tripler would not be permitted. Firstly because Novices are not to use VHF or UHF. Secondly the mechanism behind the action is complex — in fact, I have yet to see it in full AOCP, and what is the point of asking for names of devices a candidate does not understand. ■

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.90	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA3090Q	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	MISC	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458	LM1458	TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488	LM1488	UAA170	3.25		
CD4025	.55	CD4720	12.60			In some cases pin for pin substitutes will be supplied.					

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7400	.48	7483	2.30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.85
7401	.48	7485	2.95	74S186	7.50	74LS175	2.70	BD437	2.80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
7408	1.09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5.95
7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	SEMICONDS		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.60	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3.20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	.90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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PLENTY OF PARKING AT REAR STD 02

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

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VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Devonport	144.900
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VK8	VK8VF, Darwin	52.200
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JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

SIX METRES

This band died its usual natural death following mainly the closing of the Ross Hull Contest. There have been odd openings from time to time, the last recorded here at time of writing being to John VK2BHO on 18/2. Amongst other things the band will be remembered this time for a Ross Hull Contest with changed rules which have produced quite a few comments on the bands, both for and against. OK. But if you have some constructive thoughts on the future rules of the contest put them down on paper and send them to the Contest Manager, the more the merrier, and do it now, to give him time to think about the pros and cons before rules are published for the next contest. I do not like some aspects of the rules and others I agree with, but I will be having my say by letter anyway. It is very difficult, however, to provide a set of rules for a VHF Contest which will suit and be fair to all would-be operators because of our very large country, and the way operators are situated geographically. But I do believe there is something to be found between the present rules and those previously which will be a compromise and suit a majority. But do write, do not just grouch on the air.

It will be April when you read these notes, so do not forget that's in the equinoxial priod when six metres could provide some very interesting long haul DX contacts, and from outside Australia too. I suggest you look north and north-east during the late mornings and from mid-afternoons onwards, anything could happen.

TWO METRES

This still continues to be the band bringing the surprises. It has now been shown how regularly it is possible to work through to Albany in VK6, especially from VK5, but often from VK3 and, as you will read later, from VK7. "QRM" reports Peter VK7PD parked in Ulverstone hearing the VK4 Brisbane repeater noise free, and Kevin VK7ZAH was heard in Brisbane exchanging signal reports with VK3YJI.

To show 2 metres does sometimes go inland I note Robert VK3AUR up in the Grampians worked Wally VK6WG after a lot of trying. A good effort, Robert, I know only too well what it is like to be in behind hills looking west.

During the John Moyle Memorial Field Day Contest, Col VK5RO was called by VK7ZAO/7 and heard VK7ZAL/7, but no contacts resulted.

Norman VK7NR writes an interesting letter outlining some special events that occurred in Tasmania, and his letter is worth reading.

"On the morning of 9/2/77 motoring to work with the mobile on, running 1½ watts to a hi-gain (3ZCG type) antenna on the roof, I thought I heard a VK6 — said to myself must be a tourist, listened again, time being 2140Z, and sure enough the Geelong repeater (Ch. 4) pops up about S8 with VK6ZDT calling CQ — I still thought he was mobile in VK7.

"At 2155Z Dennis VK6ZDT again called CQ and gave his QTH as Wagin, WA. I called him back, and he returned with a gasp and gave me R5 S5. I switched power to 15 watts out, it made no difference, so the loss was on Geelong to Wagin path. Spent a good 5 minutes chatting when the VK3's caught on and under the QRM he went. But I heard him on and off until 2300Z. Wagin is 200 km south of Perth and 150 km east of Bunbury. VK6ZDT has no SSB equipment and was using a 7 element yagi. I was 100 feet a.s.l. and the Geelong repeater was audible in most of Launceston.

"I got on to John VK7JV who lives high on a hillside; he tried to listen and work him on reverse repeater, some noise heard but not identified. Weather conditions at the time consisted of a great sausage shaped high pressure system stretching from west of WA almost across to ZL with a depth of not more than 350 miles at its widest point, with the centre just east of Tasmania. Also another very high pressure system was following from the west. The weather itself locally seemed to be like a very high sea mist stretching to the west as far as I could see.

"I work for STC Ltd. and I had nothing but complaints from mobile radio users about extended propagation during the day (9/2). But here's the juicy bit! We had UHF mobiles in North-West Tasmania working other commercial UHF mobiles mobile to mobile in VK2 and VK4 between Armidale and just north of Brisbane! What a day, and I almost missed it all.

"I don't think any records were broken but at least it might encourage more beams to be pointed East or West as the case may be, to help break the scourge of the continent, The Nullabor." Thanks, Norman, your letter was certainly most welcome, and if it does nothing else, could help to indicate the feasibility of working VK7 to Albany direct in the future, either with SSB or FM, then what, Albany to ZL?

What is interesting, however, is the UHF operation from VK7 to northern VK2 and to VK4. This indicates the existence at times of north-south paths and as the mobiles making contacts were commercial units they would probably have been in the frequency range of 450 to 480 MHz which is getting fairly high for whip to whip operation, actually rather a staggering achievement, and one which will be the envy of many amateurs. There seems no end to the surprises to be found at times on the VHF/UHF expanding world!

Another letter to pass on to readers comes from Allan VK4ZRF who is Secretary of the Brisbane VHF Group who feels that the report which came to me of 60 active locals (Brisbane) on 2 metres (see Jan. AR) was slightly misleading. He advises "There would be approximately 10 locals who are regularly active on 2 metres, possibly 60 have the capability, but most of these are FT221 owners who leave their rigs parked on some FM channel. As for the 4CX250B's, well, there are quite a few who have tubes and sockets, some with both. There are even a couple who are doing some construction work on them, but there is one operator at time of writing and that's mine. Mal VK4ZEL has one on 6 and 2 metres, but a few months ago gave up amateur radio for fishing!

"Rod VK4ZRQ, Steve VK4ZSH and myself (VK4ZRF) (locally known as the mad trio) zapped down to Point Lookout, near Round Mountain, 50 miles east of Armidale, approximately 5200 a.s.l. for the VK2 mid-summer VHF-UHF field day contest. We were hoping for contacts with Brisbane, country areas of NSW within a 300 mile radius, and stacks of contacts with Sydney and Newcastle. We had 100 watts of SSB on 2m, 10W on 6m, 100W on FM, etc. On 6 metres we worked VK2BMX and VK2ZMO Newcastle and VK2ADT Pt. Macquarie. On 2 metres worked 8 Brisbane stations several times, plus VK4QE Gold Coast, several VK2's from Lismore and surrounding areas plus VK2APF/2 in the Blue Mountains, but to our dismay we did not work one station from Sydney, although their beacons were audible all the time on the Saturday and Sunday of the contest. Disappointing because we had sent word ahead of our expedition, but perhaps the 42°C heat was too much for them there. Strange!

"Bill VK2ZVC in Pt. Macquarie was worked by the usual Brisbane gang over the distance of 270 miles for about 3 hours

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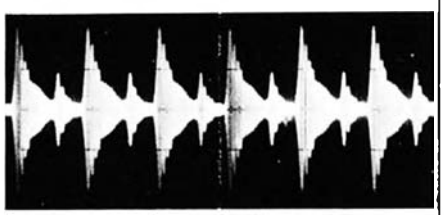

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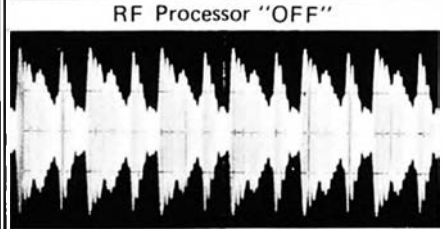

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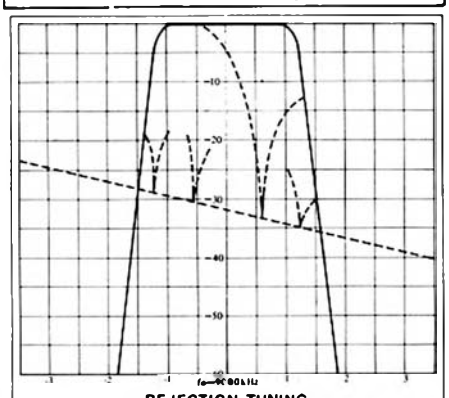

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Weight: Approx. 9 kg.

TRANSMITTER

Input Power: 200 Watts PEP on SSB, 200 Watts on CW at 50% duty cycle and 50 Watts on AM and FSK. (Slightly lower on 10 meter and 160 meter bands.)
Microphone: 500 ohm dynamic type.
Carrier Suppression: —40 dB.
Sideband Suppression: —60 dB.
Spurious Radiation: —40 dB.
Distortion Products: —31 dB.
Frequency Response: 300 to 2700 Hz ± 3 dB.
Final Transistor: S2535 x 2.

RECEIVER

Sensitivity: 0.25 μ V for 10 dB Noise plus Signal to Noise Ratio on 14 MHz.
Selectivity: 2.4 kHz nominal bandwidth at 6 dB down, 4.0 kHz at 60 dB down on SSB, CW and AM. 600 Hz nominal bandwidth at 6 dB down, 1.2 kHz at 60 dB down with optional CW filter. 6 kHz nominal bandwidth at 6 dB down, 12 kHz at 60 dB down with optional AM filter.
Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μ V equivalent to antenna input.
Automatic Gain Control: AGC threshold nominal 3 μ V. Attack time is 8 milli-seconds and release time is selected from 3500, 1500 and 200 milli-second on front panel.
Audio Noise Level: Not less than 40 dB below 1 Watt.
Audio Output: 3 Watts to internal or external speaker at 4 ohm impedance.
Audio Distortion: Less than 10% at 3 Watts output.

FT-301D Accessories everything you want in a complete home station design.

YAESU's years of experience in the radio amateur field are exemplified in the FT-301D series. The FT-301D can be interconnected to its matching power supply and external VFO unit. This feature provides you with a completely integrated home station with transceive operation on either VFO split frequency, or, crystal controlled operation with a flip of the switch. The FP-301D with built-in speaker is a complete AC power supply and can be used for any of the following supply voltages: 100/110/117/200/220/234 Volts, 50/60 Hz. A digital clock and automatic call sign identifier are an integral part of the power supply. The time display can be selected for either a 24-hour or 12-hour system with a flip of the switch on the front panel. A programmable identifier transmits your call sign in morse code automatically every ten minutes.

- **AC Power Supply FP-301D**
- **AC Power Supply FP-301**
- **External VFO FV-301**
- **Monitor Scope YO-301**

TUNABLE REJECTION TUNING

The tunable IF rejection filter utilizes sharp resonance characteristics of a crystal filter. The resonance frequency is tunable over the entire IF range to reject any interferences close to or inside the IF pass-band.

PRICES	
FT-301D inc. AM Filter	$1147
FP-301	$169
FP-301D	$289
FV-301	$149
YO-301	$345

Above prices include S.T. Freight and Insurance is extra.
90 day warranty. Prices and specifications subject to change.

bail **ELECTRONIC SERVICES**

60 Shannon St., Box Hill North, Vic. 3129. Phone 89 2213
Agents in all States and A.C.T.

FRED BAIL VK3YS
JIM BAIL VK3ABA

JAS7677-22

on 31/12. Signals peaked to S9. Steve VK4ZSH using his IC202 and a 3 el. fox-hunt yagi from Mt. Coatha also worked into Pt. Macquarie with signals S9 both ways." Thanks for the letter, Allan, you will always be remembered at this QTH for our 15 milliwatt contact on 6 metres earlier in the season!

While still dealing with letters, I have one from John VK5KG, which comes in response to my request for information on ATV activity in Australia.

"In Adelaide interest in ATV should soon get a long overdue shot-in-the-arm now that we have been granted a licence for an ATV repeater utilising 70cm uplink with 50cm (remember the old 576 MHz band) downlink. This will mean that any amateur with a TV set with a UHF tuner (and most colour sets have them) will be able to receive ATV with the aid of a small outdoor antenna. 50cm comes out at about Channel 34½!

"Active Adelaide ATV operators include Mait VK5AO who transmits on 70cm AND m, Howard VK5ZBE, Ray VK5ZEF, Pat VK5ZFX, Graham VK5ZOF and myself, John VK5KG. Rarely seen are Bill VK5HD and George VK5GG, and Rick VK5ZFQ takes an interest in our activities by helping out on occasions.

"All the above, and any other Adelaide amateur who builds an ATV transmitter on 70cm will be able to use the new repeater which will be situated at O'Halloran Hill, south of Adelaide. We hope to control the repeater by the use of a microprocessor which should make it the first of its kind in more ways than one! Any person interested in this project or ATV in general is invited to write to me, John Ingham VK5KG, 37 Second Avenue, Sefton Park, 5083, or break into the fledgling ATV net each Friday at 0900Z on 7085 kHz (or 3585 kHz depending on conditions), or on 53.500 MHz AM in Adelaide any time activity is heard."

Thank you, John, for writing, perhaps this will be the forerunner of some similar information from other centres of activity in VK. The opportunity is yours, gentlemen, if you will only write to me.

1296 MHz

Since the report of the record breaking contact last month between Reg VK5QR and Wally VK6WG on 1296 MHz, they have been at it again! On 15/2 Roger VK5NY heard Wally on 1296, and Wally was worked by Reg with good signals both ways. Reg reports the band being open for about 6 hours, during which time about 8 contacts were made! Les VK3ZBJ and Ron VK3AKC were also trying to make it to Wally without success.

All this was still not enough for these record breaking operators, as they fired up again on the night of 24/2 and worked both ways again at 5 x 8, and did the same thing again the next morning! So it seems to be a continuing event, for which they are to be congratulated again, especially considering the very low power they are using. Next plans are to go up to 2304 MHz and try it there, and considering the strength of signals on 1296 (and I have personally heard them on tape), there seems little doubt contact will eventually be made on that band.

MOONBOUNCE REPORT

Lyle VK2ALU reports in "The Propogator" of their recent activities on 432 MHz EME as follows:

12/12/76	JA1ATL — first contact, O signal strength reports each way. JA1VDV — O reports each way. F2TU — first contact, M reports each way.
8/1/77	K3PGP — first contact, M reports each way. WB5LUA — faded out after a few minutes, T report sent.
23/1/77	FY7AS — French Guiana — first contact, M reports each way. First Australia - South America contact on 70cm. This contact was the result of a CQ during the known common window rather than a scheduled test.

FY7AS uses circular polarisation. He was of consistent signal strength though only 1 to 3 dB over noise for most of the contact. He is located at the Guiana Space Centre.

It appears the period of supremacy of bipolar transistors for very low noise 70cm preamplifiers is over. The MT4575 bipolars used by VK2AMW and others give a measured noise figure of 1.2 dB on 432 MHz.

Now JA1VDV has come up with a design for a 432 MHz pre-amp having a gain of 15 dB and the incredibly low noise figure of less than 0.8 dB, according to his report in the 432 EME News for January 1977. The transistor used is a V244 GASFET which costs about $200 in USA and Japan.

The price may seem very high for such a device, but if they were in use at VK2AMW in place of our present front end transistors then our receiving system would be upgraded to the same extent as would require an increase of dish diameter from our present 30 feet to approximately 40 feet. Such would certainly cost more.

GENERAL NEWS

I note that so far there has been no response to my feeler put out recently regarding the formation of an 80 or 40 metre VHF/UHF net. If you intend writing about it, why not do so soon, at least some idea of likely interest could be ascertained.

The South East Radio Group Annual Convention is to be held again in Mt. Gambier over the June holiday weekend, 11th and 12th. Whilst sometimes there is mention of not going on with these conventions, the very good response with attendance by interested amateurs seems to quell all fears. I for one certainly look forward to them.

Lance VK4ZAZ mentions a worthwhile station to look out for is the new Brisbane FM station on 105.7 MHz. It could certainly be a very good pointer to a rising MUF and 144 MHz possibilities for that path. The fact that similar stations exist in Sydney and Melbourne are also worth keeping in mind.

That's about all for now. Thought for the month: "Inflation marches on, making it possible for people in all walks of life to live in more expensive neighbourhoods without even moving."

The Voice in the Hills. ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

April	
2/3	Common Market DX contest
2/3	Polish "SP" CW contest
2/4	ARCI QRP contest
12/13	DX YL to W/VE YL CW
16/17	Bermuda contest
16/17	Polish "SP" Phone contest
16/17	ARRL CD CW party
16/17	Florida QSO party
23/24	ARRL CD Phone party
23/24	PACC DX contest
23/24	Swiss "H-22" contest
26/27	DX YL to W/VE YL Phone
May	
1/2	Connecticut QSO party
7/8	Vermont QSO party
7/9	Georgia QSO party
14/15	Massachusetts QSO party
14/15	Kansas QSO party
14/16	Michigan QSO party
15	World Tele- Comm. Phone
21/22	YL Int'l SSBers, Inc. QSO party
21/22	New York State QSO party
22	World Tele- Comm. CW

YL Int'l SSBers, Inc. QSO party 1977.

Starts 0001 GMT May 21 and finishes 1359 GMT May 22, 1977. One 6 hour rest period in each 24 hours must be taken.

This year, DX stations are given greater encouragement to participate, by the rule which allocates 500 bonus points per 5 DX stations worked outside one's own continent.

Modes: CW and Phone, all bands.

Categories: 1. DX/WK Teams. A DX/WK team consists of one DX member and one Stateside member whose scores will be combined.

2. YL/OM Teams.

3. Single Operators.

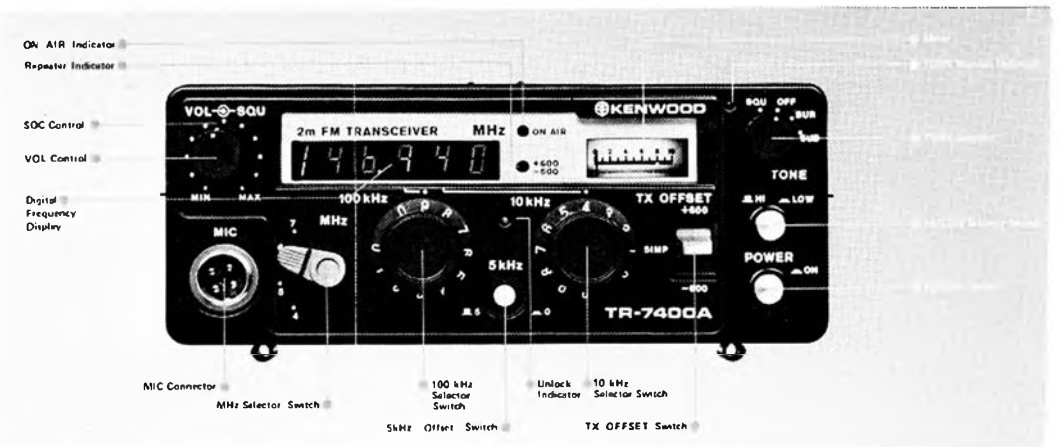
A plaque will be awarded to the highest scoring team in each category, and to the highest scoring single operator. Certificates will be awarded to highest scoring members in each state and country.

Suggested operating segments: 30 kHz around the following central frequencies: CW: 3565, 7070, 14070, 21070, 28070. Phone: 3925, 7290, 14333, 21373, 28673.

Note: Stateside stations will listen for VK stations around 3690 and 7090 on phone.

QSO Points: Phone: 2 points for each member contacted on same continent. 4 points for each member contacted on a different continent. 1 point for each non-member contacted regardless of location.

ANNOUNCING NEW 2 METRE FM TRANSCEIVER FROM KENWOOD



TR7400A ☆ FULL 4 MHz COVERAGE ☆ 25 WATTS OUTPUT HIGH, 5 to 15 WATTS LOW OFFSET FOR REPEATER ±600 kHz ☆ FULLY SYNTHESISED ☆ 5 DIGITAL READOUTS ☆ LIMITED NUMBER EX STOCK

KENWOOD TS820HF TRANSCEIVER
The pacesetter, provides superior performance, versatility and features found in no other Transceiver.

KENWOOD TS520HF TRANSCEIVER
Offers top performance, dependability and versatility at a realistic price.

KENWOOD MATCHING ACCESSORIES

KENWOOD TS700A VHF TRANSCEIVER
2 metre SSB/FM/AM/CW, offset for repeater operation. Tuneable VFO. All solid state. Full 4 MHz coverage, AC/DC. 10 Watts. Ideal for local — DX — or Oscar.

KENWOOD TS600 VHF TRANSCEIVER
Matching in size and performance to the TS700A, coverage 50 to 54 MHz. SSB/FM/AM/CW. INDENT ONLY.

We can also supply from the YAESU MUSEN range, the FT301D, FT301S, FT221R, FRG7 communication receiver.

FOR AMATEUR EQUIPMENT BASED ON COMPETITIVE PRICES, PHONE OR WRITE:

AMATEUR ELECTRONIC IMPORTS

APPOINTED KENWOOD DEALER

P.O. BOX 160, KOGARAH, N.S.W. 2217
TELEPHONE (02) 547 1467

INTERSELL ELECTRONICS PTY. LTD.

TRANSCEIVERS

SWAN 700CX — 700 W PEP Input. Standard Model 8 Pole filter and also 700CX SS16B with 16 Pole filter — P.O.A.

SWAN 300B — 300 W PEP input. USB and LSB Xtal calbr. with Standard and 16 Pole filter. Complete with integral PSU and Speaker $489.00

SWAN SS200A — All Solid State 300 W PEP input incl. VOX, Noise Blanker, SW Sidetone, Xtal calibr. and complete VSWR protection with special 16 Pole filter $750.00

POWER SUPPLIES

230XC — Complete with Cabinet and Speaker for 700CX. 230X PSU only. Both for 240 V AC mains, complete with supply leads and plugs .... P.O.A.

PS220 for SS200A $169.00

WATTMETERS

WM1500 — 1.8 MHz to 52 MHz, 0 to 1500 W RMS in 4 ranges 5/50/500/1500 W. Large easily read meter with forward power switch and reflected power $65.00

PEAK READING WATTMETER — reads PEP and RMS power up to 2000 watts in 3 ranges incl. reflected power $80.00

Secondhand FT101 with factory fitted 160MX complete with VFO fan and CW filter. Immaculate condition complete with manuals $500.00

MICROPHONES

444 SHURE desk mikes adjustable height, locking bar with VOX switch facility $45.00

404 SHURE hand mikes — both mikes now in stock again. Proven popularity due to specific tailoring for SSB. Both models complete with lead and plug $35.00

ANTENNAS

Two Element TB2HA $160.00
Three Element TB2HA $225.00
Four Element TB2HA $290.00
Solidly made antennas with all elements active on 20/15/10 MX.

MOBILE ANTENNAS

SLIMLINE 500 W PEP Mobile Antennas with base section, coil and adjustable top whip of stainless steel.
15MX $35.00
20MX $40.00
40MX $45.00
HD Spring $16.00
HD Mount $16.00

VALVES

Most Valves for Swan equipment in stock .... $10.00 ea.
8950 6HF5, 6LQ6/6MJ6. Available in matched pairs.
FC76 Digital Freq. Meter Read TX Freq. $175.00

All prices quoted are subject to changes without notice, but are inclusive of Sales Tax. Freight and Insurance extra.

SOLE AUSTRALIAN DISTRIBUTORS FOR SWAN AMATEUR AND COMMERCIAL RADIO EQUIPMENT:

VK2AHK **3 MIDSON ROAD, OAKVILLE, N.S.W. 2765 — PHONE: (045) 73 6215**

MAKE IT ON 70 cm FROM YOUR MOBILE OR HOME STATION, 2m RIG

NEW RELEASE — TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE OR ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.

A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output. Limited supply only availavle ex stock, further units currently on order for expected early delivery.

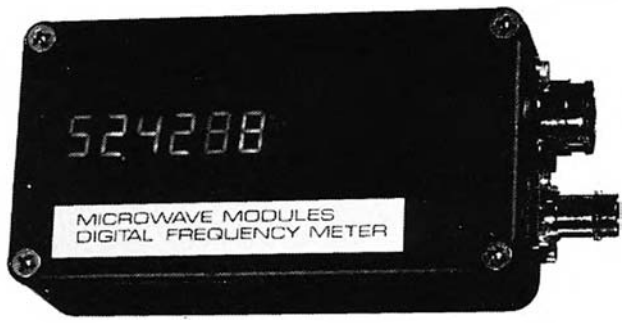
Model MMT432/144 — Price $260

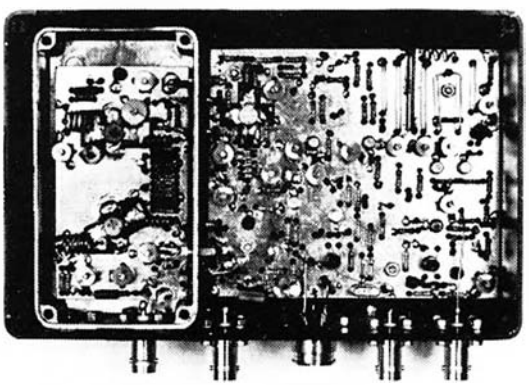
TRANSVERTER MODEL MMT432/28

FEATURING COMBINATION OF A LOW-NOISE RECEIVE CONVERTER AND A LOW-DISTORTION TRANSMIT CONVERTER PRODUCNG A SPURIOUS-FREE LINEAR SSB SIGNAL, PARTICULARLY WHERE HIGH STABILITY AND SENSITIVITY ARE OF IMPORTANCE.

Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern Microstrip Techniques ★ Power requirements 12 volt nominal at 150 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432 — Price $215





MMT432 TRANSVERTER

New Release – 500 MHz COUNTER

This counter has two ranges which are selected by supplying + 12 volts to one of two pins on the DIN socket. Internal diode switching brings the input in the 0.45 - 50 MHz range to a wide-band amplifier which drives a high speed TTL divider in the main counter logic. On the 50 - 500 MHz range the diodes switch in a high speed ECL prescaler and the demical point is changed accordingly.

A low angle AT cut quartz crystal is used giving a typical temperature stability of 0.5 ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 200 Hz at 50 MHz, or 2 kHz at 500 MHz.

The counter has reverse polarity protection and operates satisfactorily from a nominal 12V DC supply. A suitable 5 pin DIN plug is supplied.

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD500P — 500 MHz Prescaler, $55.

Model MMD050/500—500 MHz Counter, $175. **Model MMD050—50 MHz Counter, $130.**

TRANSVERTER MODEL 144/28

This 144 MHz Solid State Linear Transverter is intended for use with 28 MHz transceiver to produce a highly reliable transceive capability for satellite or terrestrial communication ★ Power output 10W min. ★ 28 MHz drive ★ IF at 500 mW or 5 mW ★ Receiver gain and noise, typical 30 dB and 2.5 dB ★ Internal Antenna changeover ★ Case size 187 x 120 x 53 cm ★ Power requirements 11 to 13V at 300 mA to 2.2 amp. peak ★ Spare 144 MHz input socket.

Model MMT144/28 — Price $185

NEW READY-TO-OPERATE MODULES AVAILABLE IN THE SALES PROGRAM OF VHF COMMUNICATIONS

1296 MHz CONVERTER
Microstripline, Schottky diode mixer. IF: 28-30 MHz or 144-146 MHz. Noise figure: typ. 8.5 dB. Overall gain 25 dB. **Price: $65.**

432 MHz CONVERTER
2 silicon pre-amplifier stages. MOSFET mixer. All UHF circuits in microstrip technology. Noise figure: typ. 3.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. **Price: $51.**

144 MHz MOSFET CONVERTER
Noise figure: typ. 2.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz, 9-15 V 20 mA.

Price: $45.

VARACTOR TRIPLER 432/1296 MHz
Max. input at 432 MHz: 24 W (FM, CW) - 12 W (AM). Max. output at 1296 MHz: 14 W.

Price: $74.

Pack and Post $1

All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

ONWARDS forwarding. It is recommended that items forwarded by Mail are registered. Post Office charge is $2, this also includes insurance. If required, goods will be forwarded by Ansett air freight or road transport collect.

Australian Distributors for Microwave Modules Limited:

AMATEUR ELECTRONIC IMPORTS

P.O. BOX 160, KOGARAH 2217, N.S.W. **PHONE: (02) 547 1467**

CW: Double the above points.

Stations may be contacted on Phone and CW on each band for QSO points.

Multipliers: Only member stations can count as multipliers.

States: 1 per State worked.

Countries: Same continent stations may be worked once only for multiplier credit (1).

Different continent stations may be worked on both Phone and CW on each band for multiplier credit (1 each time).

Teams: Each complete YL/OM or DX/WK team contacted (1 per team).

Bonus points: Add 500 points to your final score for each set of 5 DX stations contacted outside your own continent. For bonus points purposes, each DX station may be used once only, regardless of band or mode.

Logs: Must show date, GMT, RS(T), SSB-er number, partner's call, mode of operation, band, and period of rest time. Summary sheets must be compiled and enclosed. All logs must be postmarked on or before June 22, 1977, and be received on or before July 10, 1977. Send logs to Larry Miller W6ANB, 224 15th Street, Santa Monica, California, 90402.

Any member desiring to enter the DX/WK Team category should immediately send request to K6JG (ex WA6MWG), Pete Billon, 4040 Via Opata, Palos Verdes Estates, California, 90274. For records purposes, requests should be made in writing. In the week preceding the QSO party, May 14-21, members wishing a partner may request one through the system controls on SSB-ers' daily systems. No team assignments will be made after the party begins.

For this QSO party, the Call Book criterion will be used to determine in which continent a particular country should be identified. For further information, contact Ivor Stafford VK3XB.

PACC DX CONTEST

Starts 1200 GMT April 23, finishes 1800 GMT April 24. All bands 1.8 to 28 MHz, both Phone and CW may be used. The same stations may be worked once only per band regardless of mode. Send RS(T) plus a QSO number starting at 001. PA/PI/PE stations will include 2 letters indicating their province.

There are 12 provinces: DR, FR, GD, GR, LB, NB, NH, OV, UT, YP, ZH, ZL, making a possible multiplier of 72. Each completed QSO counts 1 point. Multiplier is the number of provinces worked on each band. Final score is the sum of QSO points times the sum of provinces worked on each band.

There is a SWL section. Call of the Dutch station and serial number as well as the station being worked must be logged.

Certificates will be awarded to the top scoring single operator, multi-operator and SWL in each country and call areas in W/K, VE/VO, CE, JA, PY, UA9/UAO, VK, ZL, ZS.

Indicate the multiplier only the first time it is worked on each band. Include a summary sheet showing scoring and other pertinent details, your name and address in Block Letters, and a signed declaration that all rules and regulations have been observed. Mailing deadline is June 15 to: VERON Contest Manager, PA0DIN, Schoutstraat 15, Nymegen 6805, Netherlands. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

ROENNE CITY JUBILEE AWARD
(Denmark)
To celebrate the 650 years anniversary of Ronne city.

Frequencies: All bands can be used.
Mode: FM, AM, SSB, CW, SSTV, RTTY.
Period: Only contacts made in the year 1977 count.
Points needed: LA-SM-OZ-OH need 5 points, other Europeans 3 points, outside Europe 2 points.
Category: The award can be obtained in one mode or in several modes.
QSL cards: It is not necessary to forward any QSL cards. Send a list of the amateurs contacted with information of date, time and QRG. This list has to be signed and controlled by two licensed amateurs in this country.
SWL: The award can be obtained by SWLs too. Same rules.
Fee: 10 IRC.
Repeaters: QSOs made via repeater will not count for this award.

Address: Send the application and 10 IRC to —
Award Manager, OZ4PM Poul Moerch,
Godthaabsvej 19
DK 3751 Oestermarie
Bornholm, Denmark.

TRONDHEIM 100 DX AWARD
(Norway)
Applicants must contact five amateur stations in the town of Trondheim, Norway, three of whom must be member of the Trondheim DX Club.

Send details of the contacts to:
The Trondheim DX Club,
P.O. Box 929,
7001 Trondheim, Norway.

Do not send QSL cards, but do enclose sufficient IRCs to cover cost of postage.

The first amateur to qualify in each country will, in addition to receiving the Award, be made an honorary member of the Club. ■

LARA

Ladies Amateur Radio Association

THE OM-OWNER'S MANUAL
It has occurred to members of LARA that newcomers to the field of radio might find the terminology (and slang) somewhat confusing. As a public service this month we present a glossary of commonly used terms:—

"OM" — What your Best-Beloved can turn into as soon as he is bitten by the radio bug. (You thought he was called a husband didn't you?)

"YL" or "XYL" (or other terms of endearment) = you.

"Shack" — You thought it was the garage until it became so full of rigs, aerials and other mess that the Rolls wouldn't fit.

"Tower" — Measures up to about 60 feet (vertically) — what he would really like to build in the back yard instead of the washing line — who needs a swimming pool anyway?

"Eyeball" — Face to face friendly meeting of amateurs — not a gruesome exotic foodstuff.

"Twisted Pair" — This interesting term does not refer to stockings on the washing line in a cyclone, nor does it refer to the OM and his best friend who spend hours out in the shack. It does in fact refer to the telephone.

"Faithful Hound" — Not the family pooch but the family car, festooned with directional aerials, rigs, etc., chasing around the countryside in pursuit of an EED (elusive electronic device) — referred to as "the fox" — or on LARA hunts as "the vixen".

Having put in a plug for LARA fox (vixen) hunts, I shall stop and leave readers in suspense as to the real meaning of the term "dipole". *N.B.* It has nothing to do with Icy-poles on two sticks. ■

INTRUDER WATCH

Alf Chandler, VK3LC
1536 High Street, Glen Iris, 3146

A report submitted by the VK5 Co-ordinator to the "South Australian Wireless Institute Journal February 1977" in my opinion is a classic, and I am quoting from it verbatum here. Quote —

"After my appeal at a recent WIA meeting, I sat back and waited for results. I can now report that the results were exactly nil! I now without fear or favour accuse the average Divisional membership of being spineless, gutless or absolutely without regard to either their or their fellow amateurs' future. I make no apology for my statements, basing my remarks on the general attitude of the Divisional Membership. Oh, yes, we won the RD, when it comes to play contests or to yak yak after DX, VK5 is well to the fore, yet ask for 5 or 10 minutes of their valuable on the air time and it's remarkable how soon the QRM and QRN breaks down. I've said it before, I repeat it again, the general amateur community is too b——y lazy or to b——y ignorant to look after their own future. I get more support from NON-MEMBERS of the WIA whom I have contacted and I thank those chaps who DO think of their mates, ask them to join the WIA and their description of the Institute . . . and sometimes I don't blame them.

Do you hear the Asiatic BC stations creeping into your 80 metre band, Red China, Indonesian and even Australian CW commercials working openly on 40 metres, and South American, Russian and South African teleprinter stations going flat out in the amateur part of 20 metres? Of course it's no concern of yours, they are not in the part of the particular band you are using YET. I don't worry, I have worked my share of DX, rag chewed to my W, G, JA, etc., pals and experimented to my full desire, I have not many years before I become a "Silent Key" and I have other interests to fill in the waiting time, but you poor fish, how are *you* going to fill in the void in your precious time when there will be no Amateur Radio as such — THINK.

When you hear as I did a ship commercial tell a W amateur to QRT because he was QRMing his traffic, perhaps you will let a bit of light into that foggy vacuum you call a head. (Needless to say that commercial got reported quick smart and in red ink, hi!) Let's hope you fellows see the light before it's too late. INTRUDER WATCH does not ask, it DEMANDS reports to help protect our frequencies, why don't you remove the digit and help preserve that which ARRL, RSGB and WIA, to name only three, fought for. Like TOM the famous ARRL commentator who slammed rotten radio, I have kicked the dog and spat on the cat in pure disgust but I suppose you all will become HI-FI experts in the future, so why worry, I dont!" Unquote.

Think it over. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
The letter in January 1977 "Amateur Radio" from Mr. Vale VK5NO with comments on apparent "lack of interest" in the VK/ZL/O DX Contest demands some reply. Any system of contest souring is debatable and with many years of contest operating experience and over 25 years as an administrator, this problem still concerns me. The concern is to use a system fairest to all and I still contend that the "BERU" fills this requirement better than others. Admittedly it DOES take a little more time to compute, but having re-scored hundreds of logs over the years, this is a matter of only a few more minutes. Further, this forces the entrant to take a more careful look at his claimed contacts. That certain problems arise in VK logs suggests either that up to date DXCC Countries Lists are not readily available and/or the scoring rules have not been adequately read.

The year to year degree of activity in VK and in ZL makes an interesting study as the following figures show:

Year	Organised by	ZL logs received	VK logs received	Total
1952	NZART	19	30	49
1953	WIA	15	25	44
1969	NZART	58	83	141*
1970	WIA	52	87	139†
1971	WIA	33	61	94
1972	NZART	41	68	109
1973	WIA	32	61	93
1974	NZART	45	64	109
1975	WIA	29	54	83
1976	NZART	66	75	141‡

* ZL Bi-Centennial.
† VK Bi-Centennial.
‡ NZART Jubilee.

Even the most fleeting glance will show that Mr. Vale's suggestion re "local" logs (this must refer to VK and ZL logs) is not really correct. Deeper study will show an interesting trend which apart from any possible differences in publicity might be due to the more liberal awards policy adopted by NZART in which recognition is given to placegetters in various categories. Admittedly this costs money but in the long run must have more than a little to commend it.

As some already know — I have suggested a change in scoring to a multiplier system — NOT however on a country basis but on a PREFIX basis which will give more appropriate incentive as well as utilising the ever increasing number of prefixes available. Even so, to most adequately recognise operating ability it is desirable that this be administered on a band to band basis.

No — not for one moment do I accept Mr. Vale's suggestion that the scoring system was at fault. I know Australians to be much more capable than he suggests — just as are New Zealanders! Finally I suggest that as with any other venture, PROMOTION is essential. NZART feels it has fulfilled its obligations to both Societies in this respect. Long may our association on this contest continue.

Jock White ZL2GX,
NZART Contest and Awards Manager. ■

The Editor,
Dear Sir,
I wish to point out that thanks to the efforts of our President Alan Austin we have a new patron, the Governor of Western Australia, Sir Wallace Kyle. His Excellency had a meeting with the President and our Secretary, Neil Penfold. He thought our constitution rather binding and restrictive. We are starting to change this and anticipate several changes in the constitution this year. One has already taken place which is the elimination of a qualified accountant as auditor. Any two members will now suffice.

John Kitchin,
Treasurer VK6 Division WIA. ■

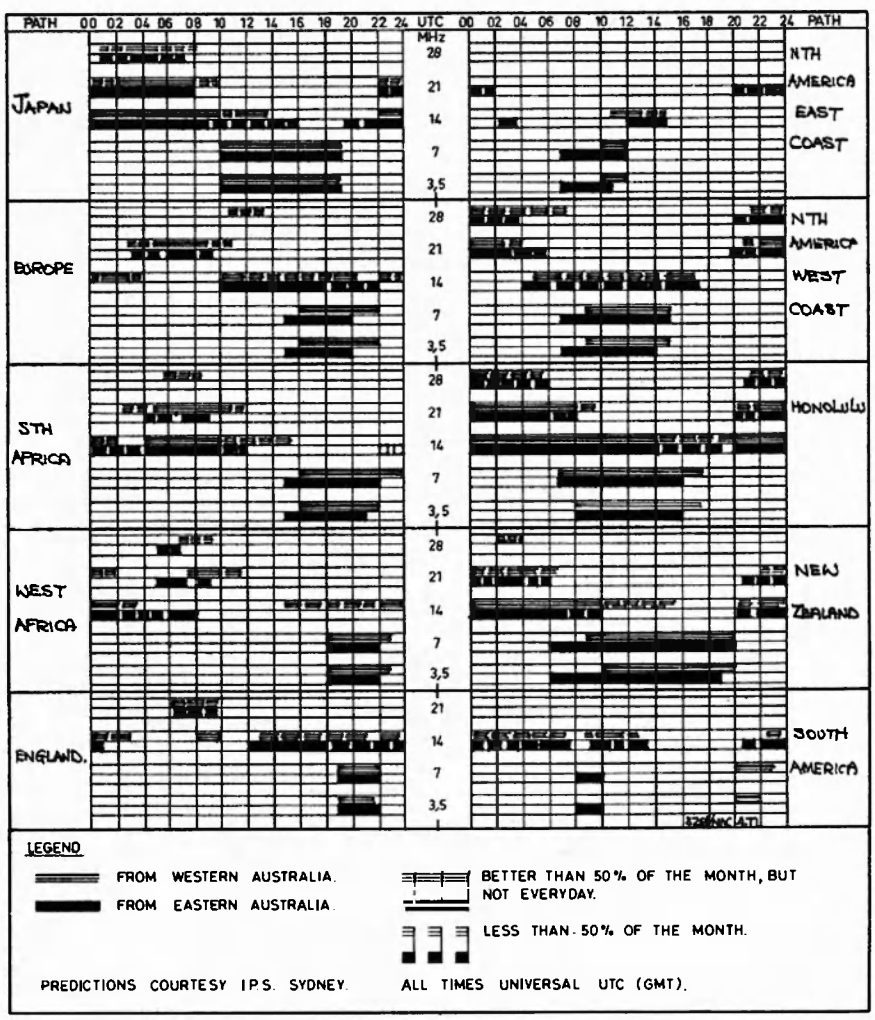
QSP

ITU MEMBERSHIP
The Republic of Surinam has become the 149th member state of the ITU. It is understood that the ITU will soon announce that it has admitted to membership Sao Thome-Principe and Guinea-Bissau, both being newly independent African republics. Radio Communication, Nov. '76.

THE NOVICE LICENSEE
The fourth precept of the amateur code (see QSP AR June 1974 p.8) is that — "The amateur is friendly . . . slow and patient sending when requested . . . friendly advice and counsel to the beginner, kindly assistance and co-operation for the broadcast listener. These are marks of the amateur spirit". Remember the help you were given when you first started in amateur radio?

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP/NAC



AROUND THE TRADE

BWD TRANSFERS NSW OFFICE

Following upon the death in the Granville rail disaster of Mr. Hal Cranfield, NSW regional manager for BWD Electronics, it has been decided as from 21st February, to transfer all sales and service activities to BWD's authorised distributor, Amalgamated Wireless (A'asia) Ltd., 422 Lane Cove Road, North Ryde, NSW 2113. Phone 888 8111, Extn. 412 (Mr. Peter Crumpler), Telex 20623.

All enquiries directed to their distributor — or if preferred to BWD head office in Melbourne — will receive immediate attention. BWD's head office postal address is P.O. Box 325, Springvale, Vic., 3171. Phone (03) 561 2888, Telex 35115. ■

QSP

AMATEUR GRANTED PATENT

In the 1974 March to June issues of AR John Adcock VK3ACA published a series of articles describing his unusual experiments with audio processing. John has now been granted British patent 1454 158 for the improved speech compressor described in the above articles. Well done John!

Remember . . .

N.Q. CONVENTION

Details in March AR

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

ICOM IC22 2m FM transceiver, xtals for 146 MHz operation, will consider offers, or exchange for ICOM IC502 or other 6m SSB equipment. Ph. (092) 92 2468 or write I. Connell VK6ZIC, C/- Box 67, Dampier, W.A., 6713.

Hygain TH6DXX Beam, new and unused, in original package, $250. VK3PG, QTHR.

Roband 5 in. oscilloscope, DC, 30 MHz, sweep ranges 0.1 usec/cm to 2 sec/cm, height 22cm, wid.h 43cm, depth 53.5cm, weight 14 kg. $150. VK2ZOF, 45 The Causeway, Maroubra, 2035. Ph. (02) 34 5571.

Yaesu-Musen FTDX100 transceiver, $400. Heathkit HW7 QRP transceiver, $100. VK3APO, QTHR. Ph. (03) 95 3329.

Kenwood TS520 transceiver 80-10m AC/DC with remote VFO and CW filter installed, mike and operating manual, excellent condition, 20 months old, had little use, $650. VK3BDY, QTHR. Ph. (03) 338 2105.

Teletype Model 15, $100. Kleinschmidt TT-76 (reperf, keyboard and TD) 230/115V, c/w gears to run on 60, 75 or 100 wpm, $200. Two Teletype MXD-8 three headed TD's (reconditioned), $20 each. TT-L/2 Terminal Unit 170/850 Hz shift, wide and narrow filters, scope indicator, AFSK generator, etc., $100. All gear in perfect working order. VK2KM, QTHR. Ph. (047) 31 5447 A.H.

Urgent Shack Cleanout (moving QTH): Swan 400 transceiver 80-10m with two matching VFO's and power supply, spare valves, $400. BC-342 RX 1.5-18 MHz, $30. BC-453 RX 190-550 kHz, $20. Tape Recorder, 2 speeds, $20. 60 feet four section wind up tower, $20. 40 feet two section wind up tower, c/w winch, guys and 2-el. 20m beam, $40. Audio generator, 3 Hz-300 kHz, sine and square wave, calibated meter and attenuator, $40. VK2KM, QTHR. Ph. (047) 31 5447 A.H.

Estate of late VK3ACE. Heathkit SB301 Rx, SB401 Tx, SB600, spkr., complete station, $375. SB200 linear, $275. SB101 xcvr with matching P/S and spkr., $275. Swan 350 xcvr with matching AC and DC PSU, $275. Johnson Matchbox ACU with SWR meter, $90. Johnson Ranger AM/CW Tx 160-10m, $20. TH6DXX tri-band beam, Ham M rotator, $180 the lot. 65 ft. tower free if required. Heathkit HF and VHF power meters, $40 each. Midland SWR meters, $15 each. B and W lowpass filter, $10. Ringo Ranger 2 metre antenna, $20. Numerous other bits and pieces. Contact VK3OM, QTHR. Ph. (03) 560 9215 for full list of gear available.

Two ex WW2 Navy TCS-13 type transceivers, complete with 12V DC gene-motor power supplies, cables, and remote cont. units. One unit original, the other slight Rx mod., both recently air tested OK. Units tune 1.5-3, 3-6, 6-12 MHz, VFO or xtl. locked (up to 4 xtals.). Tx power 10W AM or 25W CW, circuit diag's, etc., available, $50 each ONO. VK2BIP QTHR. Ph. (060) 76 9338.

FT200 transceiver as new, no mods, complete with HB AC power supply, Heathkit DC supply, $360 ONO. J. W. Nairn, Box 29, Churchill, 3842. Ph. (051) 22 1697.

Lafayette HA8008 80 through 6m amateur Rx, as new, $150. Also Deltahet mark 2 communications Rx. Kit cost $350, sell for $150. John Langburne VK2ZLJ, Flat 4, 38 Arthur St., Balmain, N.S.W., 2041.

Yaesu FRDX400/FTDX400. Condition as new. First used Jan. 1974. Can be used as separate units or transceiver. Original packing and handbook, $550. Firm. VK2OW, QTHR. Ph. (069) 82 2003.

Ken KP202 with nicads and charger, stubby helical, PL259 adapter, leather case, xtals for chans 40 and 50, repeaters 2, 3, 5, 6, 7 and 8. Perfect condition, $140. VK3BJP, QTHR. Ph. (03) 560 2804.

ICOM IC22A, perfect condition, xtal's for chans 40 and 50, repeaters 2, 3, 4, 5, 6, 7 and 8, anti-repeater 2, $150. VK3BJP, QTHR. Ph. (03) 560 2804.

Monoband Beam, 20m 3-el. rugged beam, with 1½ in. Dural full-length elements, 20 ft. oregon boom and omega matching unit. I will demonstrate to you in the shack; we will dismantle it; and you will pay $100 and take away! VK3AHR, QTHR. Ph. (03) 83 4203 A.H.

Pye 743 solid state compact transceiver, high band for 2m FM, complete with new cradle, telephone-type handset and matching speaker, $160. L30134. Ph. (03) 467 2131 Bus.

Swan 500C, AC PSU, mic. and manual, no mods, excellent condition, original packing, $360. Swan Vox unit to fit 300, 500, 350C, 500C, $35. VK2BBR, QTHR or ph. Rob Black (066) 21 4384 Bus.

Ham Radio — April 1968 to June 1972, 73 — June 1961 to December 1972. QST—May 1963 to April 1971. CQ—Odd copies 1961 to 1966. Amateur Radio — July 1962 to December, 1974. What offers? VK3QW, QTHR. Ph. (03) 560 0645.

Hallicrafter HT37 Tx, SX101A Rx, first class condition with manuals. Bendix BC221 freq. meter, type "S", power supply. VK3JA, QTHR. Ph. (055) 66 5117.

Yagi Antennas, ex 470 MHz links, each consists of two 6-element beams matching, approx. 2m, heavy co-ax. and type N connector, suit conversion to 50cm or 70cm, etc, $10 each. Jeff VK3ZJS, QTHR. Ph. (03) 37 1332.

Yaesu FT-620, AM USB LSB, exc. cond., with Cush-Craft 5-el. beam, $330. Yaesu Monitorscope YD100, all cables, manual, $150. Belcom Liner, xtal synthesised, 2m SSB transceiver, incl. xtal for satellite, 10W, $180. P. Laycock VK3BOL. Ph. (03) 718 2122.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. G. S. C. SEMMENS	**VK3GS**
Mr. R. W. G. WEHR	**VK5ZAV**
Mr. G. GLOVER, O.B.E.	**VK3AG**
Mr. C. R. McNALLY	**VK3CE**

Yaesu FTDX401 transceiver, unmarked, in perfect condition, with manual, $400. Yaesu FTDX560, perfect condition, fan installed. Also have noise blanker and crystal filter for above, $350 VK2CX, 25 Tomaree St., Nelson Bay, 2315.

Eddystone EC10 Mark 1 transistorised general cov. Rx AC/DC, suit novice or as second Rx, good condition, $150. Mrs. Howell, 17 Sherwin Ave., Castle Hill, 2154. Ph. (02) 634 1093.

204 BA—full size 4-element 20m beam antenna fitted with stainless steel hardware, excellent order, packed f.o.r. Kingston, $200 ONO. Owner going mobile walkabout VK. VK5XB, QTHR. Ph. (087) 67 2205.

Cheap registrations for the Canberra Easter Convention—OM's $5.50; XYL's $3.0; Harmonics 50c. THE radio event of the year with more prizes than ever before. See Inserts to November 1976 and February 1977 AR for details. Advance programe available from Box E338, Canberra, A.C.T., 2601.

Yaesu FRDX400 Rx Deluxe Model (Hot Super Deluxe), complete EC, original boxing, manual, $225. VK3KK, QTHR. Ph. (03) 652 8110, bus. hrs., (03) 46 4200 AH.

WANTED

Contestants to share in over $1200 worth of contest prizes donated to the Canberra Easter Convention. Dust your sniffers off now folks, and don't miss out.

One old-fashioned morse buzzer; as used pre-oscillator days. Please advise price to: Ron VK3LY, QTHR. Ph. (03) 29 3709.

Transmitting tubes type QB3/300 or C1108 required by Indonesian missionary radio station. State price. VK5UV, QTHR. Ph. (08) 225 5985 Bus., (08) 382 3353 A.H.

FT101, any model, good working condition. 18AVT or similar. IC22A. VK3BHZ. Ph. (060) 71-6211 Bus. (060) 71-7244 A.H.

Service manuals for BC221 freq. meter and SCR522 Tx/Rx. Buy or copy. J. Pretty, 57 Bayview Ave., Earlwood, 2206. Ph. (02) 55 5430.

TRI band beam and rotator, 20-15-10m, Yagi type only. VK3ARD, QTHR. Ph. (03) 277 3954.

Atlas 215XHF SSB transceiver, prefer late model in good condition. G. R. Hovey VK1HG, 22 Eubene Dr., Duffy, A.C.T., 2611 or ph. (062) 88 [illegible] A.H.

Eddystone 750 or 888 Rx, going condition, price and particulars to VK4ZBI, QTHR.

Circuit dia. of following: solid state (12V) and valve, speech compressor, both suit high imp. mic. Also solid state and valve 10W linear amp. capable 4W input and 10W AM output on 27 MHz. Solid state unit suitable for 12V DC mobile operation. Have 2 E26's on hand for valve unit. All expenses refunded. Contact Col Paton VK4NBP, 225 Pallas St., Maryborough, Qld., 4650.

FT75 or FT101E or TS520 or Uniden 2020 transceiver. A self supporting 40-50 ft. tower. A TH3 Yagi or similar. Bumper mount for HF whip. John VK2NDP. Ph. (02) 639 7962.

Astro compass. These items were plentiful around disposal stores in the 50s. VK2OK, QTHR. Ph. (065) 68 1627.

FV401 external VFO unit for FTDX401. VK4RF, QTHR.

Helical whip aerials for 20, 40 and 80m bands. Bill Perry VK3BAV, 11 Miller St., Sandringham, 3191. Ph. (03) 598 8665.

Pensioner-Associate wants to swap "K" Command Rx 6-9 MHz, working order, with CCT etc., for Tx working order, any novice freq.; or sell best offer. R. S. Inman, North Arm Cove, C/- PO Karuah, NSW 2324. Ph. (049) 97 5365. Candidate for May Novice Exam.

Sideband Electronics Sales

HF TRANSCEIVERS

ASTRO - 200 digital solid state 200 W.P.E.P. P.O.A.

TRIO KENWOOD model TS 520 - D AC - DC 10 to 80 M. **$590**

TRIO KENWOOD model 520 - D AC only 10 to 80 M. **$650**

TRIO KENWOOD model TS – 820 – S AC only 160 to 10 M. with digital readout **$980**

TRIO KENWOOD model TS - 820 AC only 160 to 10 M. **$850**

TRIO KENWOOD DS 1 DC Converter **$ 65**
VFO - 820 **$145**
DG - 1 Digital Display **$160**
YG. 88C Crystal Filter **$ 64**
SP. 520 - 820 **$ 36**

TRIO KENWOOD model TS - 700 - A FM-AM-CW-SSB transceivers. Full 144-148 MHz coverage, 10-Watt output, VFO controlled, self-contained, AC-DC operation. **$650**

TRIO KENWOOD model TS-600-A FM-AM. SSB transceiver full 50-54 MHz coverage 10 Watt output variable form 1 Watt to full power. VFO controlled AC-DC operation. Styling as TS-700-A. P.O.A.

TRIO KENWOOD model TR-7400 2 meter FM transceiver 10 to 25 watts output. Frequency range 144.00 to 147.995 MHz No. of channels 800, Double conversion superheterodine sensitivity better than 0.4 UV for 20 DB. **$385**

KYOKUTO 2 M FM 15 W output transceivers with digital read-out and crystal synthesized PLL circuitry now tiwh 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144-148 MHz, receive to 149 MHz. No more crystals to buy. Includes simplex, repeater and anti-repeater operation. only **$310**

NOVICE OPERATORS
All above HF transceivers will be modified for low cost to suit novice. Requirements 27 MHz conv. x-tals in stock now for kenwood models.

IT IS HERE AGAIN, the well known SE-501 in new style case 15 Watt pep 23 AM SSB for as low as **$215**
Same model with AC built in supply and DC built in SWR power meter and many goodies. **$260**

ICOM
VHF TRANSCEIVERS SSB
ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz **$215**

ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz **$215**

USED EQUIPMENT
Collins KWM-2 - A in new condition with power supply **$1,600**
PM.2
6146 – b valves RCA new Large stock **$10 each.**

FDK MULTY QUARTZ with 24 channels 10 sets of crystals supplied 10 Watts, new style. **$265**

YAESU MUSEN model FT-101-E AC - DC transceivers 10 to 160 M with speech processor P.O.A.

YAESU MUSEN model FT - 301 P.O.A.

YAESU MUSEN model FT 301 - D P.O.A.

YAESU MUSEN model FT - 301 - S P.O.A.

YAESU MUSEN model FP – 301 P.O.A.

YAESU MUSEN FR 6-7. Uses Wadley loop principal **$300**

YAESU MUSEN model YC-500

FREQUENCY COUNTERS P.O.A.

HY – GAIN ANTENNAS

14AVQ 10-40M. verticals, 19' tall, no guys	$ 65
18AVT-WB 10-80 M. verticals, 23' tall no guys	$ 95
TH3JR 10-15-20 junior 3 el. Yagi 12' boom	$ 16
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom	$220
TH6DXX 10-15-20 senior 6 el. Yagi 24' boom	$250
HY-QUAD 10-15-20 cubical quad Yagi 8' boom	$250
TIGER ARRAY 204BA 20M4el. Yagi 26' boom	$250
BN-86 balun for beam purchasers only	$ 25

CUSH CRAFT ANTENNAS

A144-11 11 Element 2M-Yagi	$ 45
A147-11 11 Element 2 M Yagi	$ 45
A147-20 combination horizontal vertical 2 M	$ 70
A144-20 combination Yagi with matching harness circular polarization	$ 75

ANTENNA ROTATORS
Model CDR Ham-11 for all hf beams except 40 M **$200**
Model CDR AR-22 L junior rotator for small beams **$ 65**
KEN model KR-400 for all medium size hf beams with internal disc brake **$110**
KEN model KR-500 for vertical control of satellite tracking **$110**
All models rotators come complete with 230-volt AC indicator-control units.
6-conductor cable for KR-400-500 **65 cents per metre**

COAX CABLE CONNECTORS

PL-259	$1.20
SO-239 Chassi Mount	$1.20
Male to male joiner	$1.20
Female to female joiner	$1.20
Angle connector	$1.70
T-.connector	$2.00

COAX CABLE
RG - 8 - U foam filled per metre **$1.20**

SWR METER
Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality **$ 28**

DRAKE TV - 3300 TVI lowpass filter **$ 31**
SSR-1 Receivers **$270**

All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over $100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded.

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P.O. BOX 184, SUTHERLAND, 2232

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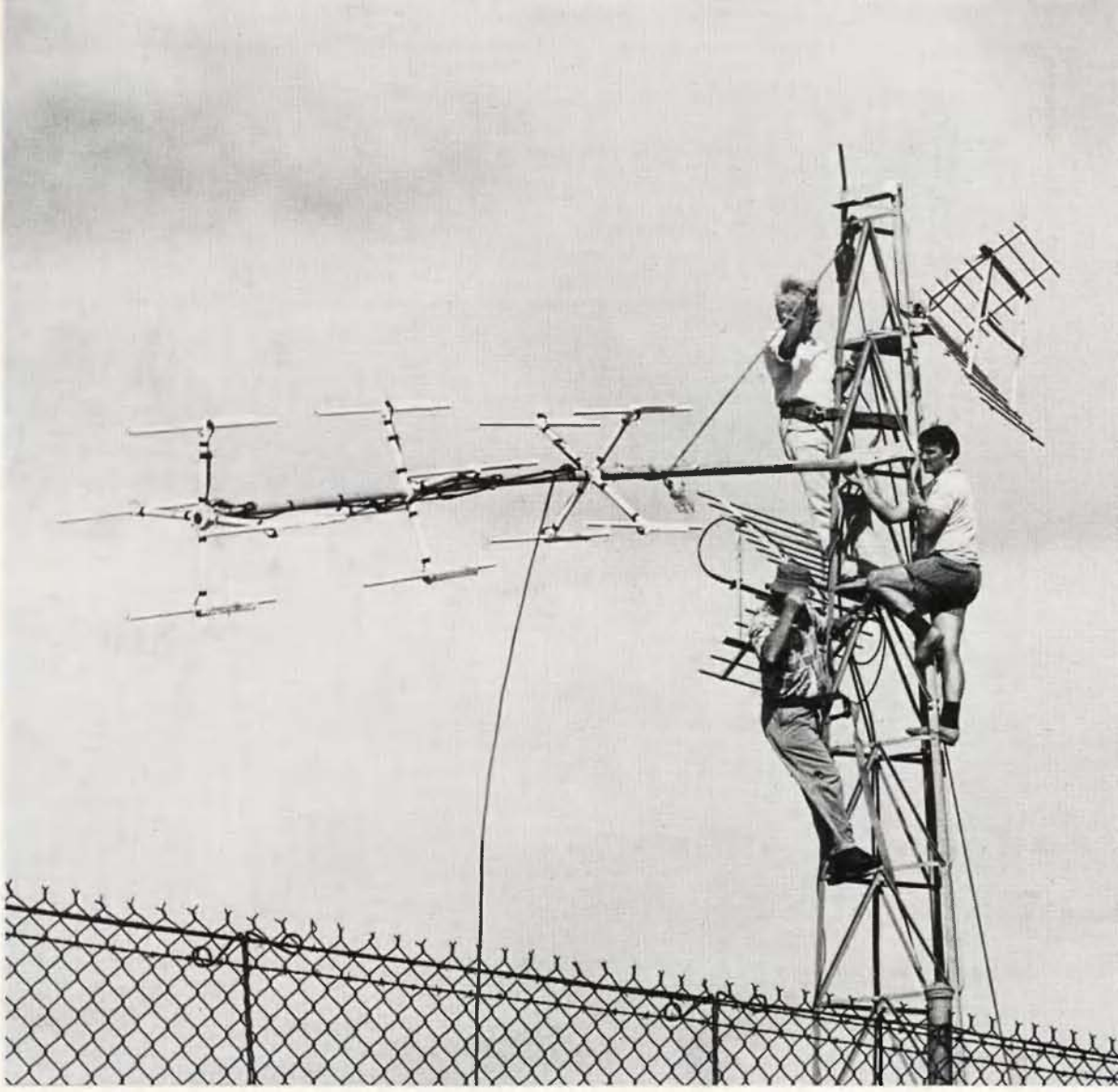
PETER SCHULZ, VK2ZXL

amateur radio



VOL. 45, No. 5 MAY 1977

CONTENTS

COVER PHOTO

Eddie Penikis VK1VP, John Tilley VK1FT and Norm Smith (top to bottom) raise the antenna for the Mt. Ginini Ch. 7 Repeater VK1RGI. The antenna is 3 bays of 4 gamma matched dipoles fed in quadrature and has an omnidirectional gain of 8 dB. See Story on page 15.

Photo by Martin Hood VK1ZME

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

HAM RADIO SUPPLIERS

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Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

MODEL OL64 D/P MULTIMETER. Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB. Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available, Model C $6.90.

$29.90 Postage $2.20

MODEL CT-500/P MULTIMETER

Of intermediate size, this popular multimeter combines high accuracy with versatility over 24 ranges. Mirror Scale. Diode protected movement.

SPECIFICATION: 20,000 ohm/volt DC; 10,000 ohm/volts AC. **DC Volts:** 2.5, 10, 50, 250, 500, 5000. **AC Volts:** 10, 50, 250, 500, 1,000. **DC Amps:** 0.05 mA, 5 mA, 50 mA, 500 mA. **Ohms:** 12k ohm, 120k ohm, 1.2m ohm, 12m ohm. **Centre Scale:** 60 ohm, 600 ohm, 6k ohm, 60k ohm. **Decibel:** —20 to +62 dB. **Dimension:** 5½ x 3-5/8 x 1¾ inches. Carrying case available, Model B — $5.90.

Price: $24.90 — Postage $2.20.

MODEL AS100 D/P MULTIMETER

This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.

SPECIFICATION: 1000,000 ohm/volt DC. 10,0000 ohm/volt AC. **DC Volts:** 0.3, 3, 12, 60, 120, 300, 600, 1,200. **AC Volts:** 6, 30, 120, 300, 600, 1,200. **DC Amps:** 12 uA, 6 mA, 60 mA, 300 mA, 12A. **Ohms:** 2k, 200k, 2m, 20m, 200m ohm. **Centre Scale:** 20 ohm, 2,000 ohm, 20,000 ohm, 200,000 ohm, 20m ohm. **Decibel** —20 to +57 db. **Dimensions:** 7-3/5 x 5-2/5 x 2-3/5 ins.

Carrying case for model I — $7.90.

Price: $52.50 — Postage $2.20.

KARPACK VOLTAGE ADAPTOR

Operates from car cigarette lighter socket. 12V negative earth cars only. Output 6V, 7.5V and 9V (switched) to 300 mA max.

$6.90 — Post $1.

200-H.

90° quadrant meter. Pocket size.

AC/V: 10V, 50V, 100V, 500V, 1000V (10,000 ohm/V).
DC/V: 5V, 25V, 50V, 250V, 500V, 2500V (20,000 ohm/V).
DC/A: 50uA, 2.5mA, 250mA.
OHM: 60k ohm, 5M ohm.
Capacitance: 100pF to 0.1uF, .001uF to .1uF.
dB: —20dB to +22dB.
Audio Output: 10V, 50V, 120V, 1000V AC.
Approx. size: 4½ in. x 3¼ in. x 1⅛ in.
$16.90. Postage $1.50.

POCKET MULTIMETER SPECIAL

MODEL C1000M MULTIMETER

Compact, handy and versatile, the C1000M is the ideal low cost pocket meter. Mirror Scale. **Specifications:** 1,000 Ohm/Volt DC; 1,000 Ohm/Volt AC; DC volts 10; 50; 250; 1,000; AC volts 10; 50; 250; 1,000; DC amps 1 mA; 100 mA; Ohms 150 KΩ; Centre scale 3 KΩ; Decibel —10 dB to 22 dB; Dimensions 3-1/2" x 2-3/8" x 1-1/8" 90 x 60 x 30 mm.

$9.75
POST $1.00

CT-500 — $24.90 — Postage $2.50

Popular, medium-size, mirror scale. Overload-protected.

AC/V: 10V, 50V, 250V, 500V, 1000V, (10,000 ohm/V).
DC/V: 2.5V, 10V, 50V, 250V, 500V, 5000V (20,000 ohm/V).
DC/A: 50 uA, 5 mA, 50 mA, 500 mA.
OHM: 12k ohm, 120 k ohm, 1.2M ohm, 12M ohm.
dB: 20 dB to +62 dB.
Approx Size: 5½" x 3 5/8" x 1P". **P&P 50c**

YAESU FRG-7

THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER

The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

$328

HIGH QUALITY 3-WAY CROSSOVER — $9.95
AND 2-WAY NETWORK — $7.90

D.D.K. CROSS OVER NETWORK:
Imp.: 8 ohm; C.O. Freq.: 800, 4500 Hz; Power Cap.: 70 watts RMS.

Red Dot: Woofer; Orange Dot: Midrange; Blue Dot: Tweeter; Green Dot: Input.

Postage $1.20

BRIDGE ROAD, RICHMOND STORE SPECIALS

SPEAKER WIRE — 100 metre Rolls

$11.90 per roll — post free.

WALKIE-TALKIES — 100 Milliwatt

7 Trans. Call Buzzer, Superhet System, 9V Battery. PMG approved, 27.240m xtal. Complete with booklet. **$52.00 Pair** — post free.

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2 STATION AND 9V BATTERY ..... **$12.90 each**
3 STATION AND 9V BATTERY ..... **$18.90 each**
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Complete with 60 ft. wire. Ideal for garage, baby room, etc. — Postage $1.50.

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240V in, 13.8 out. 1 amp continuous.
$34.00 — P&P $1.50.

SPECIAL

9" x 6" SPEAKERS

Brand new, in carton, 4 ohm impedance. Ideal for car cassettes, radios, etc.

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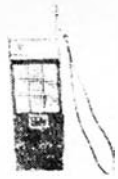
BULK BUY

MODEL NC-310 DE LUXE
1 WATT 3 CHANNEL
C.B. TRANSCEIVER

- **WITH CALL SYSTEM**
- **EXTERNAL AERIAL CONNECTION**



SPECIFICATIONS, NC-310

Transistors: 13.
Channel Number: 3, 27.24 OMHz Citz. Band.
Transmitter Frequency Tolerance: ± 0.005%.
RF Input Power: 1 Watt.
Tone Call Frequency: 2000 Hz.
Receiver type: Superheterodyne.
Receiver Sensitivity: 0.7 uV at 10 dB S/N.
Selectivity: 45 dB at ± 10 kHz.
IF Frequency: 455 kHz.
Audio Output: 500 mW to External Speaker Jack.
Power Supply: 8 UM-3 (penlite battery).
Current Drain: Transmitter: 120-220 mA.
Receiver: 20-130 mA.

Price: $105.90 pair; $55.50 ea. Postage $3.00.

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amateur radio

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QSP THE 1977 FEDERAL CONVENTION

By the time this appears in print the 1977 Federal Convention will be past history.

Whatever comes out of it however is not history. It will be the policy of the Institute as a whole. In exactly the same way that the policy of the Institute derives from all the past Federal Conventions.

The Federal Council, made up of the seven State Councillors with advice and assistance from the Executive, meets each year at what is called the Federal Convention. This is where the guidelines of the Institute originate. There is also provision for postal motions.

The discussions which are carried on in the Federal Convention are centred on current amateur radio affairs. These come forward to the Convention, through the seven Divisions, as Agenda Items. The Chairman of the Federal Convention can permit debate on other matters under what used to be called "general business" items. No advance notice is required for general business items and it stands to reason therefore that debate on these can be stopped if the Federal Council thinks more time is needed for research and general discussion in Divisional councils.

This is how the WIA as a whole makes up its collective mind. Whatever is decided by the Federal Council is going to affect every member in one way or another.

Did you, as a member, help your Division by suggesting anything constructive for discussion at the Federal Convention? If you, as a member, have an interest in any specific matter, do you ask your Divisional Federal Councillor to tell you what is the latest policy or position? Do you, as a member read the report in AR each year about that year's Federal Convention?

Unless you do you could become a mine of misinformation about the WIA.

D. WARDLAW VK3ADW,
Federal President. ■

QSP

THEFT OF EQUIPMENT

From Bathurst Technical College, stolen between 1st and 4th of February, Pye model PF2VH on 458.05 MHz, serials 1231 and 1242, black in vinyl casing. Any information to Box 145, Bathurst, 2795, please.

RECIPROCAL LICENSING PROBLEMS

"One German amateur went in September 1976 for the first time to Yugoslavia with the appropriate reciprocal licence. The licence was received before his departure and allowed mobile operation.

"Customs formalities both in and out of Yugoslavia caused no problems. The serial number of the mobile rig built into the car was entered in his passport and cancelled again when he left.

"Another German amateur who did **not** have a Yugoslav licence travelled through Switzerland and Austria into Yugoslavia. He had his two metre rig packed in his trunk and duly declared it to the Yugoslav Customs on entry. Several days later his rig was confiscated in his hotel room. Also, his car was temporarily confiscated and he had to pay a fine of the equivalent of DM 150.

"There appears to be little hope of his getting his rig back."

(Thanks to DARC for permission to publish.) (Copied from "Mobile News", January/February 1977.)

AOCP AND NAOCP STUDY PACKAGES

Course materials are available to teachers of Amateur Radio from many sources. The ARRL is producing a great deal of very good Novice course information including teaching notes, student study guides and morse cassettes.

Roger Davis VK4AAR is producing a complete series of course notes from virtually YR8 level up to AOCP. Morse cassettes are also available from this source.

Elizabeth Amateur Radio Club in VK5 has produced a home study guide which lists subjects and appropriate textbook chapters to study.

Your NAOCP or AOCP multi-choice questions are invited. They'll all be forwarded to the P. & T. Dept. Let's contribute questions of the standard we would like the exams to contain! Thanks to Rex Black VK2YA who has recently forwarded some questions.

VK3ZR.

"INK EMMA INK . . - - - .?"

Ex-Australian Special Wireless Group Operators (WW2) — If you would advise Steven Mason at 30 Jacqueline Road, Mount Waverley 3149, Vic., of your call signs and frequencies, we might be able to arrange a re-union on the air.

SPACE IDEAS

"Starting in 1979 and following about every half-year thereafter, a space shuttle will take a cylindrical structure to an altitude of 556 km. Experimental packages will remain on board under austere conditions for six to nine months. Then another shuttle will retrieve it, return to earth and NASA will return the packages back to their owners. About 14 ft by 30 ft, the open aluminium cylinder can accommodate more than 70 experiments. The orbital environment, however, provides weightlessness, high vacuum, radiation and particle fluxes." This is a brief description of NASA satellite series LDEF (Long Duration Exposure Facility) apeparing in QST January 1977.

WIANEWS

For the record, members will have seen the WAINEWS SPECIAL insert into April AR quoting in full a Central Office letter explaining a number of changes relating to Novice licensing and operations, noting preliminary investigations into the probable grant of a site in Canberra for a national headquarters and a brief reference to an amateur radio brief for WARC 79.

WARC 79

The Executive produced a draft of amateur radio background information which has since been circulated to Divisions. This document sets out to explain the amateur service as fully but as briefly as possible, its value internationally and locally, the great range of activities by amateurs, a very short historical precis, some reference to amateur radio's value in emergencies, the traning of newcomers, references to interferences of various kinds, a short appreciation of the amateur satellite service and of course details of the frequency bands now allocated and required in the future.

Unlike the preparations for the last WARC in 1959 the IARU is now much better organised and, recognising that amateur radio is a global activity, has prepared material in a "model brief" form for use by IARU member societies. This document was drawn upon by the APG Committee 2.

A circular produced by the WIA Queensland Division quotes extensively from the Netherlands Amateur Radio Society's journal "Electron" and brings out very clearly the amount of support needed by national societies for WARC 79. Members are supporting amateur radio, including IARU, by being WIA members, but what about the non-members, it asks. One thing is certain. Amateur radio will not lose by default judging by the efforts of the WIA, the IARU and all the IARU member societies. All of this is expensive but essential to the survival of amateur radio to the year 2000 and beyond.

1977 CALL BOOK

The new ten year contract for printing a Call Book was still under discussion with Central Office during March, but was finally clarified in April.

After discussion the Executive agreed that arrangements for publication should begin.

Given a fair wind there is some hope that the 1977 Call Book should come out by July or August.

1977 CONVENTION ITEMS

Agenda Items for the 1977 Federal Convention began to arrive from Divisions a week or two before the deadline of 23rd March.

Here is a brief resume of the items.

From VK2 —

Establish a 10m beacon band plan, review and, if necessary, amend the WIA 70cm band plan, review the 2m FM segment, including more repeater and simplex channels, set up a Novice licensing policy, examine the need for RTTY standards, discuss "CB", publish monthly callsign changes in AR, publish a WIA Year Book, review YRS/YRCS, morse for limited and novice licensees on VHF upwards, review Divisional broadcast timings, review the Federal repeater sub-committee's terms of reference, lower cost amateur licences for longer validity than one year, consider a VHF mileage factor for RD Contests.

From VK3 —

Establish standards for ASCII, ask for a novice segment 29.0 to 29.5 MHz or equivalent on 10m, ask that Novice licensees should be allowed to use VFOs, ask for 51 to 52 MHz or 50 to 52 MHz, morse for limited and Novice licensees on VHF upwards and CW by limited licensees from 420 MHz up.

From VK4 —

Print callsigns or SWL numbers on AR address labels, charge interest on overdue Divisional accounts with Executive.

From VK7 —

Review RD Contest awards and Rule 11.

Too late for Agenda Items are some general business items for which advance notice is given. VK2 want an extension to the 576 MHz band and to seek permission for in-band 70cm ATV repeaters. The Executive want to get frequency details of Australian stations licensed to operate in shared amateur bands.

QSP — continued

PUBLIC RELATIONS

"With the vast amount of publicity currently given to CB radio, there's a lot of confusion in the minds of the public as to just what Amateur Radio is. Is it the same as CB? Is a "ham" an amateur or CBer? Stories by confused media writers have only worsened the situation. We need to take our story directly to the public — letting as many people as possible see for themselves what we do, how we do it and how they could do it too. The county fair has been a traditional place to demonstrate Amateur Radio in rural areas. Perhaps the shopping mall is the place to do it in urban areas." Article in Worldradio January 1977.

PORTABLE/MOBILE IDENT.

QST editorial December 1976 queries the latest in the series of FCC deregulations as "deregulation or dilution?". It refers to the fact that from 26th November "FCC-licensed amateurs no longer are required to give advance notice of portable operation, and when operating portable or mobile no longer have to identify as such. Also, when a permanent move is effected, the requirement to use portable identification procedure no longer exists. In other words, the use of the slant bar on CW and indication of portable or mobile operation or phone is no longer required."

INCREASED MEMBERSHIP

The editorial in QST January 1977 reflects upon the relative stagnation of amateur radio growth from about 1964 and reviews the steps taken to reverse this situation. "Then, equally suddenly," the editorial says, "there was another development. Numbers of CBers began to realize that CB was a certain amount of fun, but that it was limited in its horizons. However, we managed to get the word to many of those CBers that there was something to replace it, something whose horizons were unlimited, and that something was amateur radio . . . The League spotted these trends early in the game and recognised that much assistance could be provided. This past fall we had some 1,400 club groups giving amateur radio training to about 36,000 would-be Novices."

LARGEST FCC RAID EVER

Under the heading in 73 for January 1977 the Associate Editor reported that Federal Marshalls and FCC agents raided 19 locations in the Baltimore-Washington area early on the morning of October 27th. Confiscated was over 65 thousand dollars worth of equipment used by outlaw SSB CBers. This, he said, was the largest single FCC raid and capped a lengthy investigation by the Baltimore office in conjunction with the Laurel MD monitoring station. Amateur equipment made up the bulk of the items — half a dozen linears, Heath and Yaesu transceivers, remote VFO's VHF, HT's, beams and rotors. Incidentally, he wrote, it was not the work of amateur operators that led the FCC to the outlaws, it was pure luck plus massive interference to radio users in the area.

FULL CALL AFTER 20 YEARS FAMINE

A recent letter from Ann Goodall, XYL of John VK3ZBG, advised of John's success recently in obtaining his CW after 20 years with a limited licence.

Congratulations, John, and we look forward to hearing you on the HF bands as soon as your new call is allocated.

It would appear that Ann is also a devoted SWL, and the Goodalls have acquired an FTDX 400 for their insomnia DX.

VK MOBILE ADVENTURE

Brian VK1ZBL/VK1NAK will be operating mobile and portable through all mainland States for the remainder of 1977. The itinerary proposes Northern Australia for the winter months and Perth area around springtime. Bands operated will be 146 F3, 27 A1/A3, and 3.5 A1/A3. Brian will be attempting to maintain a scheduled appearance at 1000 hours GMT Thursdays on 3542 kHz QRP portable. The CW is still a little slow, but should improve rapidly. ■

IMPROVING POWER OUTPUT OF THE IC-22

Phil Wait VK2ZZQ
and Roger Harrison VK2ZTB

Perhaps the most popular two metre FM transceiver in Australia at present is the ICOM IC-22, one of the products of the burgeoning Japanese amateur communications manufacturing industry. Undoubtedly it enjoys this popularity owing to its price firstly, and secondly to its features. By reputation, if not largely in fact, it has perhaps the "hottest" receiver of similar transceivers intended for 2m FM mobile operation.

The RF power output of these transceivers is nominally 10W. Most units will probably produce close to this when first purchased. However, it appears from experience, that the RF power output deteriorates with use, some dropping below 6W. The reason for this is not fully understood, but suffice to say that the phenomena exists and is certainly measurable.

Now, this situation is not all that disastrous in itself as it is only in the order of 2-3 dB, but it isn't entirely welcome either as the IC-22 is intended as a mobile transceiver where every dB counts. The capture ratio of most modern FM receivers on the amateur market is around 2 dB.

Another problem arises when a 'booster amplifier' (often incorrectly referred to as a 'linear') is added, such as those kits that have become recently available as well as commercially made units. These devices produce about 35-45 W output from a nominal 10 W drive and are simply inserted in the coax between the antenna and the transceiver antenna socket.

SWITCHING

Automatic Tx/Rx switching using either diodes or carrier-sensed relays is employed. If the drive is not up to the nominally required amount, considerably less than specificed power output is obtained and the full gain of the device is often not realised. Gnashing of teeth, cursing the kit designers, tearing of hair and crys of "why doesn't anything work for me!!!"

In the course of some development work on solid-state VHF power amplifiers, the IC-22 belonging to Phil VK2ZZQ was pressed into service as a driving source. Over a period of months the power output dropped from around 9 W or so to under 6 W when the unit was running from a nominal 13V supply. A number of enquiries and measurements confirmed the effect, many units delivering only 6 W to 7 W. Accordingly, a replacement for the P.A. transistor was sought out.

The transistor settled on was the CTC B12-12. The gain of this device appeared to be more than adequate for the job and a power output of between 11 W and 15 W from a nominal 12.5V supply was expected. In addition, the device is rated to withstand infinite VSWR, at all phase angles, from a 16V supply.

However, the input and output impedances of the existing P.A. transistor in the IC-22 were not known. A little bit of the old amateur 'suck it and see' (otherwise known as eclectic empiricism — see reference 1) was obviously going to be necessary.

Some modification of the L-G matching networks was anticipated.

Accordingly, a B12-12 was installed in place of the original P.A. transistor. With due ceremony the power output was checked to ascertain what tuning up might be necessary. Power output measured at just on 12 W from a nominal 13V supply (reference 2). Adjustment of the stage input and output trimmer capacitors could not improve on this! Bandwidth is excellent, there being less than 0.5 W variation between 146 MHz and 147 MHz.

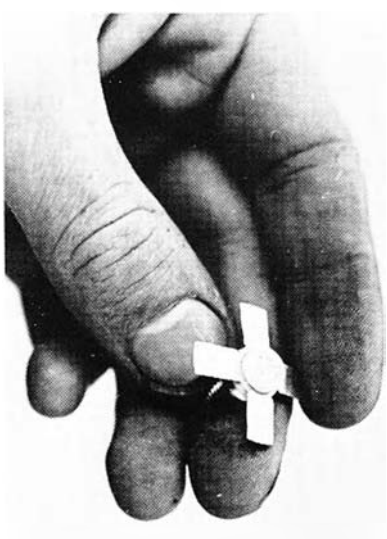


FIG. 1. THE B12-12 RF POWER TRANSISTOR

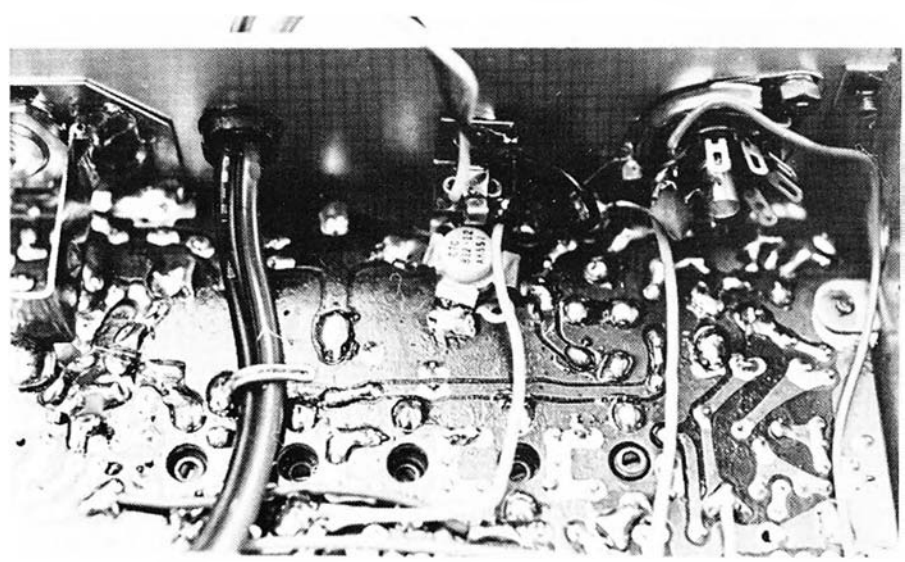


FIG. 4. THE B12-12 INSTALLED. THE COLLECTOR LEAD IS TO THE RIGHT, ADJACENT TO THE 'CTC' MARK

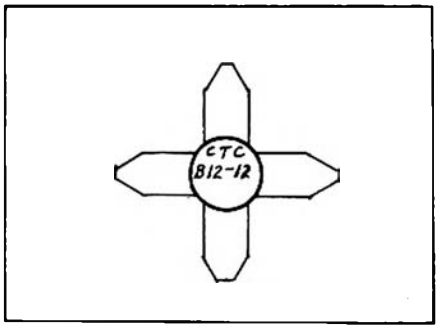


FIG. 2. CAREFULLY CHAMFER THE LEADS OF THE B12-12 IN THIS FASHION

Now for the actual conversion details. It is simplicity itself. Only the following explanation is complicated. You will need the following artisan's aids:—

(a) One pair of household scissors,
(b) One Phillips-head screwdriver,
(c) One pair of long nose pliers,
(d) One 20 W (min.) soldering iron,
(e) 115 mm of knot-free 60/40 solder with genuine resin core,
(f) One solder sucker,
(g) One hand drill (of 2.6 v 10^4 erg capacity at rest)
OR
one steam-driven electric drill with toothbrush, pencil and razor sharpener attachment.
(h) One 3/16" diameter drill bit (sharp as a tack),
(i) Thirty two minutes and 47 seconds of real time (as opposed to Greenwich mean time which is scotch anyway),
(j) One hammer (to discourage distractions),
(k) One centre punch (to rivet your attention).

Firstly, the original P.A. transistor is removed. It is located on the under side (copper side) of the printed circuit board, towards the centre-back, immediately beneath the external speaker socket. Unbolt this socket and move it out of the way to afford easier access to the P.A. transistor.

Carefully desolder each lead of the P.A. transistor. The solder sucker ensures a neat, clean job and minimises the possibility of damage to the p.c. board. The transistor is bolted onto a flange that is attached to a flat aluminium heatsink bolted to the backdrop of the chassis/cabinet. Unbolt the transistor and carefully remove it. Don't discard it as it may be needed in the event of a catastrophe (like when junior decides that the B12-12 is a monster from Dr Who and promptly flushes it down the toilet).

Using the clearance hole in the p.c. board as a guide, put a punch mark (gently Bentley!) on the flange so that it is positioned centrally with respect to the hole. Drill a 3/16" diameter hole in this position, carefully deburring it. This is to take the bolt of the B12-12. Smear the flange with silicone grease to ensure good thermal contact between the transistor and the flange.

Now, carefully chamfer each lead of the B12-12 with a pair of sharp scissors or small tin snips. Scissors are best. See figure 2. Insert the B12-12 into position and judge how the leads need to be bent in order to make connection with the appropriate lands on the p.c. board. The collector lead is adjacent to the CTC mark on the header and this is oriented towards the antenna socket. The leads may need to be shortened somewhat, depending on their original length. Bend them approximately as shown in figure 3. Take care not to stress the leads or the lead-to-ceramic-header junction. Insert the B12-12 into position again and check that the leads match up with the lands on the p.c. board without shorting to the adjacent ground plane. Resist the temptation to solder it in place.

If all is well, bolt the transistor in place, taking care that no vertical stress is placed on the leads and that they remain in correct alignment. Now you can solder the leads to the p.c. board. Replace the external speaker socket last of all. A view of the completed conversion from the underside of the chassis is shown in figure 4.

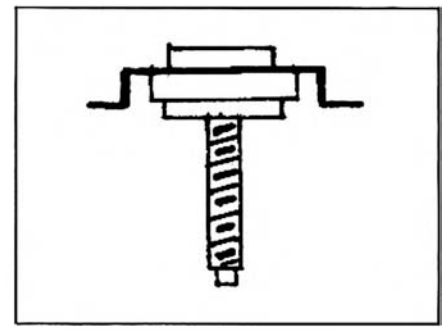


FIG. 3. BEND THE LEADS APPROXIMATELY LIKE THIS (ONLY TWO LEADS SHOWN FOR CLARITY)

Connect the antenna socket to a 50 ohm dummy load to test the converted unit. A reliable means of measuring the power output should be used. Briefly hold the transmit button down and note the power output. Some tuning may be necessary. Do not hold the transmitter on for long periods until maximum power output is achieved.

The RF output indication will now cause the meter to go full scale. This is easily adjusted. There is a diode that picks up some RF from a coil in the output network located in the shielded compartment adjacent to the antenna socket. Its location is indicated in figure 5. The diode is mounted with ½" leads. Simply bend it towards the back panel until the meter comes back on scale again when transmitting.

And that's about it. Double your deteriorated output power and drive your booster amp., neighbours, local repeater, etc. to distraction! The heatsink in the IC-22 gets hotter than it did previously, but the temperature rise is within the limitations of the transistor. Keep your overs short in any case — give the lower power stations a go!!

REFERENCES

(1) Chambers 20th Century Dictionary, pages 334 and 346.
(2) Bird 'Thru-line' wattmeter with 50 W, 50-250 MHz module and Delco 50 ohm dummy load.

Photos by Phil Wait WK2ZZQ ■

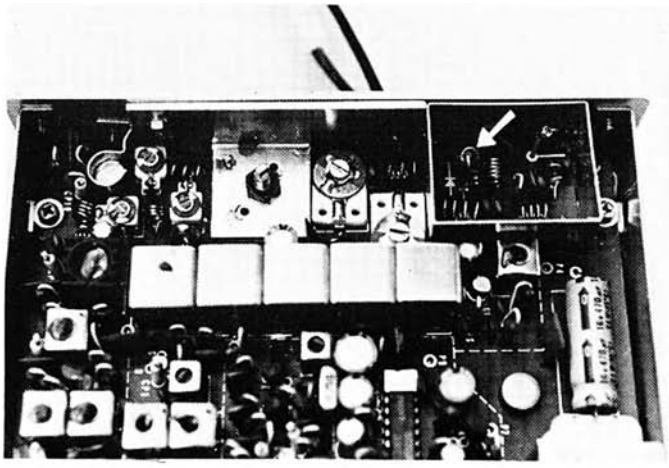


FIG. 5. TOP VIEW OF IC-22 SHOWING THE B12-12 FIXING NUT AND THE RF OUTPUT PICKUP DIODE

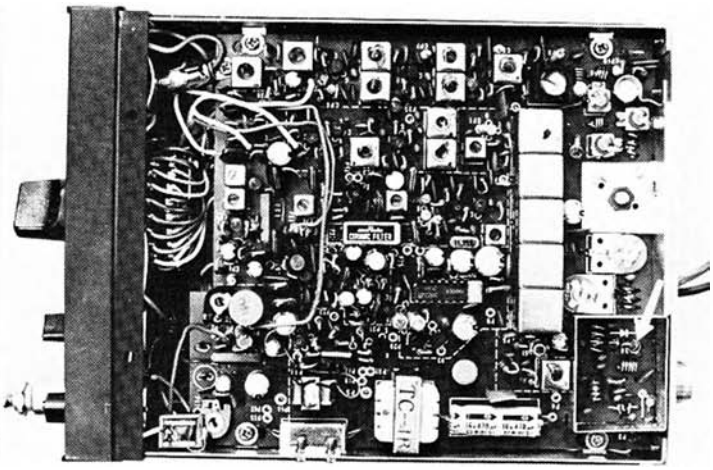


FIG. 6. TOP VIEW OF CONVERTED IC-22. LOCATION OF THE RF OUTPUT DIODE IS INDICATED BY THE ARROW

A SHORTENED FORTY METRE DIPOLE

J. R. Trevena VK3AZX
101 Wanda St., Mulgrave, 3170

This is not a new idea, but one which may be of interest because of its size and light weight. It can be used with a single mounting and also can be rotated, as it is at this QTH.

The idea of making this dipole came after the successful use of centre loaded whips for 3.5, 7.0, and 14.0 MHz whilst operating portable during caravan holidays over the past 5 or 6 years. The dipole is constructed using two of these whips mounted horizontally opposing each other and fed with coaxial cable through a 4:1 balun. The SWR is 1.2:1 or better over approximately 15 kHz.

The coils are the heart of any loaded antenna system and must have very low loss, but mechanical stability is also a factor. Several ideas were tried and this one has proved quite satisfactory.

The material is readily available from plumbers and aluminium suppliers.

The results have been compared with an inverted "V", an inverted G5RV and a loaded whip, and in all cases of VK4, VK6, P29 and ZL contacts, the loaded dipole was as good as or better than the others. One factor was noise, the three comparison antennas being 1 to 3 "S" points greater in noise level than the horizontal loaded dipole.

The total length of the dipole is 22 ft. 4 in. This may vary quite considerably if larger or smaller diameter tubing is used. The outer section is constructed so as to give a variation of 18 inches in length i.e. 3 ft. overall, which should cover all conditions of adjustment.

CONSTRUCTION DETAILS

LOADING COILS

Cut a 4½ in. length of 1⅞ in. PVC tube and cut out as shown in Fig 1 to serve as a skeleton coil former. Fig 2 shows the general arrangement of the antenna assembly.

Cut a length of 2⅜ in. PVC tube 5½ in. long for the coil casing and fit a disc each end made from a piece of ⅜ in. thick bakelite or fibre glass sheet. Remove these discs until later.

Cut a piece of 2 x 1¼ in. aluminium channel 1¾ in. long and drill and file a hole in each of the parallel sides to fit neatly over the 1 in. aluminium tube. Fit a U-bolt to hold the tube to the bracket, and fit this bracket to the fibre glass discs with 4 nuts and bolts (nuts outside). Drill and tap bracket to take solder lug for coil termination, duplicate this bracket for the ⅝ in. tube at the other end of coil and fit one end disc to the coil casing, securing it with PVC cement and 4 screws tapped in radially.

Next close wind 15 ft. of wire for the coil on the 1⅝ in. diameter tube, release tension and slip it off tube. Drill two holes 1/16 in. diameter each end of coil former for termination of winding, ease the winding on to the former and terminate one end leaving one inch of wire protruding. Stretch winding carefully to cover coil former from end to end of open section and terminate remaining end, once again leaving one inch protruding. The wire should be fairly tight on the former. Now space the winding with a piece of thin cord evenly over the whole of the former, fix wire with PVC cement and leave to set. Match-sticks can be used to keep turns evenly spaced whilst cement is setting.

Drill holes in the discs to take the coil ends, slide the coil inside the casing and fit remaining end disc with cement and screws as before. Solder a lug to each end of coil. A check with a GDO should show self-resonance at approximately 45 MHz. Duplicate for other coil and seal all holes with PVC cement.

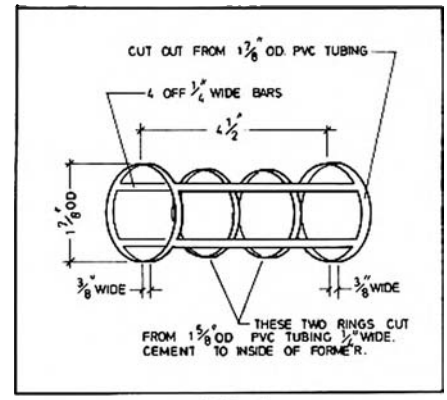


FIG. 1

ELEMENT CONSTRUCTION

The telescopic section is next to be constructed.

If the ½ in., ⅜ in. and ¼ in. sections do not fit snugly into their mating sections, expand one end of each a little with a tapered tool to give a fairly tight sliding fit.

The lengths required for each section are (in inches):

Diameter	Length
1	36
⅝	36
½	24
⅜	21
¼	30

Overlap the 24 in. and 21 in. sections 3 in. into their mates and fit 3 self-tapping screws around tube at each end of overlap. Leave the ¼ in. outside section free until final adjustment, then fix likewise. Attach 1 in. and ⅝ in. sections to the coil and tighten U-bolts. Duplicate for other sections of dipole.

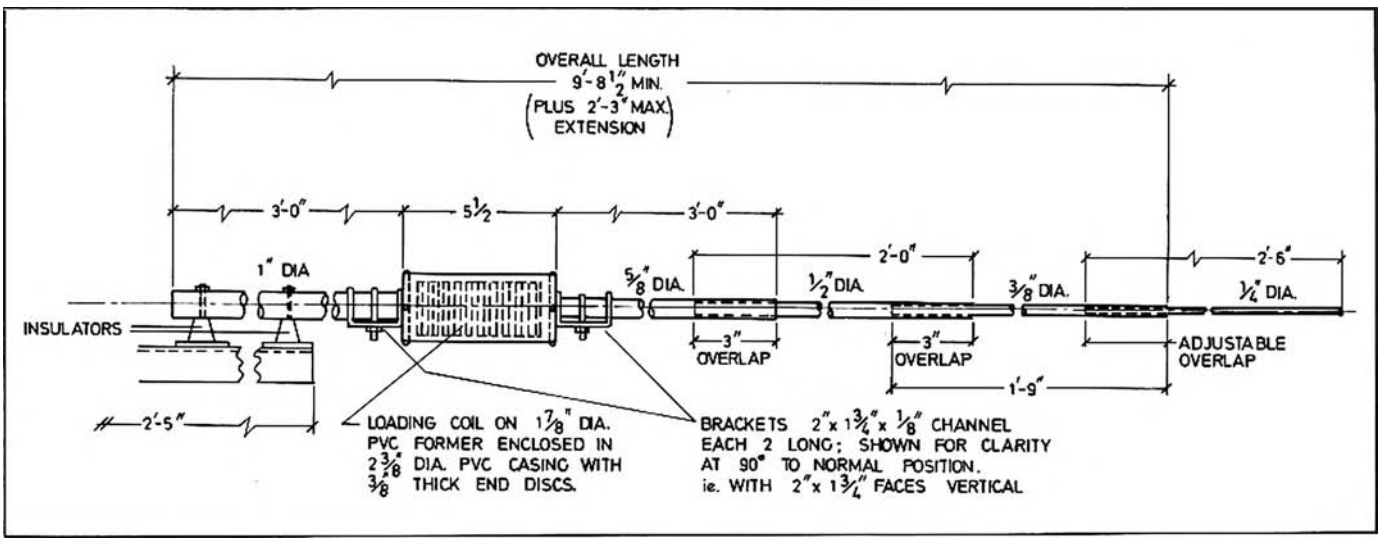


FIG. 2: Arrangement of each Half of Loaded 7 MHz Dipole.

TESTING

We now have two ¼ wave whips, so we can check each independently. If you have a metal roof, fix an insulator to hold one of the ¼ wave sections as a vertical and check resonance with a GDO. Adjust to about 7050 kHz, feed antenna with 50 ohm coaxial cable, check SWR and adjust for best SWR. Do the same for the other ¼ wave section at the same frequency. You will probably find a slight difference in the length of the two sections. Maintain this difference in the final configuration.

Next, mount the two half dipoles to the four stand-off insulators and attach to the remaining section of aluminium channel.

Mount the balun and connect the 4:1 ratio and reverse of normal, that is with the coaxial cable to the antenna terminals and the antenna to the coaxial terminals. This is because the antenna feed point impedance is in the order of 10-12 ohms.

Mount the antenna about five feet or so above the roof or part way up the mast and check resonance and SWR. Adjust for best SWR at 15-20 kHz higher than the frequency required, because the resonant frequency will drop slightly as the antenna is raised to the full height above ground.

Finally, fasten the ¼ in. sections of tube with self-tapping screws. Cover all telescopic joints with Araldite, tighten all screws and U-bolts and cover the screws and nuts also with Araldite.

Footnote: Suitable baluns are described in the ARRL Radio Amateur's Handbook 1971, page 350, or Electronics Australia, October 1965.

MATERIAL REQUIREMENTS

Aluminium Tubing: 1 in. OD 18 SWG 6 ft.; ⅝ in. OD 18 SWG 6 ft.; ½ in. OD 18 SWG 4 ft.; ⅜ in. OD 18 SWG 3 ft. 6 in.; ¼ in. OD 18 SWG 5 ft.

Aluminium channel 2 in. x 1¼ in. x ⅛ in. thick 3 ft.

White PVC Tubing 2⅜ in. OD ⅛ in. thick 1 ft.; 1⅞ in. OD ⅛ in. thick 1 ft.; 1⅝ in. OD ⅛ in. thick 0 ft. 6 in.

Insulators Stand-off 1 in, 4 off.

Bolts "U" 1 in. x 1½ in. long cad plated 2 off; ⅝ in. x 1½ in. long cad plated 2 off.

Fibre glass sheet 4¼ in. square x ⅜ in. thick.

Enamelled wire 16 SWG 30 feet (15 ft. each coil).

Bolts, nuts, fibre washers, PVC cement and Araldite. ■

TRY THIS

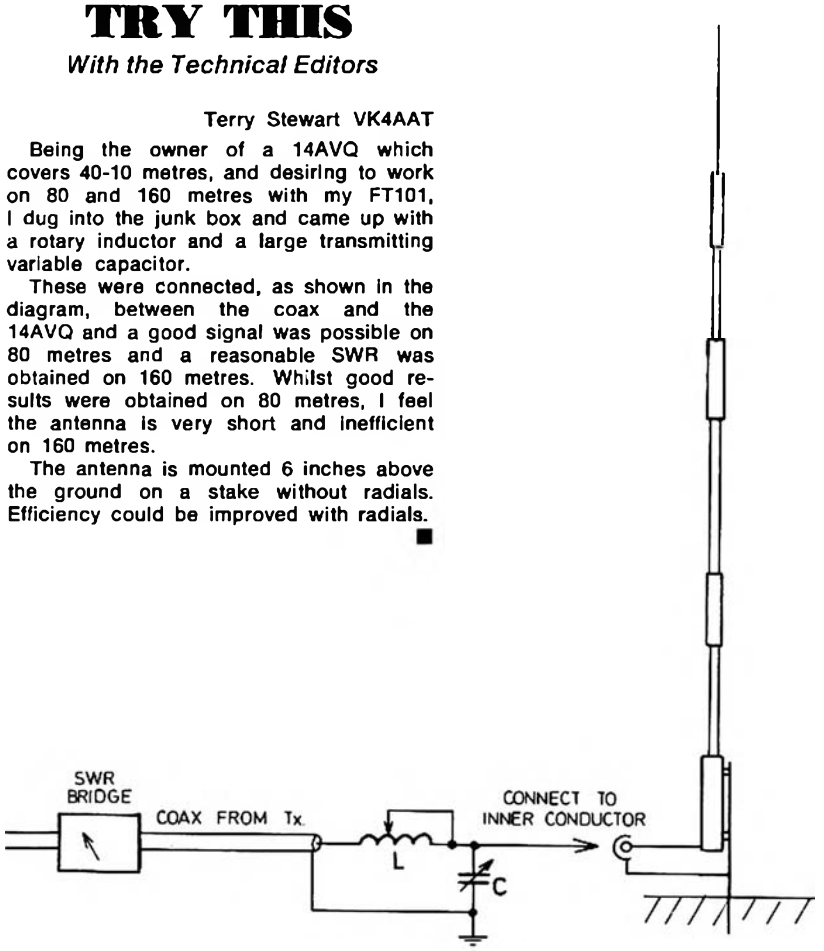
With the Technical Editors

Terry Stewart VK4AAT

Being the owner of a 14AVQ which covers 40-10 metres, and desiring to work on 80 and 160 metres with my FT101, I dug into the junk box and came up with a rotary inductor and a large transmitting variable capacitor.

These were connected, as shown in the diagram, between the coax and the 14AVQ and a good signal was possible on 80 metres and a reasonable SWR was obtained on 160 metres. Whilst good results were obtained on 80 metres, I feel the antenna is very short and inefficient on 160 metres.

The antenna is mounted 6 inches above the ground on a stake without radials. Efficiency could be improved with radials. ■



RADIO TELETYPE

Jostein Gjerde, LA7MC

PART 5 AN RTTY CONVERTER WITH ACTIVE FILTERS

This month's article has been adapted from an original article by DJ6HP by LA7MC. This article was of such length that it has been necessary to split it into two portions. The active filter is an alternative to the LC filters for which appropriate inductors are often hard to locate. The DJ6HP system must be the RTTY converter to beat all RTTY converters. Read on and find out why.

Most RTTY amateurs use their SSB station for transmission and reception. The signal they use for the printer is taken from the receiver's low-frequency output. The low frequency converter which is coupled after controls the receiver magnet in the teleprinter. On the other hand the AFSK signal is carried to the transmitter microphone input and radiates as an ordinary SSB signal.

The RTTY converter described here has, compared against the previously described constructions (including ST5 and ST6), the following advantages:—

(a) continuous shift adjustment by means of a potentiometer,

(b) by using active filters you can do away with the inductances which till now have been used for this,

(c) the Q quality for the active selection circuits is proportional to the frequency, thus the bandwidth in Hertz remains constant,

(d) the active filters operate by simple means so that the converter becomes flexible and can be adjusted to different operating requirements,

(c) setting up is very non-critical and adjustment takes less than 5 minutes.

The RTTY converters work almost always on the same principle. The low frequency signal from the receiver is passed on to the limiter V1 (Fig. 1) which is no more than a stage with a very high voltage amplification. Also, many small low-frequency voltages pass through the amplifier completely, so that at the output of V1 the whole low frequency spectrum from the receiver is present at the same amplitude. The voltage peaks are cut off, as the amplifier is always supplied with sufficient input to give positive and negative limiting (saturation and cut off).

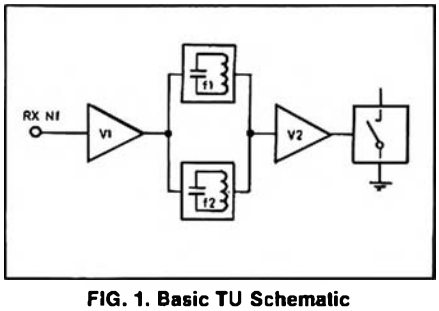


FIG. 1. Basic TU Schematic

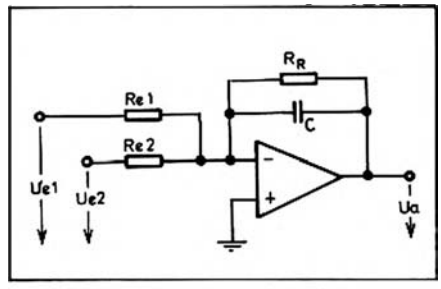


FIG. 2. Basic Active Filter

The limiter serves also to bring all low frequency signals from the receiver up to a constant amplitude value. The amplification factor of V1 fulfills this necessary function.

It is often maintained that the limiter suppresses the AM components. This happens unfortunately only in HF and medium frequency limiter stages where the amplitude, which varies mutually with the modulation, is cut off. Low frequency limiters thus amplify useful signals and noise signals.

After the limiter follows the choice of the two low frequency tones F1 and F2 which correspond to mark and space. These tones are for 850 Hz shift for example 1050 and 1900 Hz or 2125 and 2975 Hz. For 170 Hz shift one can use for example 1050 and 1220 Hz or 2125 and 2295 Hz.

In the two selection circuits the two low frequency tones for mark and space are filtered out of the frequency band containing signals with similar amplitude as a result of the limiter's action. When the maximum speed from RTTY is no higher than 50 baud, there is a 3 dB bandwidth of 50 Hz. Besides the selectivity effect, this also brings a low pass filter effect where higher keying frequencies are damped by the narrow band selectivity in the filter.

If you rectify the amplified and filtered low frequency signal for the frequencies F1 and F2 you will not get a square pulse as the frequency relationship is limited by the 3 dB bandwidth at 50 Hz. (This is due to the rise time of the narrow filter, that is the time taken for a signal to build up to a steady value, being significant compared to 22 mS.—Ed.)

For this reason there follows a type of filter which produces square pulses from the input signal. These square signals are used to operate a keying transistor which then keys the receiver magnet in the teleprinter.

DESIGN OF THE CONVERTER

With limiter amplifiers today it is usual to use an operational amplifier with high amplification. Amplification can be about 90-100 dB, that is 100,000 times. For this purpose type 709 IC amplifiers will be useful and this type is produced by most firms who make integrated circuits.

If you go from an average amplification of 50,000, 0.5 mV at the input will be sufficient to operate the operational amplifier to the positive and negative print levels, if you assume a supply voltage of ± 15V. In this way you have with type 709 an ideal limiting amplifier as with its effective clipping all signals from the receiver's low frequency output will be brought to the same level.

In published literature on the subject it is always recommended to have a band pass filter before the limiter. This filter is so made that the two tones for mark and space lie within the limit frequencies of the filter. This filter is most often constructed of LC and gives 40 dB suppression to the undesired signals provided that the filter is produced in good amateur fashion.

The task of the filter is to damp the spurious signals with higher amplitude than the useful signal, such that they become weaker than the useful signal. If the amplitude of the spurious signals is greater at the input of the limiter, the useful signal will appear as a voltage superimposed on the noise signal and will be cut off by the limiter. If such a noise signal falls within the pass band of the coupled filter, printing errors cannot be avoided. The best result occurs when the input filter only lets the useful signals pass. But if the noise signal falls within the frequency of one of the two channels, typing errors can only be prevented by a logic circuit, provided the other channel is noise free. For amateur use such a logic circuit could be too expensive.

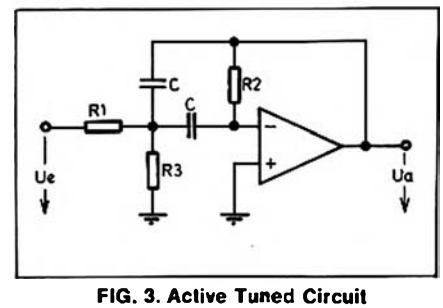


FIG. 3. Active Tuned Circuit

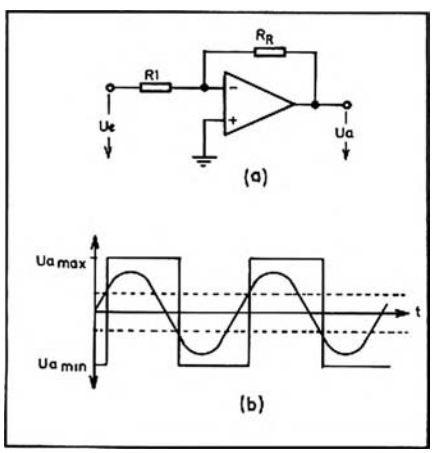


FIG. 4 — (a) Simple Inverting Schmitt Trigger
(b) Schmitt Trigger Waveform

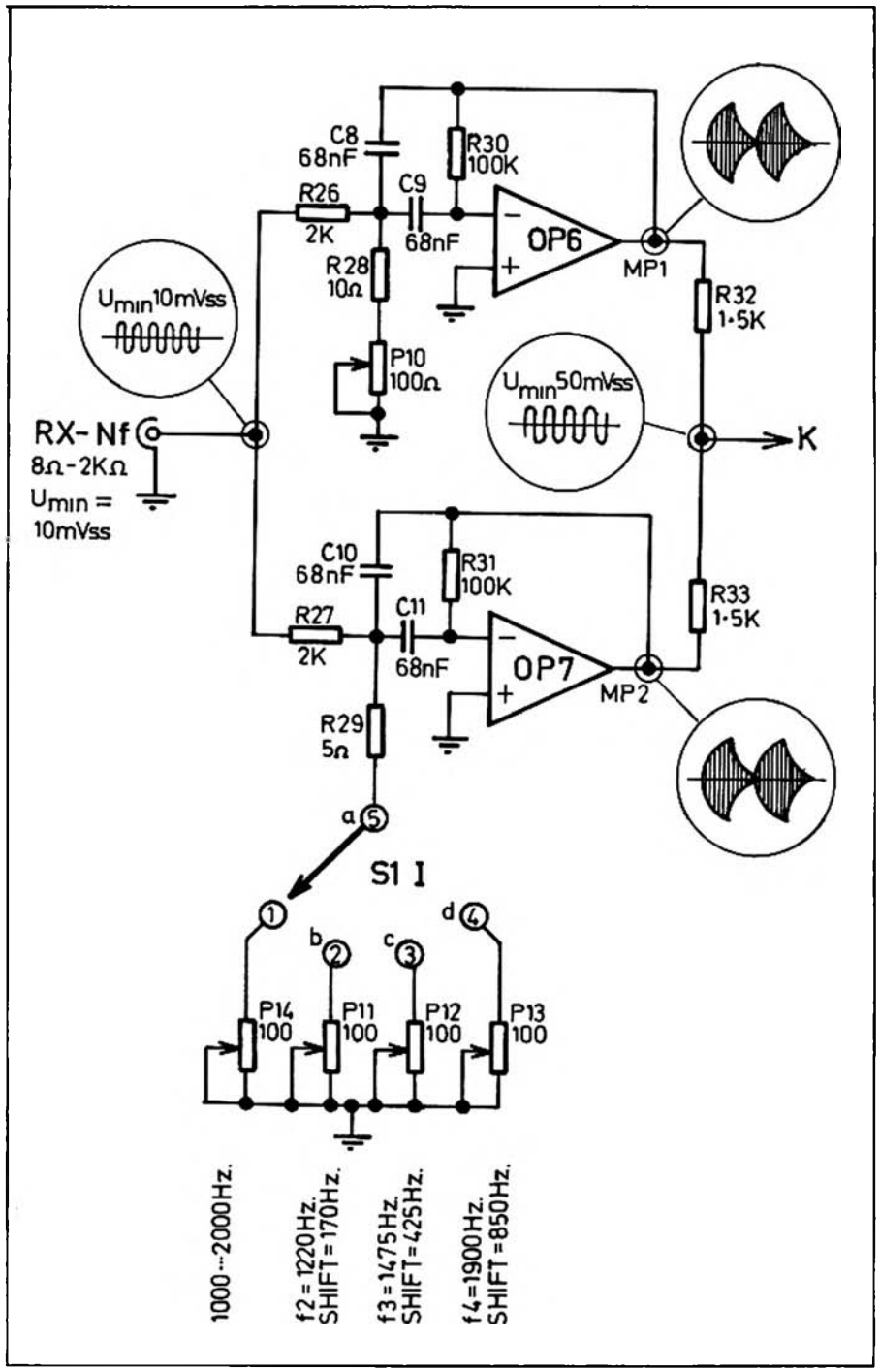


FIG. 5. Tuneable Mark-Space Filter

The necessary selection circuit in the "heart" of the converter for filtering mark and space frequencies is always more easily built with LC resonant circuits. Every RTTY amateur who has built a converter or tried to improve a commercial type has found that the inductance is some unpleasant, unknown size. On one hand, the winding of the coil can be a tiresome process, on the other hand you have almost no control of the Q value such that you are required to test it out.

If you wish in addition to be able to receive different shifts, the work and cost of the coils increases proportionately, if you wish to avoid the bandwidth attenuation attained by parallel coupling of different capacitors in the wiring circuits. No one previously thought of using continuous shift variation, since to vary capacitors in the order of 0.1 uF and coils in the order of 100 mH was difficult to achieve.

With modern electronics it is possible to avoid these difficulties, through the use of operational amplifiers increasing the resonance characteristics of the RC circuit, such that you can attain characteristics similar to an LC circuit. Fig. 2 shows a low pass filter whose output is the sum of two input signals. Fig. 3 shows how you can connect an operational am-

plifier so that it functions as a parallel resonant would. The mathematical background you can find in a handbook and you will be surprised at how exactly you can determine the Q value, amplification and resonant frequency beforehand.

Resonant frequency . . .

$$f_o = (1/(2 \times \pi \times C)) \sqrt{\frac{1}{R_2} \times \left(\frac{1}{R_1} + \frac{1}{R_3} \right)} \quad \ldots\ldots (1)$$

Voltage gain at f_o,

$$Vf = \frac{R_2}{2R_1} \quad \ldots\ldots (2)$$

Circuit Q . . .

$$Q = f/(\text{Bandwidth}) \quad \ldots\ldots (3)$$

$$= \tfrac{1}{2} \; R_2 \times \frac{1}{R_1} + \frac{1}{R_3} \quad \ldots\ldots (4)$$

$$= R_2 \times C \times f_o \times \pi \quad \ldots\ldots (5)$$

The formulae indicate to experienced readers that the resonant circuit in Fig. 3 is almost ideal for RTTY and CW purposes.

If you consider the active filter for the frequency range 500 Hz to 2.5 kHz and find realistic values for the passive building elements through repeated calculations you will not choose R2 greater than 500k ohm, assuming you are using an operational amplifier type 709. The Q value (for 50 Hz bandwidth) in the range 100 to 200 Hz is between 20 and 40. The capacitors will then have values between 20 and 100 nF. If you have enough input voltage from the limiter (about 25 volts peak to peak) you can set the amplification to 1 or even less such that R1 is of the same order of magnitude as R2. For the chosen frequency range and the Q value as desired R3 will adopt a value between 10 and 70 homs.

You can simplify the formula for resonant frequency as the factor . . .

$$\left(\frac{1}{R1} + \frac{1}{R3} \right)$$

is mainly decided by R3 as R1 is much greater than R3.

Equation 1 becomes . . .

$$fo = \frac{1}{2\pi C} \sqrt{\frac{1}{R2} + \frac{1}{R3}} \quad \ldots\ldots (6)$$

This means that you can vary the resonant frequency of the filter continuously by varying R3. The output voltage amplitude thus remains constant because R3 does not appear in the formula for amplification. On the other hand, the Q value has a linear increase with increasing resonant frequency, (fo), such that the bandwidth remains constant during frequency alteration. This corresponds with our requirements for the circuit.

The signal out from the selection circuit in Fig. 6 is rectified, on one side the positive halfwave and on the other side the negative halfwave is cut out, but more about this in the next issue. ■

(To be continued)

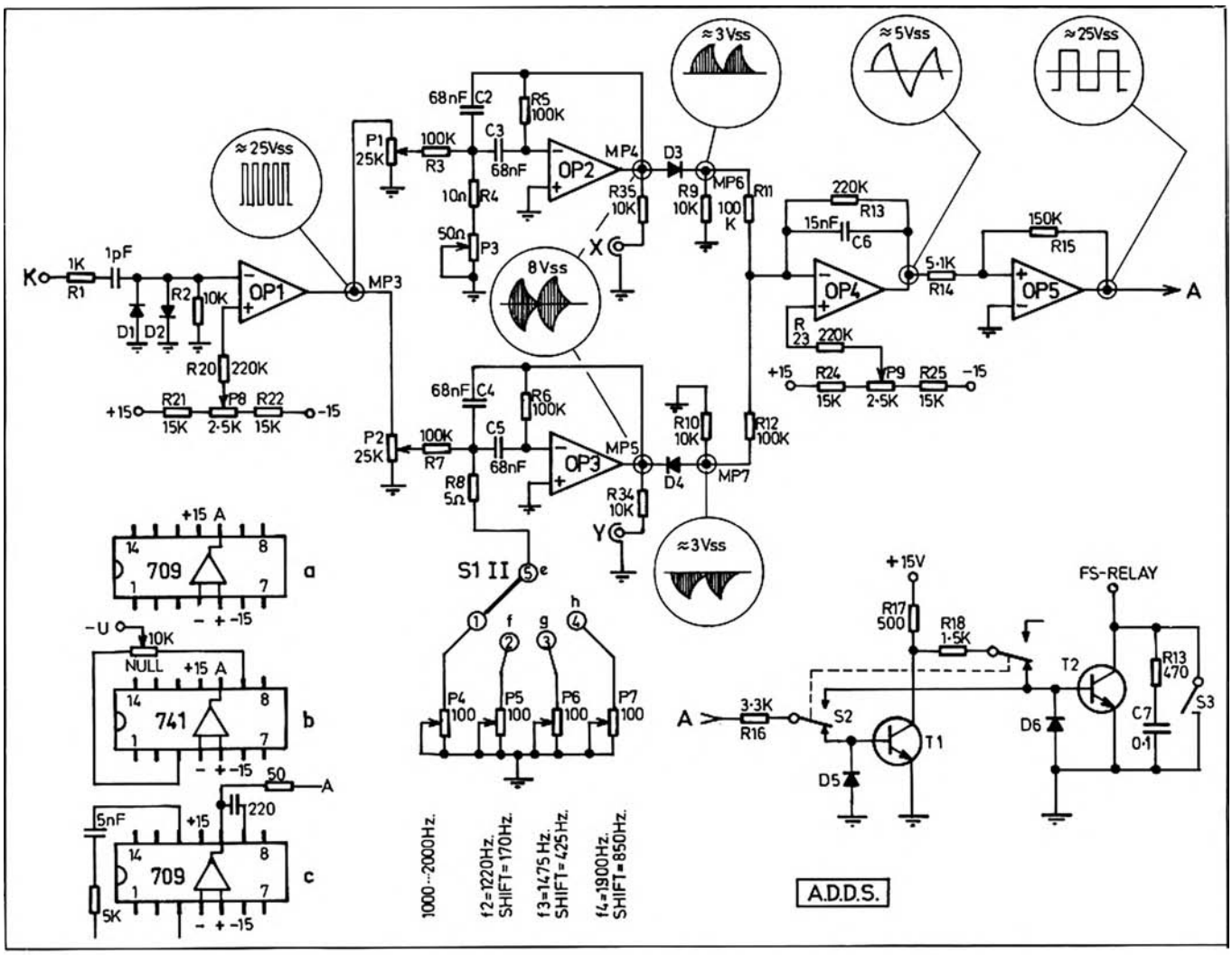


FIG. 6. TU Circuit

THE MT. GINIINI REPEATER

Martin Hood VK1ZME
12 Womba Pl., Giralong, 2617

On Saturday, 12th February, an enthusiastic team of workers scaled the tortuous road from Canberra to Mt. Ginini to install the long awaited Channel 7 repeater. There was no shortage of willing hands as VK1WI portable was also occupying the Mt. Ginini site for the John Moyle Memorial Field Day. As well as a good collection of VK1's, Chris VK2ZDD, Jamie VK2YCJ, Arthur and Dave VK2BDT ventured from VK2 to assist.

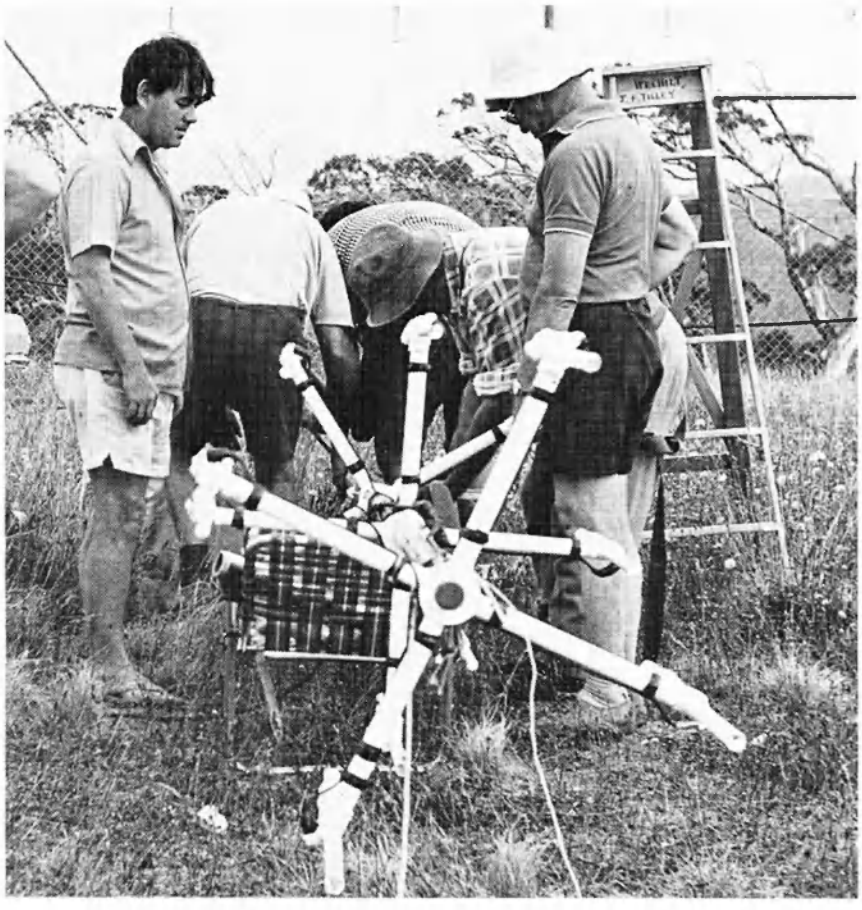
The installation was the culmination of two years of hard work by Peter VK1DS, who has mothered the project since the completion of the Mt. Majura Channel 6 repeater at Easter in 1975.

That the repeater was installed in its final location and was operating within one day is testimony to the careful design and rigorous testing undertaken before the installation proceeded. Mt. Ginini is a most unpleasant one and a half hours drive from Canberra and under snow for four months of the year, thus the reliability required of the repeater needed to be of the highest order. Mt. Ginini is also an excellent VHF location and while not the highest peak in the vicinity, is the tallest with road access and readily available power.

The repeater has proved itself to be extremely powerful and has considerably broadened the range of stations contactable on VHF from Canberra. Stations have already been worked from as far away as Griffith, Deniliquin, Raymond Terrace, Cooma, Echuca, and Sydney as well as many others. Signals from the edge of the service area have generally exhibited a very slow fading characteristic, with a period of three or four minutes, however there is little point in running high power to access the repeater unless your receiver can more than match the repeater's extremely sensitive receiver. Experience has shown that the repeater hears slightly better than it talks.

The repeater uses custom designed circuitry with careful attention to those characteristics peculiar to repeater service, in particular, a receiver which is free from spurious responses, has a high overload margin, good sensitivity and low noise figure, and a transmitter which has very low spurious output, both in-band noise and harmonics. The transmitter and receiver are combined in an 8 cavity temperature compensated aluminium duplexer and fed to the antenna via 4 MHz bandpass filter. The antenna is 3 bays of 4 gamma matched dipoles fed in quadrature and is connected via 50 ft. of RG9 double screened coax. The control logic is TTL and CMOS and uses a PROM to store the callsign.

As with all projects of this type, many people assisted along the way to the final success of the project. Peter Smith designed and constructed the transmitter, receiver and antenna and generally carried the project when others lost interest, Martin Hood designed and built the control logic and machined most of the duplexer, John Tilley assisted with the detailed testing of the antenna, Norm Smith manufactured the antenna mounting brackets, Eric Piraner and Eddie Penikis were jointly responsible for site liaison, and a host of other people too numerous to mention helped in installation and in other ways.



Many willing hands make the final adjustments to the mounting hardware, while designer Peter Smith (left) looks on. Photo by Martin Hood VK1ZME

The ultimate success of the project lies not so much in the installation of a repeater with phenomenal service range or of great technical elegance, but more in the use to which the repeater is put.

Plans already exist for using the repeater for divisional broadcasts, and doubtless other applications will suggest themselves. Finally users are reminded that the repeater is principally for use by stations which cannot communicate directly, and that if you time out you have talked for much too long.

VK1RGI SPECIFICATIONS

Location:
Mt. Ginini, 40 km south-west of Canberra 147° 47' E, 35° 38' S.

Callsign:
VK1RGI.

Frequency:
146.35 MHz input, 146.95 MHz output (Channel 7).

Receiver:
Input noise figure: 2.0 dB.
Mute threshold: 0.05 uV (approx.).
Sensitivity: 0.1 uV for 10 dB quieting; 0.25 uV for 20 dB quieting.

Transmitter:
Power output: 25 watts.
Spurious output: Less than —90 dB on 25 watts at ± 600 kHz from carrier.

Antenna:
3 bays of 4 gamma matched dipoles fed in quadrature (90° out of phase).
Beam width (horizontal): 20°-30°.
Azimuth pattern: Omnidirectional ± 1.5 dB.
Calculated gain: 7-9 dB over single dipole.

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The VFO revolution goes mobile with the unique, ICOM developed LSI synthesiser with 4 digit LED readout. The IC245 offers the most for mobile on the market. The easy to use tuning knob moves accurately over 50 detent steps and assures excellent control as easy as steering the vehicle. With its optional adapter, the IC245 puts you into all mode operation on 12v dc power with a compact dash-mounted transceiver. In FM, the synthesiser command frequency is displayed in 5KHz steps from 146–148MHz and with the sideband adapter the step rate drops to 100Hz from 144–146MHz. For maximum repeater flexibility, the transmit and receive frequencies are independently programmable on any seperation. The IC245 even comes equipped with a multiple pin Molex connector for remote control. The IC245 is a product of the revolution in VFO design, from its new style front panel, to its excellent mechanical rigidity and large scale integrated circuitary. Your IC245 comes complete with mounting bracket, mic, English manual and VICOM 90 day warranty. Price $479. Optional ssb adapter $139.

SPECIFICATIONS

GENERAL	
Frequency Coverage	**144.00 to 148.00 MHz*
Modes	*FM (F3)*
	**SSB (A3J), CW (A1)*
Supply Voltage	*DC 13.8V ±15%*
Size (mm)	*90H x 155W x 235D*
Weight (kg)	*2.7*
TRANSMITTER	
TX Output	*F3 10W*
	**A3J 10W (PEP), A1 10W*
Carrier Suppression	*40 dB or better*
Spurious Radiation	*–60 dB or less below carrier*
Maximum Frequency Deviation	*±5 KHz*
Microphone Impedance	*600 ohms*
RECEIVER:	
Sensitivity	**A3J, A1 0.5 microvolt input gives 10 dB S+N/N or better F3 0.6 microvolt or less for 20 dB quieting S+N+D/N at 1 microvolt input, 30 dB*
Squelch Threshold	*–8 dB or less (F3)*
Spurious Response	*–60 dB or better*
SYNTHESIZER:	
Frequency Range	*144 MHz to 148 MHz*
Step Size	*5 KHz for FM*
	**100 Hz or 5 KHz for SSB*
Stability	*per C in the range of –10 to +60 C. ±0.0000145% per C*

* Valid with SSB Adapter only

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The IC211 is the all mode PLL transceiver featuring twin optically coupled VFO's, VOX, cw monitor, pulse type noise blanker, ac/dc capability, built-in swr bridge and full coverage from 144–148 MHz. The rig is fully synthesised in 100Hz or 5KHz steps using the ICOM developed CMOS LSI. Semiconductors include 91 transistors, 15FET, 14 IC, 90 diodes and 1 LSI. The IC211 comes complete with mic, cables, English Manual and VICOM 90 day warranty. Price $785.

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NEW NICAD PACK
This pack has been especially designed to fit neatly into the ICOM portable transceivers in place of the dry cells. It consists of 10 nicad batteries (900mAh) together with a charger (13.8vdc input) allowing the NICADs to be charged from a car battery or a bench power supply. Complete kit and instructions $57.

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IC202 2M SSB portable transceiver	$219
IC502 6M SSB portable transceiver	$219
IC3PS matching power supply	$115

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ICOM

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Duplexer:
Eight cavity notch configuration.
Insertion loss: 1.7 dB from antenna to receiver or transmitter.
Notch bandwidth: ± 35 kHz at —100 dB.

Control Logic:
TTL and CMOS.
Time out: 3.5 minutes ± 1.5 minutes.
Identification: MCW, 800 Hz at 20 w.p.m.
Mode of initiation: A callsign will be started at the end of the transmission tail if — (a) there has been no transmission received for 30 seconds ± 20 seconds,
OR (b) no callsign has been transmitted in the previous four minutes.

Range:
This depends to a large extent on the terrain, but appears to extend to between 200-400 km for base stations, given average conditions.

Height:
Antenna: 1770m. ■

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

This month we will take a look at three rather different subjects ranging from a modification to the popular HAM II antenna rotator, a solution to the FM problem on the old SB34 SSB transceiver and a harmonic problem being encountered with the TS-520 transceiver.

THE HAM II ROTATOR

One of the big improvements that the HAM II rotator have over the older HAM M is the provision of a separate brake control which allows the application of the brake after the rotator has actually stopped. If used correctly, this feature will save a considerable amount of wear on the brake mechanism. However as users of this device will know in the heat of chasing a rear DX contact, it is very easy to get the sequence of releasing the control buttons into the wrong order. To overcome this and in fact make the release of the brake control quite non-critical, Tom Fishpool P29KE has come up with the solution. The circuit is self explanatory. While on the subject of rotators, this same feature can of course be added to the HAM M unit to give smoother stops and consequently less wear on the braking unit. I seem to remember that this has in fact been covered in one of the American magazines but at the time of writing this I have been unable to turn it up.

THE SBE34 TRANSCEIVER

Although there are quite a few SB34 transceivers in Australia, very few amateurs know just what they are, so before getting around to the modification perhaps a quick description might be in order. Manufactured in the United States by the Side Band Engineering Company during the 1964-65 period, it was perhaps the first solid state valve final transceiver ever produced. Covering 250 kHz sections of the 80, 40, 20 and 15 metre bands its compact size has only recently been improved on by the well known Atlas. One problem that crops up frequently with the 34 is an FM effect with normal sideband modulation. The trouble in the VK3OM SB34 was traced to the voltage regulation of the VFO. Extremely small variations in voltage produced quite large changes in frequency and although the VFO is fed from a regulated source, the shunt type regulator used is just not adequate for the job. Solution, fit one of the new IC type regulators, in this case an LM 340/6. As the VFO actually requires 7 volts a silicon diode was connected from the centre leg of the 340 to ground. As the 340 is a three connection device — volts in, earth and regulated voltage out, connection into circuit is simple. There is no need to remove the original regulator, just disconnect the VFO DC feed wire and take it to the LM-340. With this done the FM will disappear like magic and the overall stability will also improve particularly under mobile conditions with varying input voltage.

THE TS520 TRANSCEIVER

I have had reports that the TS520 is prone to producing high level harmonic output in the 90 to 140 MHz region. In one or two cases this has led to interference to aircraft radio operation. To check this out on my 520, I loaded up on 20 metres and ran carrier in the tune position. Under these conditions the rig is running about 25 watts output. A quick tune around on the FM tuner in the next room disclosed a strong harmonic on 98 MHz. Running full output with a linear would certainly bring this up to a high level. According to Jack VK3UO, the solution is to improve the grounding of the final tuning capacitator rotor. A couple of wipers made up with phosphor bronze or the like and secured to the final cage at the point where the shaft leaves the box will apparently break up a resonance that occurs in this circuit. If any readers have had experience with harmonic radiation from TS520's I would like to hear from them. ■

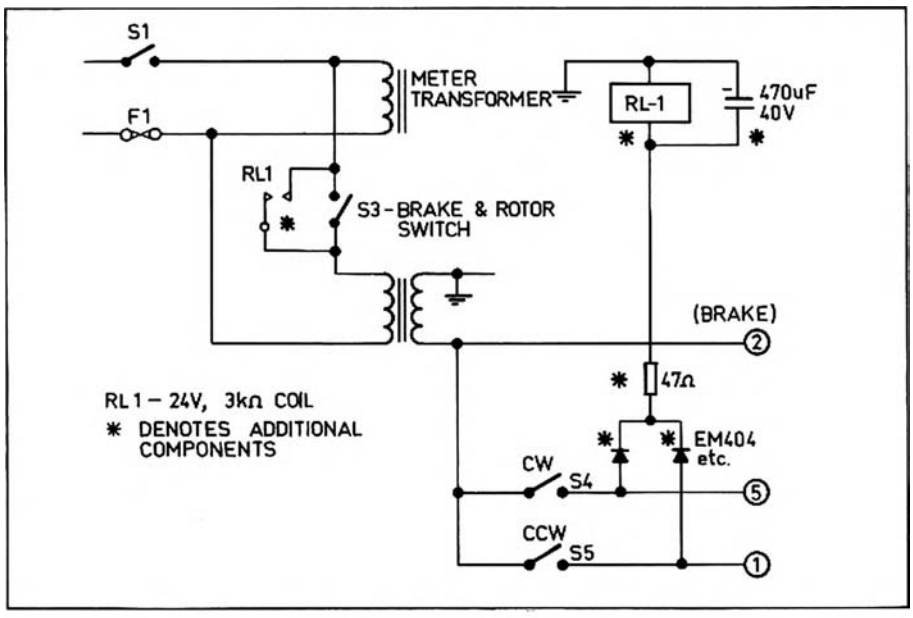

FIG. 1. HAM II Rotator Modification

Remember . . .

N.Q. CONVENTION

Details in March AR

QSP

WIA PATRON

The West Australian Division is very pleased to announce that H.E. the Governor of W.A., Air Chief Marshal Sir Wallace Kyle, has accepted the invitation to become the Vice Regal Patron of the Division.

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All above HF transceivers will be modified for low cost to suit novice. Requirements 27 MHz conv. x-tals in stock now for kenwood models.

IT IS HERE AGAIN, the well known SE-501 in new style case 15 Watt pep 23 AM SSB for as low as **$215**
Same model with AC built in supply and DC built in SWR power meter and many goodies. **$260**

ICOM
VHF TRANSCEIVERS SSB
ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz **$215**

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USED EQUIPMENT
Collins KWM-2 - A in new condition with power supply **$1,600**
PM.2
6146 – b valves RCA new Large stock **$10 each.**

FDK MULTY QUARTZ with 24 channels 10 sets of crystals supplied 10 Watts, new style. **$265**

YAESU MUSEN model FT-101-E AC - DC transceivers 10 to 160 M with speech processor P.O.A.

YAESU MUSEN model FT - 301 P.O.A.

YAESU MUSEN model FT 301 - D P.O.A.

YAESU MUSEN model FT - 301 - S P.O.A.

YAESU MUSEN model FP – 301 P.O.A.

YAESU MUSEN FR 6-7. Uses Wadley loop principal **$300**

YAESU MUSEN model YC-500 P.O.A.

FREQUENCY COUNTERS

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TIGER ARRAY 204BA 20M4el. Yagi 26' boom **$250**
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Model CDR Ham-11 for all hf beams except 40 M **$200**
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PL-259 **$1.20**
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SWR METER
Twin meter model:Y.M. - I.E. 3.5 to 145 MHz prof quality **$ 28**

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All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over $100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded.

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PETER SCHULZ, VK2ZXL

NZART JUBILEE VK/ZL/OCEANIA DX CONTEST 1976 RESULTS

With the receipt of more logs than ever before in a VK/ZL/O DX Contest, this part of NZART's Jubilee Year Celebration must be considered a real success. Even so, the lack of logs from some areas — particularly the Americas and some European countries is unfortunate. As part of our Jubilee, Participation Cards have been sent to all who submitted logs (direct if IRC sent, or via QSL Bureaux), while Jubilee Plaqués have been posted to single operator continental winners. What a pity that no awards were made in two areas!

The checking of logs, tabulation of scores, production of results, and the allocation of certificates has been a time consuming but worthwhile task. The use of almost 400 certificates indicates generous allocation of these. This is appropriate to the occasion and the fact that in some "areas", so many logs were prepared and submitted. Special NZART Jubilee Certificates will be sent to a few National Societies whose members supported the contest so well. NZART will again organise the VK/ZL/O DX Contest in 1978 while WIA (Australia) will do so in 1977.

Good DX and 73,

Jock White ZL2GX,
NZART Contest and Awards Manager.

RESULTS

PLAQUES AWARDED

	PHONE	CW
OCEANIA	AG6JFY	AG6JFY
ASIA	JA2HLX	JA2BP
EUROPE	DL8NU	UP2NK
N. AMERICA	W6HX	W9SZR/3
S. AMERICA	LU3HAK	No entries
AFRICA	9J2GJ	No entries

PHONE		CW	
Africa		**Asia**	
9J2GJ	180	EP2SV	102
S. America			
LU3HAK	170	**Oceania**	
Oceania		AG6JFY	22815
AG6JFY	40264	FK8AH	1683
KH6IJ	17310	KH6IJ	11284
VR1AA	14097	VR1AA	17172
P29RJ	1848		
Asia			
CR9AJ	152	**N. America**	
N. America		PZ1AH	198
TI2CF	2343	VE7IQ	1200
VE7DTO	60	VE3GCO	14
XE1LLS	500	XE1FL	88
XE1DU	252	W1EVT	4416
K2CW	227	W2GXD	2240
W2GXD	24	K2CW	1834
LU1BAR/W3	243	W9SZR/3	5859
W3TV	147	W3TV	1682
AC4WSF	9	AC4WSF	486
K5OOU	848	W5SOD	168
W6HX	11880	WA6KZI	5760
W6DGH	210	W6DGH	819
K3MNT/7	396	K3MNT/7	1245
WB0LLR	6272	K9DX	5220
WA2WMT/0	4966	AC0MHK	225

EUROPE — PHONE

DL8NU	6400	UK2GKW	5504*	UA1MA	2
DJ4PT	3700	UK2GAG	408*	UA1TBA	2
DL0SK	1170	UR2FQ	1130	UA1JM	check
DL1KB	948	UR2QD	567	UK1AAA	2976*
DJ0XT	231	UR2REN	352	UK1NAA	132*
DJ9ZB	196	UR2OA	200	UK1TAA	24*
DL7VB	60	UR2RJ	48	4L1RO	12*
DL8DC	check	UR2QI	27	UK1ADZ	8*
DM2AYK	3200	UR2JH	27	UK1ZAB	2*
DM5UUL	180	UA4RZ	1287	UA2EC	264
DM3WMJ	check	UW4NP	707	UC2ABT	540
DM3SIC	check	UA4PW	666	UC2AAQ	162
DM2CMF	check	UA4IU	245	UC2OBI	8
DM4YEL	check	UA4NAA	204	UC2WAS	1
EA2IA	42	UA4UAZ	48	UK2WAO	3*
F6CLM	20	UK4HBB	1495*	UP2NK	3268
G3NAS	1100	UK4WAB	1111*	UP2OU	110
HA8KCP	528	UK4FAA	18	UP2ND	30
HA6NP	54	UK4PNZ	check	UP2BBF	16
HA7KLG	100*	UB5WE	3152	UP2BF	8
I1PIN	1729	UB5MCS	2079	UP2BAO	8
OH6JW	2376	UY5OO	561	UP2BCS	check
OH1PS/2	108	UB5VAA	500	UK2BBB	4950*
OH2LU	50	UB5UAT	405	UK2BAS	3454*
OH7NW	2	UB5GBD	144	UK2PAF	1064*
LZ1QO	1296	UT5HP	84	UK2PBR	870*
LZ2RF	40	UY5ZM	68	UK2PAT	154*
OK1ATE	322	UB5ABJ	32	UK2PRC	2*
OK2BKR	150	UB5LAY	24	UQ2GW	1001
OK1AEZ	108	UY5DP	18	UQ2GDQ	605
OK1WT	84	UB5OD	1	UQ2GEC	2
OK3TAB	32	UT5OV	check	UK2GKW	1552*
OK2BIQ	28	UK5MAF	4427*	UK2GBN	150*
OK1AGN	24	UK5IAZ	1752*	UK2GBY	45*
OK1MGW/P	12	UK5WBG	1342*	UR2RDQ	576
OK2SLS	10	UK5QBE	1236*	UR2REN	572
OK2YAX	8	UK5MBP	70*	UR2REC	222
OK2KOS	870*	UK5VAA	24*	UR2QI	132
OK1KSO/P	440*	UK5IAN	2*	UR2RJ	102
OZ5KF	5728	UO5DN	590	UR2IP	32
OZ5EV	189	UO5OWS	40	UR2QD	8
OZ4PM	2	UV3CE	2844	UA4HAL	1424
OZ1ZE/P	2	UA3QCR	1793	UW4NP	1050
OZ2E	check	UA3GM	540	UA4SM	754
SP3DOI	1606	UA3AAK	376	UA4HCM	616
SP5BT	308	UA3IAT	40	UA4BP	490
SP3BQD	30	UA3DDF	40	UA4HDV	114
SP9KMQ	5	UA3TCH	28	UA4ADN	105
SP4AS	check	UA3XD	8	UA4HGG	90
YC6EX	89	UA3NG	3	UA4HEJ	85
YU2HDE	1344*	UA3TN	check	UA4YAT	68
YU2CBK	60*	UK3ACM	1672*	UA4HBP	32
SM0CCE	966	UK3XAA	1518*	UA4IU	26
SM4CAN	120	UK3AAC	910*	UA4HGF	18
SM7FDO	54	UK3AAI	882*	UA4HBW	18
SM5CMP	60	UK3DAH	774*	UA4PAV	14
SM6AWI	26	UK3SAB	504*	UA4HAN	10
SM0GMG	10	UK3ABX	76*	UA4HCR	3
SM6BBX	8	UK3TBF	20*	UK4HBB	2318*
SM7CMV	5	UA6DL	620	UK4WAB	1355*
UA1CS	2717	UA6LAX	472	UK4AAI	108*
UA1MU	408	UA6LBC	184	UK4FAA	6*
UC2ABT	350	UA6JAD	39	UO5GR	306
UP2BAR	60	UA6LBL	48	UO5OWS	60
UK2BAS	1639*	UA6JWW	3	UO5AP	check
UK2PRC	2*	UK6LDN	check	UF6BD	32
UQ2GW	408	UA6HBU	check	UA3GM	960
UQ2GDQ	184	UA6LY	check	UA3QAQ	440
UQ2HO	105	UD6CC	150	UA3EAL	360
UQ2GAB	24	UF6FCO	2	UA3DEA	210
UQ2MU	16	UK6LEZ	2790*	UA3AFL	200
UQ2GCN	8	UK6AAJ	1078*	UA3UO	198

EUROPE — CW

DL8NU	2860	DM2AYK	1819	YU3NP	126
DL0SK	1358	DM2CMF	754	YU2CBK	112
DL1KB	1330	DM3SIC	174	YU1AJQ	98
DJ0XT	385	DM2DEO	64	YU1GMN	60
DL1SV	192	DM3YBF	48	YU2HDE	36
DK5OS	80	DM2AYO	check	YU2CBE	32
DK3KD	48	DM3WMJ	check	UA1AGK	24
DK8AX	8	DM2BHC	check	UW1YY	16

* Denotes multi-operator.

EUROPE — CW (cont.)

EA4BV	30	UA1MA	2	UA3UAA	98
F9BB	100	UA1TBA	2	UV3FQ	60
F8TM	8	UA1JM	check	UA3LCL	36
GM3CFS	399	UK1AAA	2976*	UA3ZBM	32
HA5LZ	133	UK1NAA	132*	UA3AFQ	24
HA5KKN	42	UK1TAA	24*	UA3YR	16
HA6KNB	40	4L1RO	12*	UA3ET	10
HA7KLG	966*	UK1ADZ	8*	UZ3TG	10
I3GNQ	1008	UK1ZAB	2*	UA3ABD	10
LA2Q	64	UA2EC	264		
LA3UG	60	UC2ABT	540		
LZ1QO	1560	UC2AAQ	162		
LZ2RF	1020	UC2OBI	8		
LZ1WI	90	UC2WAS	1		
LZ2GS	50	UK2WAO	3*		
LZ1XZ	6	UP2NK	3268		
LZ1IF	2	UP2OU	110		
LZ1KAA	900*	UP2ND	30		
OE1TKW	8	UP2BBF	16		
OH2BAH	369	UP2BF	8		
OH7NW	288	UP2BAO	8		
OH2BCI	192	UP2BCS	check		
OH2LU	162	UK2BBB	4950*		
OH2JW	140	UK2BAS	3454*		
OH1PS/2	60	UK2PAF	1064*		
OH3XZ	30	UK2PBR	870*		
OH5PT	24	UK2PAT	154*		
OH3NJ	16	UK2PRC	2*		
OZ7BW	610	UQ2GW	1001		
OZ1VY	128	UQ2GDQ	605		
OZ2E	115	UQ2GEC	2		
OZ1W	59	UK2GKW	1552*		
OZ4PM	2	UK2GBN	150*		
OZ6XT	check	UK2GBY	45*		
ON4XG	456	UR2RDQ	576		
PI1ARS	24	UR2REN	572		
OK1TS	624	UR2REC	222		
OK2QX	420	UR2QI	132		
OK2BKR	357	UR2RJ	102		
OK3MM	336	UR2IP	32		
OK1AII	175	UR2QD	8		
OK1MIN	108	UA4HAL	1424		
OK2BHX	96	UW4NP	1050		
OK1DKR	84	UA4SM	754		
OK2SLS	56	UA4HCM	616		
OK2BBJ	51	UA4BP	490		
OK1KYS	33	UA4HDV	114		
OK1ATZ	24	UA4ADN	105		
OK2PAE	24	UA4HGG	90		
OK3RJB	16	UA4HEJ	85		
OK2PFQ	12	UA4YAT	68		
OK2SYS	8	UA4HBP	32		
OK2PAH	4	UA4IU	26		
OK1MGW	3	UA4HGF	18		
OK1AOV	2	UA4HBW	18		
OK2BPK	2	UA4PAV	14		
OK2SPS	2	UA4HAN	10		
OK1KZ	2	UA4HCR	3		
OK3TDN	2	UK4HBB	2318*		
OK2YAX	2	UK4WAB	1355*		
OK1IAR	check	UK4AAI	108*		
OK1US	check	UK4FAA	6*		
SP3DOI	570	UO5GR	306		
SP8ECV	540	UO5OWS	60		
SP6DMJ	18	UO5AP	check		
SP2ABE	check	UF6BD	32		
SM6BGG	1770	UA3GM	960		
SM5TA	448	UA3QAQ	440		
SK0EJ	133	UA3EAL	360		
SM5CMP	120	UA3DEA	210		
SM6FPG	84	UA3AFL	200		
YO6EX	744	UA3UO	198		

EUROPE — CW (cont.)

UA3IAT	6
UA3TAM	2
UA3WU	2
UA3LAR	2
UA3ECF	1
UZ3ER	check
UV3CM	check
UA3TCI	check
UA3IBH	check
UA3AEZ	check
UA3AJA	check
UK3DAH	1568*
UK3ACR	1196*
UK3XAA	819*
UK3IBA	344*
UK3SAB	304*
UK3ABX	280*
UK3QAA	182*
UK3TBF	175*
UK3DCF	152*
UK3AAC	90*
UK3EAZ	8*
UK3TAU	check*
UA6LCN	216
UA6PBA	126
UA6LAX	112
UW6MP	108
UA6LBO	80
UA6LDD	72
UK6DAU	18
UA6LAH	10
UA6LBX	8
UA6YAK	check
UA6AE	check
UA6YBE	check
UK6LEZ	2794*
UK6AAJ	1887*
UK6AAU	462*
UK6ARA	78*
UK5JAA	4488*
UK5QBE	1344*
UK5WBG	1331*
UK5JAZ	912*
UK5MBP	75*
UK5QBL	2*
UB5MCS	1278
UB5WE	1157
UY5DP	852
UB5IDL	820
UB5NU	812
UB5LAY	590
UT5LF	280
UB5ZAL	264
UB5MET	216
UB5LCN	182

UB5VAW	182
UB5UAT	154
UB5CI	152
UB5MBY	138
UY5OO	133
UB5IAM	132
UB5VY	126
UK5MAF	100
UB5NS	100
UB5LDA	96
UB5QAP	90
UT5OQ	78
UB5ICS	75
UB5VAF	57
UB5VAL	55
UB5BAZ	55
UB5IBW	55
UB5QBG	44
UB5NQ	40
UT5PK	40
UB5VLD	36
UB5VLB	36
UB5DAX	32
UB5VWA	32
UB5UAW	32
UB5GBD	32
UB5VAO	32
UB5UCH	30
UT5AA	12
UB5TAM	8
UB5QCK	8
UB5HQ	8
UB5UBI	8
UB5HAC	8
UT5LN	4
UB5LCV	2
UB5FAP	2
UB5QFB	2
UY5EK	check
UY5EL	check
UB5BAW	check
UK5EAK	check
UB5BAX	check
UB5ICK	check
UB5ZAT	check
UB5UBG	check
UB5RAF	check
UB5KAK	check
UB5EAX	check
UB5WAL	check
UB5ZBB	check
UB5ZA	check
UK5ICA	check
UK5WAA	check

ASIA — PHONE

JE1SSE	13135
JA1FIJ	5859
JH1BUW	2960
JH1KRC	1932
JR1HOH	1540
JA1ZLO	1264
JA1OHZ	392
JG1AOU	369
JH2CKX/1	276
JI1JBX	272
JA1OVI	264
JA1VZM	248
JA1AAT	192
JG1FJT	185
JI1KAM	184
JA1PUK	161
JA1YYB	156
JG1DUN	144
JG1EIQ	120
JA1NGD	120
JF1NCT	114
JA1HST	90
JG1VPX	72
JH1LKH	65
JF1DYY	56
JE1TSD	52
JG1POB	36
JG1EJB	27
JR1FVW	27
JJ1KNS	24
JA1JQY	18
JI1RWM	16
JA1RUJ	12
JI1DCW	10
JF1SMT	10

JE1XRZ	8
JI1QGB	8
JH1INM	4
JI1MPA	3
JF1XCK	2
JI1QNX	2
JE1PFD	1
JA2HLX	19866
JA2LHG	1320
JA2DI	1296
JH2HFD	990
JA2XPU	484
JA2ZAP	387
JR2BDG	288
JA2ATE	256
JA2BHQ	248
JE2BTX	224
JA2INO	210
JH4JLT/2	189
JA2LFG	144
JA2LWA	114
JA2DLM	60
JA3PGA/2	76
JR2MKV	30
JA2HGA	44
JA2BJW	56
JR2BDF	24
JE2DBZ	12
JA2VUP	10
JA2HNP	8
JE2FUP	2
JH2WIC	1
JA2HMF	1
JH6DVA/3	18718
JA3CMD	2820

ASIA — PHONE (cont.)

JA3YKC	2265
JH3JUB	1887
JR3JBY	550
JA3VOV	312
JA3BX	288
JE3SEN	260
JA3UB	168
JR3MVF	152
JA3ELU	78
JA3IBU	52
JF3GKE	44
JE3TYR	21
JA3GHG	10
JH3BJN	10
JF3GNW	4
JA3YEJ	3
JH3KWQ	3
JF3GFH	2
JF3HKY	2
JH3SON	2
JH3SQM	2
JR3SIT	2
JH3AIU	1
JA4COS	5759
JA4ENY	4312
JA4BKL	3036
JA4XMI	1196
JH4ARN	938
JH4BTX	405
JA4CZM	270
JA4SZ	259
JA4GTJ	144
JH40DR	102
JA4UDP	84
JH4LWL	84
JA4NOD	66
JA4DWG	32
JA5PUL	847
JA5AUC	744
JA5MOU	396
JA5CHB	320
JA5IRY	230
JA5RFY	182
JA5PXG	12
JA6MPJ	19686
JA6KAK	3120
JA6WSB	1944
JA6AHT	1296
JH6RIM	1036
JA6UYF	741
JH6HYL	490
JA6GGD	168
JA6ERE	140
JA6JRI	119
JA5CEK/6	27
JH6UUK	2
JA7FAS	6480
JA7EID	4995
JA7JH	2484
JA7SPJ	1358
JA7BJS	968
JH7FNM	920
JA7JND	616
JA7GZA	500
JH7GPW	378
JH7CUO	342
JA7VEK	240
JA7CUK	175
JA7AQR	140
JA7JGD	114

ASIA — CW

JR1NRP	7279
JA1CMD	6840
JA1EMX	4200
JA1GLT	1649
JF1MYI	1632
JA1AFF	798
JA1LE	720
JA1BFR	648
JA1ITS	546
JA1DSI	533
JA1NHM	528
JR1OML	480
JH1LKH	432
JR1FVW	420
JH1ENA	408
JH1SSK	407
JR1IOS	308
JG1EIQ	279
JH1AVU	256

JH7EKS	96
JA7YDB	60
JH7FUI	16
JA7GAX	14
JA7UU	3
JH7MEH	3
JA8SW	1740
JA8WQI	603
JA8FBM	24
JA9UX	1342
JA9CGW	612
JA9JBK	270
JA9YAV	84
JA9ISK	48
JA9KUC	36
JA9AAY	1
JA0UXG	1170
JA0YUK	957
JA0FMB	610
JA0MT	350
JA0IAB	280
JA0CZJ	136
JA0KUP	75
JA0WJN	24
JA0CDV	18
JA0GZ	8
JA0VPM	2
JA0EPI	2
JH0ALB	2
UL7EAJ	1120
UL7NW	328
UL7OAO	24
UL7WI	12
UK8JAA	364
UV9PP	4432
UA9UF	2684
UA9MS	2508
UA9FV	513
UW9TZ	351
UW9WZ	273
UA9OS	224
UA9CBO	138
UA9WS	120
UA9CDZ	75
UA9VI	40
UA9FAJ	6
UA9CBW	2
UA9FAL	2
UV9OV	check
UA9YAU	check
UK9AAN	12152*
UK9CDM	100*
UK9CAM	72*
UK9FER	56*
UK9MAA	33*
UK9WBD	4*
UW0LT	6132
UA0FBE	2178
UA0MI	1635
UA0JAY	759
UA0CBO	550
UV0EX	184
UW0MF	378
UA0CAH	152
RA0SER	14
RA0SCO	2
UK0FAA	6666*
UK0CBE	1334*
UK0SAR	540*
UK0LAM	95*

ASIA — CW (cont.)

JH1OEL	2
JA1AAT	2
JA4TNV/1	2
JF1WSR	2
JH3QIM	4
JH3BDB	4
JH3SOM	2
JH3SQN	1
JE3QBG	1
JF3GFH	check
JH3BJN	1
JA2BP	9827
JA2BI	2814
JA2EG	1692
JA2DNA	1152
JA2PSV	1008
JR2IEG	900
JA2CPD	770
JA2MYA	500
JR2BDF	387
JA2HNP	374
JR2XRH	369
JA2LWA	261
JE2CUW	234
JR2AQP	216
JA2MIM	208
JA2INO	145
JA2VUP	130
JA2AJA	120
JR2GCS	80
JR2CLJ	75
JR2BDG	65
JE2BTX	55
JR2MCN	48
JA2HLX	40
JA2TK	40
JH2IIH	32
JE2LPC	30
JR2LFW	21
JR2AGL	21
JA2HRA	18
JA2XPU	10
JA2AB	8
JH2QWI	4
JE2BPJ	2
JH2NYZ	1
JA2EKR/3	5539
JA3AAW	4554
JA3YKC	3674
JA3BRB	2960
JA3GHG	944
JR3WXA	504
JA3DBD	243
JA3BAG	203
JR3COZ	144
JH3ARL	84
JE3SEN	48
JE3OUU	40
JH3SRJ	40
JH3KWQ	36
JA3EEM	30
JA3ARM	16
JH3YCJ/3	16
JH3TEV	8
JA4AXB	3819
JH4LZR	432
JA4UDP	96
JA4XRN	88
JH4EBN	84
JA4GXS	40
JH4IUL	30
JA4DWG	8
JA4JGQ	2
JA5JGY	1080
JA5IRY	693
JA5AF	12
JA5MOU	6
JA6BSM	5772
JA6AKW	3404
JH6DOG	1998
JA6OKK	984
JA6YAP	935
JA6KAK	770
JA6AHT	638
JA6UYF	189
JA6ZSE	161
JH6KXG	1
JA7MJ	6541
JH7IOS	4401
JA7SPJ	3256
JA7GAX	2373
JA7HMZ	2223
JA7CPW	1050

JA7JT	320
JA7GDI	272
JA7KE	114
JA7EWS	105
JH7KKC	10
JH7CUO	4
JA8SW	920
JA8BEV	848
JA8GQ	160
JA9DGI	1326
JA9JBK	1190
JA9FOR	312
JA9BKW	216
JA9CWJ	120
JA9ACE	102
JA9KHU	4
JH0BBA	1024
JH0CAZ	333
JA0CDV	175
JA0WJN	108
JA0EPV	64
JA0VFM	36
JA0GZ	32
JA0NCE	12
JA0KOH	8
UL7PBY	836
UL7PA	399
UL7TAM	150
UL7PAZ	100
UL7TBF	60
UL7GBY	52
UL7PBK	45
UL7EAH	45
UL7TAK	42
UL7AAQ	30
UL7RM	24
UL7GAA	20
UL7JAC	7
UL7LCQ	3
UL7NAA	3
UL7NAL	3
UL7CAD	3
UL7TA	check
UL7TAC	check
UL7TBN	check
UL7LAH	check
UH8HBR	48
UH8BAX	2
UH8DI	2
UI8ACZ	133
UI8ADB	132
UI8ACI	98
UJ8JAS	732
UJ8AZ	133
UJ8AE	48
UM8MAO	600
UW9PT	1596
UA9HAO	1261
UA9IG	1080
UW9WL	994
UA9NW	880
UA9JAA	840
UA9YAR	759
UA9CDU	732
UA9ABA	600
UA9MS	450
UA9CBM	414
UA9OBU	315
UA9NP	288
UA9FAJ	252
UW9AI	224
UA9NN	203
UW9WZ	192
UA9AAB	95
UA9HM	90
UA9CAN	84
UA9AED	68
UW9AT	57
UA9HBD	40
UA9HAX	36
UA9CGT	28
UA9FAL	21
UA9CAM	18
UA9CHT	18
UV9CQ	16
UA9CHW	6
UA9CBW	2
UA9OAI	2
UV9WF	check
UA9TS	check
UV9EI	check
UA9CJF	check
UK9WAP	910*

* Denotes multi-operator.

ASIA — CW (cont.)

UK9AAA	616*	UA0JAW	312
UK9FER	414*	UA0BAC	138
UK9OAD	2*	UA0ML	125
UA0MI	3036	UA0AAC	125
UA0ZBP	1743	UA0WAS	95
UW0IX	896	UW0FZ	75
UA0CAV	660	UA0YAD	64
UA0CBW	624	UA0KAH	10
UA0CAD	528	UK0CBE	1404*
UA0CBO	329	UK0KAA	7*

SWL

F23060	252	UA3-1701093	748
BRS15822	1866	UA3-14246	720
A8808	125	UA3-123238	640
BRS35943	2400	UA3-127355	608
DL9286	2040	UA3-123238	576
DE-M24/17701	840	UA3-127321	558
DE19162	572	UA3-122552	540
DL-P26/1582816	252	UA3-170646	540
DL-P26/1542935	252	UA3-157342	528
D10/1516160	56	UA3-170751	416
DM7736-0	2798	UA3-170389	378
DM7215/1	770	UA3-170934	288
DM-EA-8053 IH	612	UA3-118208	276
DM6405/N	432	UA3-170751	256
DM6721/G	18	UA3-170796	238
HA6-072	48	UA3-122540	234
HE9ILN	2812	UA3-15710	203
HE9EVI	60	UA3-1271	200
I2-14713	2772	UA3-170389	200
I0-5h651	1392	UA3-157343	174
I3-64889	952	UA3-15575	140
I2-55791	594	UA3-122543	112
I4-62874	580	UA3-1701091	110
I5-50661	156	UA3-12244	48
I5-60029	80	UA3-142843	32
I1-58999	16	UA3-1701163	32
OK1-11861	342	UA4-09543	5720
OK1-20350	260	UA4-148117	2288
OK3-26327	238	UA4-095171	2128
OK3-26743	196	UA4-148227	440
OK2-14760	100	UA4-095216	324
OK1-5324	96	UA4-131165	70
OK2-16368	70	UA4-148106	26
OK3-26312	51	UA4-09781	check
OK2-18860	24	UA4-09578/MM	8118
ONL-383	272	UB5-0715	1152
NL-4276	684	UB5-068297	739
SM7-5755	200	UB5-071343	700
UA1-16938	624	UB5-072101	660
UA1-144291	392	UB5-0601464	594
UK1-1691	198	UB5-060805	572
UA1-1431	144	UB5-05942	388
UA1-169185	120	UB5-067725	352
UA1-144296	48	UB5-073877	304
UA1-169185	6	UB5-077529	280
UN1-088218	320	UB5-073636	192
UN1-088388	75	UB5-059505	72
UC2-006101	610	UB5071282	64
UC2-0101	208	UB5-0732546	60
UC2-009389	140	UB5-070224	50
UC2-00689	95	UB5-05911	21
UP2-038521	1786	UB5-0731712	10
UP2-038196	1674	UB5-064402	8
UP2-038456	1328	UB5-081202	
UP2-0381524	1320	UB5-067800	
UP2-038601	812	UB5-071201	
UP2-038657	486	UB5-059447	
UP2-0381512	470	UB5-062240	
UP2-038457	270	UB5-069320	
UP2-038450	140	UB5-0731214	
UP2-038145	132	UB5-080133	
UP2-0381523	110	UA6-150762	1760
UP2-038672	32	UA6-90611	738
UP2-038665	16	UA6-150767	414
UA2-125184	30	UA6-1011152	282
UA2-12569-	10	UA6-1011446	256
UA2-125329	2	UA6-1011151	110
UR2-08366	132	UD6-001229	224
UR2-08372	18	UD6-001204	182
UQ2-037155	920	UL7-023135	592
UQ2-037115	156	UL7-023148	400
UQ2-03762	132	UL7-179200	358
UQ2-037152	54	UL7-02368	238
UA3-170159	1378	UL7-023107	110
UA3-1421	1152	UL7-026199	check
UA3-142198	1052	UL7-026203	check
UA3-155150	936	UI8-053400	44
UA3-127322	756	UA9-14530	792
UA9-16555	666	JA5-1231/3	1512
UA9-154832	252	JA3-8943	1184
UA9-15424	336	JA4-30756	1343
UA9-084200	238	JA7-6824/7	2484
UA9-145234	210	JA9-2155	300
UA9-154860	120	UA0-107287	2888
UA9-145197	110	UA0-110109	2392
UA9-165694	110	UA0-11287	960
UA9-165694	check	UA0-124121	656
UA9-1541134	check	UA6-10833/0	520
JA1-18277	2646	UA0-107131	114
JA1-4876	964	UA0-10771	95
JA1-1176	432	UA0-107294	90
JA1-11702	120	UA0-12830	52
JA1-21002	108	UA0-13976	26
JA3-8783	2108		

* Denotes multi-operator.

The VK and ZL results appeared on page 20 of March 77 AR.—Ed.

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson*	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah*	144.900
	VK7RTW, Lonah	432.475
3D	3DAA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

* denotes change

TV STATIONS AS BEACONS

Vladivostok, U.S.S.R.	video	49.750
Krn, China	video	49.750
Feshun, China	video	49.750
Nanking, China	video	49.750
Auckland, N.Z.	audio	50.740
Dunedin, N.Z.	audio	50.750
Wellington, N.Z.	audio	50.750
Gisborne, N.Z.	audio	50.760
Wagga, N.S.W.	audio	51.740
Brisbane, Qld.	audio	51.750
Hong Kong	audio	51.750
Melbourne, Vic.	audio	51.760
Malaysia	audio	53.750
Seoul, Korea	video	55.250
Quezon, Philippines	video	55.250
Hawaii	video	55.250

A letter from Roger VK2ZTB advises the Mawson beacon VK0MA is still operational, so it has been listed again. Advice also comes via "QRM" that the Devonport beacon VK7RTX has now been shifted to a new site at Lonah where the 432 MHz beacon and the FM repeater are located, bringing all three together.

A letter from Jeff Pages, VK2BYY, the VHF and TV Group Secretary, advises of the establishment of a new beacon at the QTH of Barry Goodman VK2ZAC at High Range near Mittagong, and is operating on a frequency of 144.120 MHz with the call sign VK2RHR, which it identifies every three minutes on MCW. The transmitter runs 10 watts into five vertically stacked half-wave collinears. The purpose of the beacon is to evaluate High Range as a possible permanent repeater or beacon site. Reports covering a period of about a week would be appreciated, and may be forwarded to Barry at P.O. Box 318, Mittagong, N.S.W. 2575. The establishment of an ATV repeater in Sydney is being investigated.

In response to a request from Graham VK8ZCJ in Darwin for a listing of TV stations suitable for beacon purposes around the 6 metre band, I have this month included a fairly extensive list, and I am indebted to Graham for passing on to me the details of the various Asian TV stations shown listed herewith. It is not anticipated these will be repeated each month, but certainly would be updated where possible as the two equinoxes approach, these being the best periods for TEP and F2 propagation from the north and north-east. I suggest those who are interested should remember the date of this listing or copy them on to a more easily used medium, and kept by the 6 metre equipment.

There may be those who have a bit of a smile when they read of some of the exotic places listed for the beacons, but let me assure you they are listed in all seriousness, and the seriousness paid off for Peter VK5ZPW who lives at Angaston, some 40 miles approximately north of Adelaide. Peter telephoned me with the news that on Sunday, 27th March, he copied the Hawaiian beacon KH6EQI on 50.104 for 2 hours, 0145 to 0345Z with signals peaking to S9, with little QSB. The station was signing V V V V de KH6EQI repeatedly. Peter has the reception on tape, and I have heard the tape and verify the call sign. Faint CW signals were heard on 50.180 and 50.050, but nothing to work. Peter remarked that 10 and 11 metres were full of signals, with many JAs on 11m. The only VK station to be worked was Harry, VK4ZHG in Gympie.

Congratulations, Peter, it shows band watching pays off even if you did not work anyone. And there has been an unconfirmed report, which must be treated with caution, that WB9AK (?) was heard in VK3 about 0045Z on Saturday, 26/3. Anyway, whatever may or may not have been heard, it was a week-end of high band activity for those involved.

Graham VK8ZCJ continues in his letter to say he has only recently been able to get back on the air following Tracy, and uses an FT650B to a 5 el. yagi at 35 feet. On 2 metres a VK4ZWP transverter to a QQE06/40 linear with a 10 el. yagi at present on the ground! The first JA opening to Darwin for 2½ years occurred on 13/3 beginning at 0710Z and the last contact at 0808Z, and Graham worked 18 stations in JA with signals peaking over S9. Brian VK8VV and Neil VK8ZCU were also working the JA's.

Graham's other activities around 6 metres was the reception of Russian/Chinese TV video on 49.75 MHz on March 2, 3 and 5. Openings were late in the evening around 2100 local (1130Z), with very strong signals. Mike VK8ZMA reported viewing TV on Channel 0 on 2/3. No amateur signals have been heard on evening TEP.

TV video has been heard on 49.75 and TV audio on 53.75. Wide band FM was also heard on 49.305 with Japanese language on 13/3, in association with the JA opening, but no TV was heard on 49.75, nor any sign of the JA beacon on 52.500.

For the sake of the record Graham mentioned he worked ZL, P29 and all VK States over the Christmas period, over 200 different stations were worked, and he ran up 130 contacts on 28/12/76. The most regular "beacon" into Darwin was Wagga Channel 0, and the VK2WI beacon on 52.450. On January 1 he heard JA's via Es at 0300Z, also ZL TV at 0500Z, both were triple hop Es, but no amateurs were worked in either area.

To conclude the Darwin scene Graham mentions Brian VK8VV has an FTV650 on 6m to 8 elements, and a TS700 on 2m to 6 elements. Neil VK8ZCU has an FT620 on 6m to 4 elements.

Referring back to Roger Harrison VK2ZTB and his letter, he encloses a clipping from QST of January 1977, which mentions trans-equatorial signals being heard on 146 MHz by YV5ZZ in Venezuela from LU7DJZ in Argentina. This followed as a result of hearing fluttery signals prior to AOS for Oscar 7 on orbit 9062A on 8/11/76. Ed YV5ZZ reasoned that TEP could be extended as high in frequency as 2 metres. Upon listening on the 145.9 uplink band, he heard very plainly, about 6 dB above noise, the uplink signal of LU7DJZ. The signal displayed the characteristic flutter usually associated with TE and there seems little doubt that TEP was responsible for reception of the 2 metre uplink transmission of LU7DJZ. Path length 3100 miles. YV5ZZ heard no US stations. Next will come schedules between the two stations in the hopes of making what must be the first 2 metre TEP contact.

Roger comments: "The signals in question are no doubt supported by Class 2 (i.e. night-time) TEP considering the time, frequency and fading characteristics. Considering the VK scene, Darwin is in a prime position for 2m Class 2 TEP to JA. The Ionospheric Studies Group of WRE operated beacons from Darwin on 48, 72, 88 and 102 MHz which were monitored in Yamagawa in Southern Japan, until cyclone Tracy took them away. The 102 MHz beacon was audible at good S/N ratios in Japan for considerable periods around the two equinoxes.

"As Class 2 TEP occurrences increase with increasing solar and ionospheric activity, we should see an increase in the possibility or probability of 2m TEP in the next few years. The terrestrial 2m record could be gained by a VK-JA QSO on 2m via TEP as well as providing some useful addition to research on TEP and the ionosphere. A station having moonbounce capability at each end could almost certainly make the grade, but such sophistication is not really necessary. Run lots of power to the biggest antenna you can raise, and run **regular skeds** during the hours of 8 p.m. to midnight local time during the equinox periods, as well as other times if it can be arranged. See my original articles on TEP in AR, early 1972."

Those are wise words from someone who should know, and it could well pay the boys in Darwin and North Queensland to consider the upgrading of their 144 MHz capability to the highest practicable limit for what could be an outstanding experience one day.

GENERAL NEWS

In the February issue of "Eastern Zone News" from VK3 is an interesting article on "Amateur Radio in Japan" by George Francis, VK3HV. A few items are worth mentioning here. The JARL was re-formed on 29/7/1952, resuming operations with 30 active stations. In 1972 there were 140,000 stations, and at present there are over 450,000 licences! All stations must be approved before coming on the air for the first time by a Government inspector (RI). If later a change of equipment takes place, a new application must be made, and only after a further station inspection and granting of permission, may the changed equipment be placed on the air. The JARL is now authorised to certify station equipment, so long as its power is under 10 watts, thus eliminating the need for a State inspection, and most certainly a painstaking wait. However, for changes in the frequency bands previously licenced, type of emission, antenna or output power, a new application must be made in the normal way.

The Japanese 6 metre allocation is 50 to 54 MHz with phone permitted between 50.1 and 52.5, with 51.000 MHz the calling frequency. On 2 metres the allocation is 144 to 146 MHz, 144.32 to 145.48 for FM and phone, calling frequency 144.480 MHz. The 70cm band extends from 430 to 450 MHz.

Amateur radio in Japan has a current annual growth rate of just under 20 per cent, and Ministry officials have stated that the sharp increase reflects the spread of scientific knowledge in Japan. Simplification of the licensing examination system has helped to boost the numbers of operators in all age groups.

All very interesting, George. We take this opportunity, too, to wish you a happy stay in New Guinea. George left Morwell in February for a two year stay in that country, and has taken equipment with him and will be active on all bands from 160 to 2 metres inclusive. His address will be P.O. Box 1105, Boroko, Papua New Guinea.

Col VK5RO had an interesting crossband contact recently, when on 20/3 he worked at JH6 station who was on 6 metres, and Col was on 10 metres!

Charlie VK9JD will be operational from Norfolk Island on 6 metres with an FT620B to a 5 element beam . . . VK9ZM on Willis Island is now off 6 metres . . . There will be no 6 metre operation from Macquarie Island for the time being.

EME REPORT

Lyle VK2ALU writes in the "Propogator" that tests were scheduled for 26/2 with W4WD and W6ABN. "Nothing was heard from W4WD. Signals from W6ABN were not loud enough to make a contact possible, and he has since advised by mail that his gear is not quite up to moonbounce standard yet.

"A half hour VK2AMW CQ period then followed, during which we were called by a weak station which we could not identify. He faded out after 10 minutes. Other stations were heard during this period, carrying out their scheduled tests on 432.040, 432.050 and 432.060 MHz. Our echoes were peaking up to 6 dB over noise during these tests."

Lyle also makes a request for 70cm SSB contacts. He can operate between 432.100 and 432.200 MHz with 200 watts PEP transmitter output and approximately 3 kW PEP ERP from antenna. His address is as per the Call Book and would appreciate hearing from anyone interested. He may also be able to organise RTTY on above frequencies, with 100 watts of transmitter output, if anyone is interested.

From the Annual Report of the EME Project Group, Lyle reports that during the 12 months to March, 48 EME tests and 11 CQ periods were scheduled for VK2AMW. They had contacts with 12 different stations, bringing their operating total now to 25 stations in 10 countries, but so far have not been able to contact a 432 MHz station in VK by EME path.

Several dozen stations are now being regularly scheduled over the EME test week-ends each month in addition to QSO's which take place as a result of CQ's. New stations are appearing nearly every month, and the band segment in constant use extends from 432.000 to as high as 432.060.

VK2 MID-WINTER VHF FIELD DAY

Jeff VK2BYY has written enclosing details of the annual VK2 VHF Mid-Winter Field Day Contest to be conducted over the Queen's Birthday holiday week-end, 11th to 13th June. Details are published elsewhere in this issue.

That's all for now. Closing with the thought for the month: "Everybody is ignorant, only on different subjects."

73. The Voice in the Hills. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,

RE: CHESS VIA AMATEUR RADIO

I was surprised to read of Chess via Amateur Radio in the January 1977 issue of AR, because of an episode that happened to Len VK3LP and myself a couple of years ago.

We had been enjoying chess contacts for many months, when we were separately contacted and "warned off". I was contacted by an inspector from the Radio Branch and told that someone had monitored our transmissions in Queensland, and (1) that our operating procedure was not correct, and (2) that chess over amateur radio was "not allowable".

To say the least, I was amazed at both of these, because we had taken pains to ensure full standard procedures, including the VK prefix, and because chess is, I believe, an activity within the ambit of allowable activities and conversations.

The inspector did ask me if I wished to contest their comments, but at that stage I was so disturbed at being contacted by them, that my only thought was to quit, and not rock the boat. Having stewed over it for two years, and having seen that January 1977 article, I believe now that I should have taken them up.

I have also found that there are a small number of others who are interested in this interesting activity. I therefore think that it is time for a definite ruling from someone in "Authority" that chess IS an activity that can be conducted. I guess that this action becomes the job of Federal Council, so I would ask that they consider it.

There is no need to regulate operating procedures, because these are adequately covered by our current processes. There are also two standard international methods for writing down chess moves, and as these are known by most chess players, there is no need to formalise that these be used over the air.

I would also ask that if there are any others interested in this activity that they write me a note. Bands (HF) used have been 7.0 and 14.0 There is a good case for VK activity on 3.5.

Bruce H. Bussenschutt VK5OR ■

(Playing chess on the air is not officially regarded as being a suitable subject for amateur communications in VK. This is an expression of opinion by Central Office. Perhaps amateur radio "on air" discussion subjects are more closely scrutinised these days vis-a-vis claims being made by the exponents of "CB".—Ed.)

The Editor,
Dear Sir,

Reference: the letter published in February AR by Rodney Champness VK3UG. As Mr. Champness seems intent on procuring a reply to criticism levelled by him at the various groups involved with morse practice broadcasts, I feel I should oblige. His first letter did not go unnoticed, incidentally, but it was the consensus among my colleagues involved in morse practice in VK2 that we should ignore such correspondence until the author chose to "put his money where his mouth is". However, two letters were just too much, hence my reply.

There are several morse practice broadcasts originating on various bands by various divisions — perhaps the two most commonly known are the VK2 and VK5 divisional broadcasts originating at 0930 Z and 1030 Z respectively, on or about 3550 kHz each evening. I believe there is a limited service in VK4 also. As far as I know there is no service from Mr. Champness's division — VK3. In VK2 the practice broadcasts originate from one of eight stations each night of the week with one station spare for contingencies. These operators are generally not mad keen CW exponents but just ordinary amateurs who wish to provide some help to those would-be amateurs needing CW practice.

It is quite wrong to assume that we have not taken the trouble to consult the RFMD regarding the method of generating morse for the exams. We have not only done this, but we have access to and indeed regularly broadcast the actual tapes previously used by the RFMD in the AOCP and NAOCP exams to give candidates some idea of the real thing. We would like very much to be able to present this realism all the time, but we can't all be expected (can we?) to shell out 300 or more dollars for a keyboard generator with all the frills that the RFMD possess, and with which these tapes are prepared. The 80Mx VK2 sessions are practice sessions designed not to teach more but rather to provide regular practices(it is up to the individual to learn the characters, etc.). We commence at 5 w.p.m. usually and work up, providing practice in a variety of formats and yes, styles (which is not a euphemism for bad morse), but unless you are going to have everyone use a keyboard preset at certain speeds, weighting, etc., uniformity is impossible. In any case, I would think it could be quite boring to those listening regularly.

Finally, from what we can gather, by all accounts we have quite a reasonable following and play a significant part in the success of many attempting and gaining the AOCP and NAOCP.

I think that is a pretty reasonable achievement.

Mark Salmon VK2DI,
Co-ordinator, VK2 Division,
Morse Practice Broadcasts. ■

QSP — AFTERTHOUGHTS

WIANEWS March AR, 3rd last paragraph — Japanese CB are of course on 27 MHz not 21 MHz as printed.

TECHNICAL CORRESPONDENCE

The Editor,
Dear Sir,

RE: CIRCUIT BURGLAR ALARM — MARCH AR

I regret to say that the bridge rectifier circuit is incorrectly drawn, the rectifier symbol should be rotated 90 deg. clockwise for all connections to be correct.

This occurred due to an interruption at the time, but I don't know how it was missed when checking on completion, maybe getting too old for these exercises! Sorry about this error.

Ed Manifold VK3EM ■

CONTESTS

VHF MID-WINTER FIELD DAY CONTEST, 1977

Conducted by the VHF and TV Group, NSW Division of the WIA.

The group is conducting this contest over the Queen's Birthday long week-end. Points are biased towards tunable operation. **Starts** 1200H EAST, SATURDAY, JUNE 11. **Finishes** 1200H EAST, MONDAY, JUNE 13.

RULES

1. All VHF bands 52 MHz and above may be used.
2. You may work a station once per band per clock hour.
3. The minimum contact distance is 1 km.
4. Crossband, HF and repeaters may be used to set up contacts, but not for scoring.
5. Oscar 6 and 7 are not classed as repeaters for scoring purposes.
6. Serial numbers, callsigns, band, time, mode and location of each station worked must be recorded in your log book.
7. **Single Operator Entrants** — You must perform **ALL** operating personally. One log keeper is allowed, plus unlimited moral support.

SECTIONS

1a. Multi-operator Field Stations, 1b. Single-operator Field Stations.
2. Mobile Stations.
3. Home Stations.
The best 6 consecutive clock hours and the best overall score in each of the above sections.

ENTRIES

Entries must give the callsign and the total points claimed from each station worked; there is no need to submit complete log book extracts. Include a cover sheet and the usual signed declaration.

Entries must reach the VHF and TV Group at 14 Atchison Street, Crows Nest, N.S.W., 2065, before August 1, 1977.

SCORING TABLE

km	6m-FM	6m-Tune	2m-FM	2m-Tune	70cm	ATV	576 up
1-50	2	3	1	3	4	20	10
51-100	4	6	2	6	10	50	50
101-150	10	15	5	15	30	150	100
151-300	20	30	10	30	50	250	200
301-500	50	75	15	45	100	500	500
501-800	40	60	25	75	200	1000	600
801-1200	30	45	35	105	400	2000	700
1201-2000	20	30	75	225	500	2500	800
2001 up	50	75	125	375	600	3000	1000

OSCAR 2-10 Translator 20 VK/ZL, 50 other countries.
70-2 Translator 50 VK/ZL, 100 other countries.
ATV serial numbers must be exchanged on sound and vision. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

INTRODUCTION

This is the first of a possible series of Amateur Television reports. The series will be co-authored by Peter Cossins VK3BFG and Kevin Callaghan VK3ZVJ. We hope to compile as much information and news as possible from all States, and to get this news we would appreciate as much feedback as possible from all ATV communities. Most of the information published will be news and happenings from each area, but there will also be technical articles pertaining to ATV.

VK1, VK2, VK4 AND VK6

Could you please contact either of the authors as to where the activity is, frequencies, localities, liaison frequencies, etc., so that news and notes may be included in this column.

VK3

At this stage we know of activity only in Melbourne and surrounds. Liaison is on 147.63 MHz FM with a secondary frequency on 147.7 MHz. There are approximately 63 stations capable of receiving, and of these 25 are capable of transmitting. There are undoubtedly many more viewers. Activity is not on an organised basis and QRM is not unknown. The activity is normally on the simplex frequency of 426.25 MHz vision and Intercarrier sound on 431.75 MHz. Only three or four stations can use the secondary ATV frequency of 444.25 MHz. This secondary frequency is planned as the input frequency of the proposed VK3 ATV repeater.

VK5

Activity in Adelaide is on a simplex frequency of 442 MHz vision and 446.5 sound. The known stations transmitting are VK4AO, KG, HD, ZBE, ZFX, ZEF, ZOF, GG. All stations can transmit intercarrier sound. The liaison frequency is 53.5 MHz AM. All stations can receive 576 MHz ATV, the proposed repeater output frequency.

VK7

In Northern Tasmania, Winston VK7EM receives and transmits. Tony VK7AX is preparing to join in. Frequencies are the same as VK3. Working into VK3 is possible during the summer season. We believe that there is also some activity in Hobart. Information please.

GENERAL NEWS

Through this series we hope to join together the various groups so that designs, equipment and contacts, we hope, can be exchanged. Undoubtedly given the right conditions, ATV DX can be worked over many hundreds of kilometres.

ATV repeater tests have been conducted in Adelaide and an initial test has been conducted in Melbourne. Repeaters in both States are planning on 70cm input and 50cm output.

Most receiving stations use the VK2ZIM converter either Mk. 1 or Mk. 2 versions. Antennae are usually 11 element Yagis, W0EYE 15 element Yagi's or Collinear arrays.

Transmitters range from modified commercial UHF mobiles or base stations, home made or solid state exciters and amplifiers, with series or grid modulation, even screen modulation is in use. The DJ4LB system from VHF Communications is also very popular. Modulation of a 2 metre final and then using a Varactor tripler has also been tried and works.

Video signals range from test signals to Color cameras and Video tapes. The small closed circuit vidicon camera is very popular and inexpensive. Some of the TV stations have made available their old black and white equipment which has become redundant since they went to color. This has been available at very cheap prices. Many stations are getting very elaborate with their video facilities and can transmit a number of cameras with very professional results.

Don't forget in VK3 to watch the Ron Harrison VK3AHJ ATV segment in the Sunday morning broadcast on VK3BWI at 10.30 East. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Craters SA, 5152

RULES FOR WANCA

1. "Worked All Norwegian Communes Award" is issued by the Vadso Society of NRRL to all amateurs and SWLs.
2. The award is issued for contact with 25 different Norwegian communes. "Basic" — WANCA MIXED — and thereafter "Stickers" each additional 25 communes contacted till all communes contacted. At present 454 communes and 5 Norwegian arctic/antarctic areas. For WANCA class ALL, all Norwegian communes and 3 of 5 Norwegian arctic/antarctic areas must be contacted. A special award will be issued to all who can confirm contact with all Norwegian communes and **all** Norwegian arctic/antarctic areas. Only contacts made on or after 1st January 1975 will count for WANCA.
3. All band, modes may be used. No cross-band or via repeaters. QSO's via Oscar count. Minimum report RST 338 RS 33.
4. Mobile or portable contacts valid, but QTH must be stated during QSO, or printed on QSL card.
5. QSL card not required, log data count.
6. The award fee is n.kr. 30 for "Basic" — WANCA MIXED — award and n.kr. 10 for each "Stickers". No fee for blind-handicapped amateurs/SWL's.
7. "Record Book" listing all Norwegian communes and areas, available from Award Manager WANCA for n.kr. 15. Together with the "Record Book" the Directory of Post Offices will be sent. The Directory of Post Offices list all Norwegian Post Offices and their commune belongings. No fee for blind-handicapped amateurs/SWL's.
8. In addition to "Basic" certificate — WANCA MIXED — the following certificates are issued:
   WANCA — CW: Only contacts made on CW count.
   WANCA — SSB: Only contacts made on SSB count.
   WANCA — RTTY: Only contacts made on RTTY count.
   WANCA — SSTV: Only contacts made on SSTV count.
   WANCA — NOVICE: Only contacts with LB stations count.
   WANCA — MOBILITY: Only contacts with mobile or portable stations count.
   WANCA — SWL: For SWL's. All band/modes count. Mobile or portable contacts count.
   For WANCA — CW/SSB/RTTY/NOVICE/SSTV: Mobile or portable contacts **do not count.** Any band may be used.
   WANCA — CW/SSB/RTTY/SSTV/NOVICE/MOBILITY are only issued to holders of WANCA MIXED. No fee for these certificates, if applied for together with WANCA MIXED or together with applications for "Stickers" for WANCA MIXED. Otherwise a fee of n.kr. 10. No one may apply for higher number of communes worked than one have on WANCA MIXED on these awards.
9. All fees WANCA/"Record Book" contributed to LA5LG's Fund for Norwegian Blind-Handicapped amateurs.
10. Awards Manager will help anyone with identification of commune belongings, if call, full address listed on a sheet of paper and forwarded with 2 IRC.
11. All applications should be made according to "Record Book" signed by two amateurs and forwarded with the fee to

    Award Manager WANCA,
    Sverre J. Schmidt LA1QK,
    P.O. Box 3,
    N-9801 Vadso, Norway. ■

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.90	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA30900	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	MISC	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458	LM1458	TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488	LM1488	UAA170	3.25		
CD4025	.55	CD4720	12.60			In some cases pin for pin substitutes will be supplied.					

POPULAR SEMI-CONDUCTORS STOCKED

7400	.48	7483	2.30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.95
7401	.48	7485	2.95	74S196	7.50	74LS175	2.70	BD437	2.80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
7408	1.09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5.95
7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	**SEMICONDS**		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3.20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	.90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

PC BOARD

FIBREGLASS —

4" x 3" S.S.	.75
6" x 4" S.S.	1.20
8" x 3" S.S.*	1.20
6" x 6" S.S.	1.60
8" x 6" S.S.	2.20
12" x 4" D.S.	2.90
12" x 12" D.S.	6.00
6M CONVERT	2.50
2M CONVERT	2.50

DIP SOCKETS

8 PIN	.45
14 PIN	.48
16 PIN	.54
24 PIN	.95
40 PIN	1.50

TOROIDS, etc.

IRRESPECTIVE OF MIX

T-12	.70
T-25	.75
T-37	.80
T-50	.85
T-68	.95
T-80	1.10
T-94	1.50

Free Data on request.

COIL FORMS

NEOSID772/1	.20
5027/6PLB	.20
7100CAN	.20
5200/8PLB	.25
7300CAN	.25
F16 or F29	.12

MISCELLANEOUS

SO239	1.95
PL259	1.95
BNC Plug	2.30
BNC Sockets	1.60
7 Seg Displays	2.50
Miller Coils	Indent
A.R.R.L.	See E.T.I.
Publications	or write
BOXES	
108 x 108 x 50	2.75
216 x 108 x 50	3.75
INSTRUMENT BOX	
160 x 160 x 70 (Black/White)	5.90

VALVES

6DQ5	7.25
6GK6	4.95
12BY7A	1.95
OD3	P.O.A.
7360	P.O.A.
*QQE06-40	34.90
*6146	8.90
*6146B	9.70
*6939	16.95
*4-125A	63.90
*4-250A	71.90
*6JS6	P.O.A.

* Indent only.

PUBLICATIONS

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MAIL: P.O. BOX 33, PENDLE HILL, N.S.W., 2145

Mon. Tues. Wed. 8.30-5.30. Thurs 8.30-7.30. Fri 8.30-6.00. Sat 8.00-12.30.

PLENTY OF PARKING AT REAR STD 02

INTRUDER WATCH

Alf Chandler, VK3LC

1536 High Street, Glen Iris. 3146

As I haven't got much of interest IW wise this month, I thought that some comments on recent Observer's reports may be useful. Lately the Voice of America, Philippines has been heard on 14100 kHz with two programs superimposed.

It has been ascertained that the programs are Russian language and those transmitted on 11865 and on 9630 kHz. A little fundamental mathematics — twice 11865 equals 23730 minus 9630 equals 14100. Thus, it appears that the second harmonic of 11865 is beating with the fundamental of 9630 producing the spurious transmission. VOA has been alerted and they say — "We are doing major maintenance work and the fault will be attended to in due course".

Another VOA program has been reported on 14175 kHz, but so far we have not got to the cause. We think that the program on 11840 kHz is beating with another as yet unknown frequency. Further reports would be appreciated.

A broadcast on 3537 kHz which has been reported here as 3535, and the word "Fukien" decyphered is — "Fukien Front, People's Liberation Army". 3549.5 reported here as 3550 kHz, we think is still Ambon, Indonesia, but we need further confirmation. In the USA "FCC has sent out telegrams recently on about ten of my complaints". This from K6KA.

If you care to listen on 14180 kHz at about 0600-0630 UT you will hear a carrier, and if you listen intently enough you will be able to compare the program with that on 7090 kHz, Radio Tirana. The second harmonic on 14180, and from America is said "Yes, Tirana is famous for harmonics, but also so are their jammers". NAP heard on 14024 kHz is Red Chinese despite the call-sign, and K6KA says "I had better remind FCC about my summaries alert on NAP. I alerted 14024 not so long ago." He also says "It's odd you don't get BAA6/7/8/20/22/24 with RY's at 0001 Z daily on 14340 kHz". Would somebody with RTTY facilities give me a read-out on this one. ■

LARA

Ladies Amateur Radio Association

This month will see some LARA members sitting for the Novice exam, so to start off, we wish these people the very best of luck.

Since more Novices will appear on air soon there has been some discussion within LARA as to how Novice activity can be encouraged. It has been suggested that the LARA sked which is currently held on 3650 MHz (on Monday nights at 8.00 p.m. Eastern Time) should move down to 3.558 Hz which is within the Novice band. Some operators already have crystals on this frequency and if the LARA sked were moved, then new YL operators could be encouraged to buy these crystals and join in. Most current members of the net could change to this frequency with little trouble, so the idea looks promising. This will be brought up and discussed further in the Newsletter and members' opinions and/or objections are welcomed.

Just a general word about the LARA sked. This is a LARA net linking YL operators all over Australia for a regular chat and also the sked allows YL newcomers to try their hands at operating, overcoming "mike-shyness" and coming up to say "hello". To make the net-controller's job easier, it has been agreed that the first half-hour of each sked be reserved for YL operators and YL guests from other stations. After this first segment, the gentlemen are free to join in should they wish.

LARA VK3 NEWS

This month, the LARA meeting will be combined with a car rally. The meeting will be held on Sunday, 22nd May, at the home of Jean Troubridge, in North Melbourne, starting at **11.00 a.m.** Further details can be obtained, as the date gets closer, by contacting Jean on 329 8506. Also in VK3, some LARA members have been representing the club at one of our favourite sports — fox hunting. A LARA team has joined in VHF group fox hunts with moderate success and a great deal of fun.

Once again, best wishes to exam candidates.

33 LARA ■

20 YEARS AGO

Ron Fisher, VK3OM

MAY 1957

Amateur Radio for May 1957 included the start of a series of articles that still continues to be a standard reference. Gordon Brown VK5XU "Modifying the AR7 Receiver" has probably been copied and read by more people than almost any other single series published in AR. Part one contained a general description and the Alignment procedure.

A second article by Gordon, "Adding AVC and Audio Volume Control to the Type 3 Mark II" was also a very popular one at the time. Two different "spy" type transceivers were popular for portable operation at the time, the Type A Mark III and the larger Type 3 Mark II. The type A covered 40 and 80 with a 7C5 in the final while the type 3 covered 80, 40 and 20, used a 6L6 in the final and ran about 30 watts input on CW. Naturally they were adapted for AM phone operation and were extensively used for both portable and home station operation.

Indeed May was a real "surplus" issue with an AT5 transmitter conversion article by Don Haberecht VK2RS. The old AT5 worked well enough on 80 and 40 but 20 metre operation required doubling in the final and 15 and 10 were not covered at all. Don's article showed how to remedy all of these problems.

Technical articles were rounded out with "A Simple Capacity Bridge for the Blind" reprinted from the New Zealand Break In magazine, plus quite a bit of data on some of the newer tubes.

The predecessor of the present LARA column, YL Corner, was conducted by Phyl Moncur, wife of Len VK3LN. Phyl wrote mainly about the trials and tribulations of the XYL of an enthusiastic amateur. ■

IARU NEWS

NEW PREFIXES

From the January 1977 issue of the IARU Region 1 News the following is a list of recently issued prefixes —

D7A-D9Z — Rep. of Korea.
S7A-S7Z — Rep. of Seychelles.
S8A-S8Z — Transkei.

NEW ITU MEMBERS

From the same source the following new ITU member countries were listed—

Surinam — Republic.
Sao Tome and Principe — Democ. Rep.
Cape Verde — Rep.
Angalo — Peoples' Rep.

KUWAIT LICENSING

"Readers will recollect that OM Collin 9M2CR recently spent 6 months in Kuwait working for ITU. It took all that time — and more — to get formalities completed for his 9K2 ticket — allotted the callsign 9K2ET. No chance of getting 9K2CR since this was already issued to the D-G of Telecoms himself; though it was never used by that gentleman. No real problems in getting a ticket for anyone able to produce his current licence from a reputable administration such as Malaysia." 9M2CR writing in the MARTS newsletter No. 6. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

CQ September 1976

DXpedition to Tonga and Niue Islands; How to Make a Contest More Fun; An Improved Antenna Noise Bridge; A Push-Button to Dial Telephone Converter; Antennas; Simple Antenna Ideas; Novice: Effects of FCC Rules Changes; QRP: Major RF Loop Consideration: Pt. V; The Tempo MR-2 Monitor Receiver (Review); Modern Surplus Equipment for 10 and 6 Metres; Put a Touch-Tone Pad into Your HT.

CQ January 1977

Slow Scan Television, Overview '77; Announcing the 20th Annual CQ World Wide WPX/SSB Contest; Waveguides, Pt. 2; Conversion of Decimal and Seven Segment Signals Back into BCD; Sending and Receiving QSL Cards; The Yaesu YC1355D Frequency Counter (Review); Signal/One Transceiver Improvements; A Voltage-to-Frequency Converter IC with Amateur Applications; Making IC Projects Work; Improving CW Selectivity in the Argonaut; The G3NGD Semi-Vertical Antenna; In Focus: 1977 — A Look Ahead.

CQ February 1977

A DXpedition to Trinidad Island; The Kenwood TS-820 Transceiver (Review); The

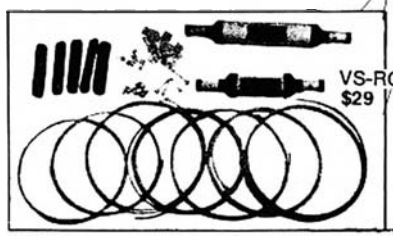
Hy-Gain's Incomparable HY-TOWER

for 80 thru 10 Meters Model 18HT

- Outstanding Omni-Directional Performance
- Automatic Band Switching
- Installs on 4 sq. ft. of real estate
- Completely Self-Supporting

By any standard of measurement, the Hy-Tower is unquestionably the finest multi-band vertical antenna system on the market today. Virtually Indestructible, the Model 18HT features automatic band selection of 80 thru 10 meters through the use of a unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical ¼ wavelength (or odd multiple of a ¼ wavelength) exists on all bands. Fed with 52 ohm coax, it takes maximum legal power . . . delivers outstanding performance on all bands. With the addition of a base loading coil, it also delivers outstanding performance on 160 meters. Structurally, the Model 18HT is built to last a lifetime. Rugged hot-dipped galvanized 24 ft. tower requires no guyed supports. Top mast, which extends to a height of 50 ft., is 6061ST6 tapered aluminium. All hardware is iridite treated to MIL specs. If you're looking for the epitome in vertical antenna systems, you'll want Hy-Tower. Shpg. Wt., 96.7 lbs.

Sale $298.00



$102

HIDAKA'S VS-41/80KR

for 10 thru 80 Meters

- An Individually Tuned High-Q Trap for Each Band
- Takes Full Power
- Rugged Total Performance Construction
- Easily Installed Using Minimum Space

Now . . . a modestly priced easily errected all-band vertical that delivers outstanding omni-directional performance on each band . . . HIDAKA'S Model VS-41/80KR. It is ruggedly constructed of heavy gauge, taper-swaged aluminium . . . uses four separately tuned High-Q air dielectric traps . . . each trap factory tuned to provide maximum performance 80 through 10 meters. Uncompromised performance for short haul or DX communication is ensured by the low angle radiation pattern developed by the VS-41/80KR. SWR is 2:1 or less on all bands. If mounted in an elevated position a radial wire system should be used. An accessory TRAPPED radial wire kit is available, the Model VS-RG. The VS-41/80KR comes complete with Terelyne guying cord.

TECHNICAL DATA

Power Rating	1 kw AM, 2 kw SSB
Feed Line Required	50-70 ohm coax
Minimum Ground Required	8ft. Ground Rods
Overall Height	28.4 ft.

NEW . . .

Special hinged base assembly on Model 18HT allows complete assembly of antenna at ground level . . . permits easy raising and lowering of the antenna.

The Versatile Model 18V for 80 thru 10 Meters

The Model 18V is a low-cost, highly efficient vertical antenna that can be tuned to any band . . . 80 thru 10 meters . . . by a simple adjustment of the feed point on the matching base inductor. Fed with 52 ohm coax, this 18 ft. radiator is amazingly efficient for DX or local contact. Constructed of heavy gauge aluminium tubing, the Model 18V may be installed on a short 1⅝ inch mast driven into the ground. It is also adaptable to roof or tower mounting. Highly portable, the Model 18V can be quickly knocked down to an overall length of 5 ft. and easily re-assembled for field days and camping trips. Shpg. Wt., 5 lbs.

$49

Also available from BAILS —

VS-2GH 2 metre ⅝ wave G.P.	$35.00
VS-6GH 6 metre ⅝ wave G.P.	$37.00
ARX-2 three half wave 6dB gamma loop matched vertical	$49.00
ARX-450, 435-450 MHz three half wave 6dB Ringo	$45.00

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JIM BAIL VK3ABA

Multi-Band Trap Antenna, Pt. 1; Report on N6V's SSTV Pics. from Mars; The Gross CW-25 Transmitter; Understanding Coaxial Cable; Single Sideband Theory for People Who Don't Understand Single Sideband Theory; On a Clear Day You Can CFAR Ever; The Powerlarm, A Log-Periodic Quad Array; A Synthesiser for the HT-220; Peak Envelope Power; Slow Scan Television, Overview '77, Pt. 2.

QST January 1977
Understanding Linear IC's; A Dual-Gate MOSFET Dip Meter; The DVM/Frequency Counter Becomes a Clock; A Gated Noise Source; A Prototype Pulse-Code Modulation System; The Microprocessor and Repeater Control; Reviews, Heathkit HR-1680 Receiver; Heathkit HS-1661 Speaker; Palomar Engineers R-X Noise Bridge; Heath HW-2021; The Barlow-Wadley XCR-30 Receiver; Kronotek RF-Actuated Timer RT-1; National Semiconductor SC/MP Microprocessor; A New Look Noise Blanker That Works; A Hybrid 20 Metre Quad; Speak Up We Can't Hear You; Getting to Know OSCAR from the Ground Up; We've Only Just Begun; The Canadian Winter Rally; Chart Your Way to Better DX; Your SCM and How He Is Elected.

RADIO ZS December 1976
A December Night's Thoughts; Shoot for the Horizon, Pt. 1; Marconi of the South African Police.

73 December 1976
Go Tone for Ten; World's Simplest Five Band Receiver; How Do You Use IC's?; Hamming 101; A Super Cheapo IDer; The ZF Special Antenna; CT7001 Clockbuster; Saving a CBer; A Ham's Computer; What's All This LSI Bunk?; The Soft Art of Programming, Pt. 3; New Improved Monitor; Put Snap in Your SSTV Pictures; What's All This Wire-Wrap Stuff?; Exploding the Power Myth; Exploding the SWR Myth; Bring a Dead Band to Life; The IC22 Walkie; The Latest in Counters; The Five Minute COR; See the World and Get Paid; Watch DX With a Spectrum Analyser; DXing with a Weather Map.

HAM RADIO December 1976
High-Frequency Communications Receiver; Low-Frequency Loop Antennas; QRP 7 MHz CW Transmitter; Broadband Amplifier Uses MOSpower FET; Electronic Meter Amplifier; ASCII-to-Morse Code Translator; Ladder Network Analysis; Resurrecting Old Receivers; Increased Flexibility for MFJ CW Filters; Signal to Noise Performance of Low-Frequency-Shift RTTY; Microcomputer Interrupts. ■

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP/NAC

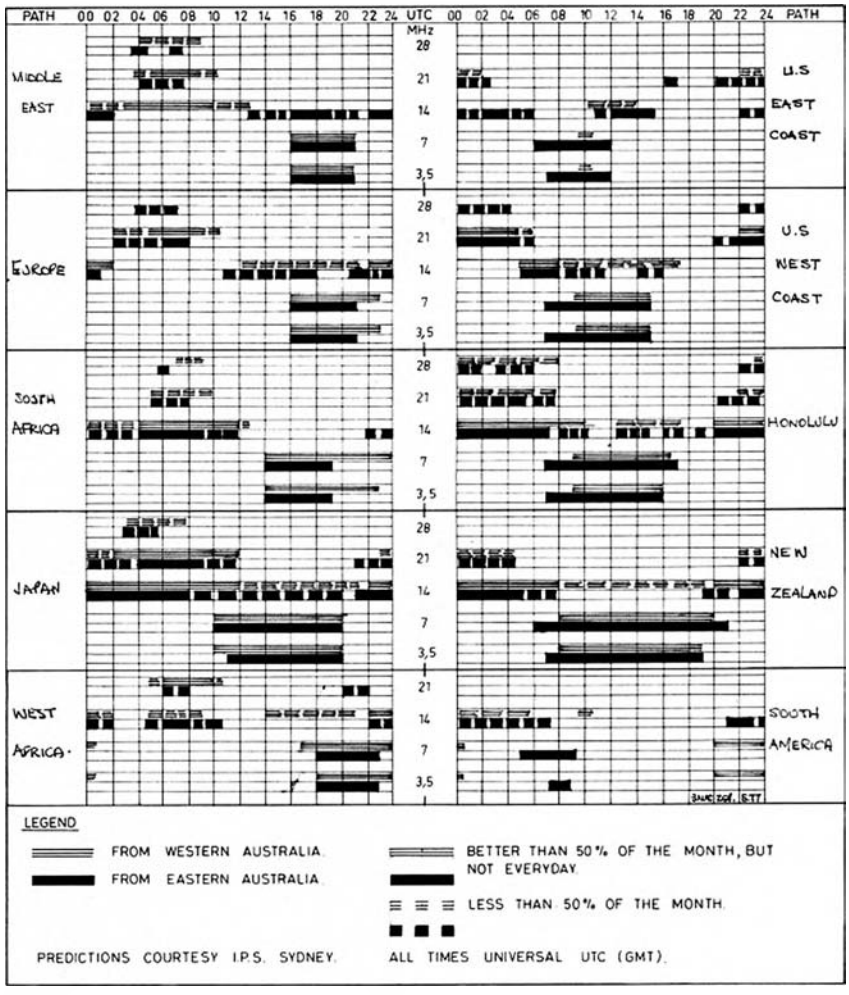
Charts for April and May begin to show the influence of the new cycle activity. Whilst there is no great upsurge in the sunspot count, there is a significant increase in ionospheric quality. The 2800 MHz solar flux measurements are showing up this increase with monthly means around 75 whereas last year they were in the high 60's. In turn these produce changes in the formula for computing path openings.

10 metres is showing many awakening signs — not just to the occasional users but the solid adherents who are finding increasing path openings. 15 metres is also showing plenty of activity with plenty of DX being worked. 20 metres is well and truly alive along with 40, 80 and 160 metres.

There have been significant increases in signals across most paths in recent months, particularly those lying close to and indeed over the polar regions showing more reliability. These are encouraging signs as a decrease in polar cap absorption will open up paths that have been dormant for quite a while.

The Dec.-Jan. reports from Zurich indicate a rise in the running smoothed number becoming more apparent as 1977 draws on. It is still too early to say when the low mathematically occurred, perhaps by late 1977 it will have become apparent. However there is still life in the old cycle spots and the newer ones are well up in activity when they occur.

With the next maxima predicted for around 1982 with a number around 50 (like 1974) will force many to look closely at antennas if they seriously wish to work DX. It will be many decades before we see conditions anything like the two previous maxima. However those who know the signs and use them to their advantage will be working more than the average share of DX.



With WARC 79 and the prospect of some additional bands I have recently had a look at some forward predictions. Two interesting prospects are 18 and 24 MHz and 10 MHz looks also very promising. Whatever the outcome will be, it's desirable that whatever we have now should be well used.

In closing I wish to add a word of thanks to Bert VK3GS who had assisted me over many months with his sunspot observations from his well equipped observatory. His untimely addition to the Silent Keys has left me without an eye on the sun. I certainly will miss his excited calls to tell me of news of sunspots.

VK3ZGP/NAC ■

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- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

VHF Specials, tubes, new, unused, QQVO3-20 $20 ea.; QQVO6-40 $30; 2E26 $10; Nuvistors 6CW4 $10 ea.; 7587 $12 ea.; Nuvistor bases $2 ea.; QQV bases $3 ea.; general radio frequency meter type, 720A 100 to 200 MHz, $85. VK2BFJ, 90 Wyong Road, Killarney Vale, N.S.W. 2261. Ph. (043) 32 5758.

AWA-MR 10C, low band un-mod., cables, transistor P.S., handset and cradle, VGC, $20; Pye, Victor, low band un-mod., VGC, less mic. insert, $18; AWA-MR 6A, high band, 6 channel switch, no xtals, VGC, $30. VK3EM, QTHR. Ph. (03) 58 7745.

SSB Tx, 100W output, 80 thru 10m, uses two 6146 final amplifier tubes, Hallicrafters model HT-37, 240V AC operation, $250. James VK2JO. Ph. (02) 36 2981.

Moving overseas, must sell FT101E, IC22A with channels 40, 50, R42 and R48. Both in A1 condition with original cartons, also Heathkit HW101 less power supply, in working condition. T. Dobler, Box 883, Mackay 4740.

National Panasonic 3 band, 2 speaker, 14 transistor Rx, as new. Tunes 530-1600 kHz, 2.3-7 MHz, 7-22 MHz, $40; MFJ SSB filter, SBF-2, as new, $25. Philips Black and White TV, 21 inch, on legs, in excellent order. VK3LC, QTHR. Ph. (03) 509 2556.

Europa 144 MHz transverter to 28 MHz, 200 watts p.e.p. and excellent reception. Plugs into most Yaesu gear, transceive or split frequencies, brand new, $220, two only. VK3DS, QTHR.

Heath HW32 20 metre, 200 watt transceiver with H.D. power supply (H.B.) and manual. This is a first class performer, home or mobile, and it's light, $200. VK3DS, QTHR.

IC21A FM Transceiver, base/mobile station, 10 pairs crystals, AC/DC, excel. cond., little use, $200; Ranger ARX2 2m antenna, $25; Hy-gain 2m 5/8 whip with magnetic base, exc. performer, good cond., $25. VK3LJ, QTHR. Ph. (053) 32 3412.

Yaesu FT 101B Transceiver, 10 to 160m, WWV, SSB, AM, CW. In first class condition, very little use 230/240 AC or 12V DC supply, additional xtl locked position and inbuilt speaker, self contained 13½" x 6" x 11½", suitable for stationary or mobile use, $395. VK2AXS, P.O. Box 954, Parramatta. Ph. (02) 635 1320.

Commercial radio mast, four 12 ft. sections, top fitting for 12 ft. 2 in. pipe, self supporting, hot dip galv., heavy construction, excellent condition, $400. VK2AXS, P.O. Box 954, Parramatta. Ph. (02) 635 1320.

Modern quiet 16 sq. brick country home, with 23 ac., excellent DX position for HF, VHF, UHF, beautifully located Upper Hawkesbury area, 1000 ft. el., unrestricted view Blue Mountains, 3 br., central heating, all electric, good double garage and shedding, heavy 60 ft. tower, radial earthing system, 240V aux. diesel unit, 42 air miles from Bankstown, air strip with hangar available, delightful bush walks, unspoilt native flora and fauna, perfect place to get away from it all, yet only an hour's drive Hornsby, $71,000. VK2AAK, P.O. Box 954, Parramatta. Ph. (02) 635 1320.

Collins KWM2 Transceiver, purchased new, no mods., excellent DX unit, $1,200; PM2 Collins portable power supply, $180; 312B5 Collins external VFO, watt meter, phone patch, speaker and control unit, $520; 637T Collins calibrated stainless steel portable multi dipole, all frequencies, offers; 20A AWA, clean, $30; 20B AWA 12V FM unit, clean, $35. VK2AAK, P.O. Box 954, Parramatta. Ph. (02) 635 1320.

GDO and Megacycle Meter, 420-940 mc. by Measurements Ltd., with power supply, $120; steel cable, 3/8", 264m, new, $115; Dexion 200 ft. heavy duty, $100; cutter, $30, all new. VK2AAK, P.O. Box 954, Parramatta 2150. Ph. (02) 635 1320.

PAL TV Pattern Generator, Philips PM5509, $750 or offer. VK4RY, QTHR.

ICOM IC22A 2m FM 10W, mobile with mounting bracket, includes Ch. 2, 8, 40 and 50, perfect condition, $175. VK3AQL, QTHR. Ph. (03) 277 5623.

QTH for Sale, 70 ft. ex DCA tower (self supporting) with TH6 6 el. tribander and Ham II Rotator and control, plus B/T Home, 2 double br., lounge and sep. dining room, large eat-in kitchen, bathroom, laundry, l/u garage, fully filtered 24 ft. a.g. pool, plus 10 ft. square "Shack" amongst trees in garden, located opposite park, 5 min. walk to station and shops, $38,000. VK2DD, QTHR. Ph. (02) 546 6385.

ICOM IC202, as new condition, bought Feb. 1977. Unmodified, covers 144.0 to 144.4 MHz, 3W PEP, Japanese manual, all connectors, getting married and, unfortunately, I need the dbs. Price $190, negotiable. Doug Rosser VK2ZEX. Ph. (02) 633 2199 bus.

Multi 2000 2m fully synthesised SSB-FM-CW transceiver, little used, exc. condition, $400. Yaesu FT2FB mobile 2m FM rig, Ch. 40, 50, R2, 3, 4, 5 and 8, with direct 4 & 8, $150. Lafayette HA800B amateurs bands Rx 80 thru 6m, $150. All in original packing and complete with instruction books and accessories. VK2AOE, QTHR. Ph. (02) 69 5099 bus, (02) 449 6364 AH.

DX160 Communications Rx, exc. cond., $150, also two Midland twin meter SWR bridges, exc. cond, $25 ea., also 13.8V 5A power supply, solid construction, $50. Ph. Bert (03) 42 5312 bus., (03) 758 4086 AH.

Uniden 2020 transceiver, complete with external speaker in first rate condition, $700. Bob Cunningham VK3ML. Ph. (03) 20 7780 QTHR.

Modulation Transformer Thordarson 60W mounted in a home-brew BC Rx complete with HT power supply, $40 ONO. Microwave Dish, ex-radar elliptical reflector with tilt yoke, $20. Contact John Sved VK3ZVZ, 12 Great Valley Rd., Glen Iris, Vic. 3146, Ph. (03) 25 4953 AH.

One little Dick Power Supply, 12V, 3 amp., $20.00. Good cond. VK3TG, QTHR. Ph. (058) 52 1636.

Hustler Whips, 80, 40 and 20m, complete with MO2 mast, bumper mount, base mount, new, never used, $110. Yaesu speaker (matches 401, 101 etc.) new condition, $30. Yaesu YD-844 microphone, new cond., $30. C. P. Singleton VK4UX, 45 Edward St., Dalby, Q. 4405.

FT101 Mark 2 transceiver (same as 101B), exc. cond., little used, complete with original packing box, instruction book, mic. etc., no mods, $525 ONO. Also DC75 power supply C/W mobile mount for FT75, used once, $40 ONO. VK4XT. Ph. (074) 62 2389 or write PO Box 496, Dalby, 4405.

WANTED

Translator communications HF Rx, Barlow Wadley or similar. Jim VK4OK, QTHR. Ph. Banana 21R.

Constructional details for AC transformers with secondary winding, 24V up to 750W rating. Please write S. A. Flett, 14 Wade Street, Lismore 2480.

Atlas 210X transceiver or any small HF transceiver like Swan monobanders etc. for mobile use. VK4XT. Ph. (074) 62 2389 or write PO Box 496, Dalby, 4405.

Information on ARP/ATS, particularly on modification and improvement for a new Amateur wanting soldering iron experience. Ph. (03) 47 1973. 49 Kinsale St., Reservoir, 3073.

HF Transceiver, second-hand, preferably Yaesu FT101, FT200, FT400, also Ken KP202 2m hand-held and 4CX250B valves, chimneys and parts to suit VHF Linears. Any reasonable condition. Graeme VK7ZAQ. Ph. (004) 27 8992 (mornings).

Pair Selsyn Motors. Particulars to VK4SD, QTHR.

RENTAL

VK3AOG will be in Cairns June-Sept. approx. The home QTH on Murray at Barmah is available for modest rental. Tower with TH3 and 2MT beams, home brew linear. Home is new, Color TV, dishwasher, etc. Ph. Tom Sawers (058) 69 3283.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. A. JACOBSEN	VE7CGF (formerly VK6WB and ZL3WB)
Mr. A. J. E. FORSYTH, O.B.E.	G6FO (Proprietor of Short Wave Magazine)
Mr. R. W. WILKINSON	VK3AKC
Mr. A. S. LITTLE	VK5AF
Mr. J. W. LADE	L40576

RON WILKINSON VK3AKC

The amateur fraternity were saddened to hear the news of the death of Ron Wilkinson VK3AKC, of Geelong, on Tuesday, 22/3/1977. Darrell VK3AQR was kind enough to phone me on the Wednesday with the news, and I appreciate his promptness in letting me know, so word could be passed to Ron's many friends.

Ron was always noted for his cheery greetings on the air and giving his location as Geeee-long, something we all appreciated.

His dedication to the art of VHF and UHF was recognised universally, and his many years of activity included operation on all bands from 160 metres to 1296 MHz, and currently with such modes as SSB, CW, FM and ATV. His activities on 1296 MHz EME operation are legend, and his pioneering efforts in this direction have surely been an inspiration to others, helped by his ready willingness to share his knowledge with anyone showing interest.

His absence from the bands will be particularly noticed in Victoria and Tasmania because he could always be counted upon to come on or be on the air at times when it mattered, providing the other end of contacts across the water for test purposes with others, being aware of possible band openings on 144 and 432 MHz etc.

Over the 17 years I have known Ron and Mary, his wife, I always felt at ease in their company, and as recent as last July my wife and I were guests of Ron and Mary at their home, and have many pleasant memories of that last stay.

Time will heal the wound caused by Ron's passing, but I am sure Ron will be long remembered for his many achievements, as an amateur, for efficiency with his work, which was a pleasure to behold, as a citizen, and as a gentleman. We will proudly remember him.

Eric Jamieson VK5LP

ALBERT SCOTT LITTLE VK5AF

Scott passed away on 12th February following about two years of ill-health. Active as VK5AF since 1948, but with pre-war and post-war amateur interest, he operated mainly DX bands, with almost exclusive mobile facilities over the last few years

He served in the RAAF as a pilot during World War 2 and following successful academic Radiocommunications studies, was employed as a Radiophysicist on the 1953/54 Antarctic Expedition to Macquarie Island, where he operated as VK1AF.

He was awarded the I.R.E. "Fisk" prize for the most successful student in 1952.

Professionally he was employed as the District Supervisor for the Electricity Trust of South Australia, at Strathalbyn, where his Electrical, Civil and Radio Engineering backgrounds were combined in an intense study of the problems of RFI from High Voltage Power lines. His assistance with the local Emergency Fire Service radio system extended over many years.

Scott was frequently engaged in a variety of amateur experiments, often in collaboration with his life-long friend, Bob Edgar, VK5RS, and his brother-in-law, Rob Gurr, VK5RG.

The sympathy and friendship of all Amateurs is extended to his wife Marion and their four daughters.

Rob Gurr VK5RG

LOOK INTO THE ULTIMATE

VOX: Voice – activated mike circuit is built into the TS820. All vox controls up front.

NOISE BLANKER: Crystal filter circuit is highly efficient in eliminating pulse noises.

RF MONITOR: lets you hear your own transmission. Also useful for adjusting RF processor

IF SHIFT: (Passband tuning) varies IF passband without changing receive frequency-lets you eliminate unwanted signals. RIT lets you vary receive frequency 5k Hz either side of VFO.

VERNIER: Plate tuning control has vernier for fast precise tune-up adjustment.

HEATER: lets you turn off tube filaments on receive only. TS820's solid state circuit draws less than most car dash lights.

DIGITAL READ-OUT. (Optional) Clear blue readout on receive and transmit.
Mixes carrier, VFO and 1st het frequencies.

THE BREATHTAKING KENWOOD TS-820 PACESETTER HF TRANSCEIVER

You command the band with our Kenwood TS820. Superb phase lock loop circuitry allows highly accurate frequency derivation without introducing spurious signals. You can switch sidebands (USB, LSB, CW) without recalibrating, too!

Kenwood's exclusive FET-based VFO gives high stability under all conditions. If you'd like to know more, just mail the coupon today.

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TV506: 6MTR band transverter

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TV502: 2MTR band transverter

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amateur radio

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COVER PHOTO

Michael Owen VK3KI (right) presents Peter Williams VK3IZ (left) with an engraved plaque in recognition of Peter's role in the formation and establishment of the International Amateur Radio Union — Region 3. (See IARU News on on page 18.)

The presentation was made at the 1977 Federal Convention held in Melbourne over the Anzac Day week-end.

— Photo by Cyril Maude, VK3ZCK.

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MODEL OL64 D/P MULTIMETER. Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB. Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available. Model C $6.90.

$29.90 Postage $2.20

MODEL CT-500/P MULTIMETER

Of intermediate size, this popular multimeter combines high accuracy with versatility over 24 ranges. Mirror Scale. Diode protected movement.

SPECIFICATION: 20,000 ohm/volt DC; 10,000 ohm/volts AC. **DC Volts:** 2.5, 10, 50, 250, 500, 5000. **AC Volts:** 10, 50, 250, 500, 1,000. **DC Amps:** 0.05 mA, 5 mA, 50 mA, 500 mA. **Ohms:** 12k ohm, 120k ohm, 1.2m ohm, 12m ohm. **Centre Scale:** 60 ohm, 600 ohm, 6k ohm, 60k ohm. **Decibel:** —20 to +62 dB. **Dimension:** 5½ x 3-5/8 x 1¾ inches. Carrying case available, Model B — $5.90.

Price: $24.90 — Postage $2.20.

MODEL AS100 D/P MULTIMETER

This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.

SPECIFICATION: 1000,000 ohm/volt DC. 10,0000 ohm/volt AC. **DC Volts:** 0.3, 3, 12, 60, 120, 300, 600, 1,200. **AC Volts:** 6, 30, 120, 300, 600, 1,200. **DC Amps:** 12 uA, 6 mA, 60 mA, 300 mA, 12A. **Ohms:** 2k, 200k, 2m, 20m, 200m ohm. **Centre Scale:** 20 ohm, 2,000 ohm, 20,000 ohm, 200,000 ohm, 20m ohm. **Decibel** —20 to +57 db. **Dimensions:** 7-3/5 x 5-2/5 x 2-3/5 ins.

Carrying case for model I — $7.90.

Price: $52.50 — Postage $2.20.

KARPACK VOLTAGE ADAPTOR

Operates from car cigarette lighter socket. 12V neg. earth cars only. Output 6V, 7.5V and 9V (switched) to 300 mA max.

$6.90 — Post $1.

200-H.

90° quadrant meter.
Pocket size.
AC/V: 10V, 50V, 100V, 500V, 1000V (10,000 ohm/V).
DC/V: 5V, 25V, 50V, 250V, 500V, 2500V (20,000 ohm/V).
DC/A: 50uA, 2.5mA, 250mA.
OHM: 60k ohm, 5M ohm.
Capacitance: 100pF to 0.1uF, .001uF to .1uF.
dB: —20dB to +22dB.
Audio Output: 10V, 50V, 120V, 1000V AC.
Approx. size: 4½ in. x 3¼ in. x 1⅛ in.
$16.90. Postage $1.50.

POCKET MULTIMETER

SPECIAL

MODEL C1000M MULTIMETER

Compact, handy and versatile, the C1000M is the ideal low cost pocket meter. Mirror Scale. **Specifications:** 1,000 Ohm/Volt DC; 1,000 Ohm/Volt AC; DC volts 10; 50; 250; 1,000; AC volts 10; 50; 250; 1,000; DC amps 1 mA; 100 mA; Ohms 150 KΩ; Centre scale 3 KΩ; Decibel —10 dB to 22 dB; Dimensions 3-1/2" x 2-3/8" x 1-1/8" 90 x 60 x 30 mm.

$9.75
POST $1.00

CT-500 — $24.90 — Postage $2.50

Popular, medium-size, mirror scale. Overload-protected.

AC/V: 10V, 50V, 250V, 500V, 1000V, (10,000 ohm/V).
DC/V: 2.5V, 10V, 50V, 250V, 500V, 5000V (20,000 ohm/V).
DC/A: 50 uA, 5 mA, 50 mA, 500 mA.
OHM: 12k ohm, 120 k ohm, 1.2M ohm, 12M ohm.
dB: 20 dB to +62 dB.
Approx Size: 5½" x 3 5/8" x 1P". **P&P 50c**

YAESU FRG-7

THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER

The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

$328

HIGH QUALITY 3-WAY CROSSOVER — $9.95
AND 2-WAY NETWORK — $7.90

D.D.K. CROSS OVER NETWORK:
Imp.: 8 ohm; C.O. Freq.: 800, 4500 Hz; Power Cap.: 70 watts RMS.

Red Dot: Woofer; Orange Dot: Midrange; Blue Dot: Tweeter; Green Dot: Input.

Postage $1.20

SPEAKER WIRE — 100 metre rolls

$11.90 per roll — post free.

WALKIE-TALKIES — 100 Milliwatt

7 Trans. Call Buzzer, Superhet System, 9V Battery. PMG approved. 27.240m xtal. Complete with booklet. **$52.00 Pair** — post free.

INTERCOMS

2 STATION AND 9V BATTERY .... **$12.90 each**
3 STATION AND 9V BATTERY .... **$18.90 each**
4 STATION AND 9V BATTERY .... **$26.90 each**

Complete with 60 ft. wire. Ideal for garage, baby room, etc. — Postage $1.50.

CB POWER SUPPLY

240V in, 13.8 out. 1 amp continuous.
$34.00 — P&P $1.50.

SPECIAL

9" x 6" SPEAKERS

Brand new, in carton, 4 ohm impedance. Ideal for car cassettes, radios, etc.

$4.00 each
Postage $1.00

10 for $30.00
BULK BUY

BARLOW-WADLEY XCR-30

a truly portable communications receiver, based on the WADLEY LOOP principle, the same principle as applied in the DELTAHET and RACAL receivers. A truly crystal-controlled highly sensitive multiple-heterodyne portable receiver of exceptional stability with continuous, uninterrupted coverage from 500 kHz to 31MHz.

All for **$310.00** F.O.R.

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amateur radio

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JUNE 1977
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QSP ADVANCING THE STATE OF THE ART

What do we all understand by "advancing the state of the art"?

Perhaps the use of Oscar satellites for long distance VHF/UHF communication, or maybe solid-state digital techniques for RTTY or SSTV, or even the use of UHF repeaters as an aid to mobile communication. Australian amateurs are indeed employing not only the above advanced techniques but also many more.

It is quite obvious, however, that "advancing the state of the art" will mean different things to different amateurs.

The 1296 MHz contact between VK5 and VK6 earlier this year excited many amateurs and raised the odd eyebrow world-wide. The sceptics will say "that if one waits long enough, of course the band will open" — maybe. One of the stations used SSB — SSB on 1296 MHz!—what's the point? Why there aren't many commercial VHF SSB systems in use — let alone SSB on UHF or SHF!

In VK2 a small band of microwave enthusiasts are quite active on most of the amateur allocations up to 10 GHz and over the years there has been sporadic activity on 1296 and 2300 MHz in VK3 with even less known activity in the other States.

In Europe, considerable effort is being put into popularizing the microwave bands. A recent report in "Radio Communication" (RSGB) mentioned a meeting of IARU Region 1 VHF Managers in Amsterdam where it was suggested that "given the effort over the next year or two, it is quite possible for amateurs to make a significant change in their use of microwave bands which could well influence our position at WARC 79".

The same article went on to mention that what is needed to stimulate activity on these bands is one or two proven, bug-free designs for equipment and LOTS more operating.

"Lots more operating" is certainly needed in Australia, especially on the higher frequency amateur bands. So there is a need for amateurs — who are involved in state of the art activities — to inform others of their work.

Tell us what you are doing.

P. A. WOLFENDEN VK3ZPA.
Chairman VHF/UHF Advisory Committee. ■

QSP

AMATEUR EXAMINATIONS

The August AOCP theory exam, we are told, will be of the usual essay-type question.

However, it is likely that the February 1978 exam is going to be of the objective, multi-choice format.

The Federal Education Committee wishes to assist the P and T Department to produce an exam bank of suitable questions. We therefore invite questions, preferably typewritten (indicating in pencil the correct answer), to be forwarded from all States.

This is an opportunity to assist the P and T Department to develop a bank of questions at a depth level which is generally accepted as satisfactory for amateur exams.

The format of Novice 5 w.p.m. CW exams is being investigated with P and T Department. The main question is spacing of characters in letters and between words. This is being closely looked at, and it is hoped that agreement can soon be reached on a satisfactory format for the exam.

VK3ZR

1976 VK/ZL/OCEANIA DX CONTEST

1. Almost 1,200 logs were received.
2. Entry of ZL2GJ was omitted from Phone result — 1,355 points.
3. An error was made in ZL 40 metre CW results. ZL1AMO with 7,620 points was THIRD and not ZL1AIH.

ZL2GX

1977 CALL BOOK

Your last opportunity to be listed correctly in the 1977 Call Book is **NOW.** If your address label is incorrect in any detail this error will go through to the Call Book because the listings will derive from the same EDP file. **Write now.** This applies to any changes in call sign or the addition of any call sign or any different call sign to the one listed in the 1975 Call Book. Zones, clubs, groups, repeater groups, school clubs and others please take note and act on the above **now.** Next week will be too late.

2M BEACONS

From Radio ZS of January 77 comes news that the first two metre beacon was put into operation at Alvertsone near Durban as ZS5VHF on 144.925 MHz. Five other beacons are planned for the Republic — Cape Town, ZS1BHF on 144.92 MHz. Grahamstown ZS2VHF on 144.91. Hamismith ZS4BHF 144.90. Johannesburg ZS6JHB 144.915, and Potgietersrust ZS6TIB on 144.905 MHz. Yet another beacon now in operation is in Mbabane Swaziland, 3D6AX on 144.735 MHz.

NEW PREFIX

For the period 4th June to 12th June this year the prefix GE may be heard in place of the familiar G, GM, GW, etc., prefixes. This was stated to be a one-off concession to mark HM the Queen's Silver Jubilee celebration. Radio Communication April 77.

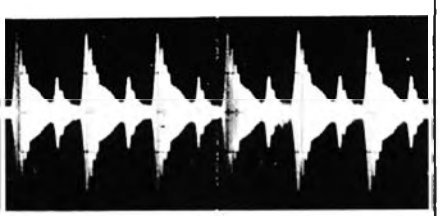
FT-301D

All Solid State Digital Readout HF Multi-Mode Transceiver

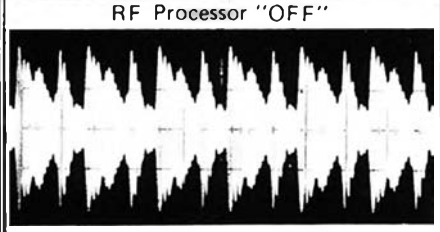
The FT-301D is an advanced fully solid state Digital Readout SSB, AM, FSK and CW transceiver covering 160mx thru 10mx including one auxiliary band and WWV. It has all the outstanding features of Yaesu's top performance FT-101E (inc. RF Processor) plus many more additions (Digital Readout, I.F. Rejection filter, & switchable AGC time constant).

RF PROCESSOR

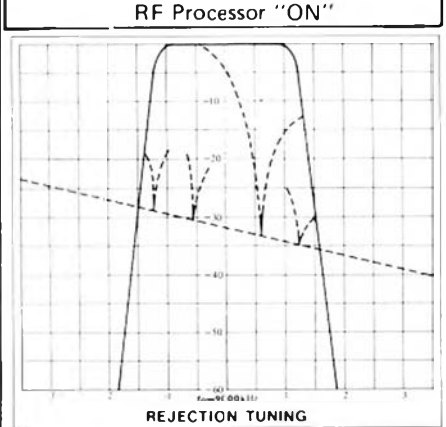
The RF Processor increases talk power to cut through the pile-ups without addition of a linear amplifier



RF Processor "OFF"



RF Processor "ON"



REJECTION TUNING

FEATURES

- ALL Solid State — 27 IC, 47 TR, 24 FET and 94 diode
- ALL Band — 160 through 10 meter plus receive only for WWV/JJY
- ALL Modes — SSB (USB/LSB selectable) CW, AM and FSK
- Digital Dial Readout — by large LED diode
- 200 Watts PEP INPUT for SSB, CW and 50 Watts for AM, FSK
- RF Feedback — for clean signal
- Rejection Tuning — tunable crystal filter rejection
- Effective Noise Blanker — for elimination of noise spikes
- RF Speech Processor — for increased talk power
- Built-in fully adjustable VOX
- Automatic break-in CW operation with sidetone
- Selectable 25 kHz/100 kHz calibrator, ± 5 kHz TX-RX or RX clarifier with separate ON-OFF switch
- Selectable, amplified AGC system — SLOW, MEDIUM and FAST
- Built-in internal crystal control (11 channels) provision and dual VFO adaptor
- Adjustable carrier level for tune-up and novice operation
- Triple protection circuits for PA stage and warning system
- 8-pole SSB filter for unparalleled selectivity
- Built-in speaker
- Compact size, light weight
- Complete line of compatible accessories for flexible station design

TECHNICAL DATA

GENERAL

Frequency Range: 1.8—2.0 MHz, 3.5—4.0 MHz, 7.0—7.5 MHz, 14.0—14.5 MHz, 21.0—21.5 MHz, 27.0—27.5 MHz, 28.0—29.9 MHz, WWV 5 MHz (receive only)
Mode: SSB (selectable USB or LSB), CW, AM or FSK
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation
Calibration Accuracy: 2 kHz maximum after 100 kHz calibration
Backlash: Not more than 50 Hz
Antenna Impedance: 50 ohm unbalanced nominal
Circuitry: 24 FETs, 47 Transistors, 27 Integrated Circuits and 94 Diodes
Power Requirements: 13.5 V DC nominal, 1.1 A (digital type) and 0.9 A (dial type) for receive and 21 A for transmit
Size: 280(W) x 125(H) x 270(D) m/m
Weight: Approx. 9 kg

TRANSMITTER

Input Power: 200 Watts PEP on SSB, 200 Watts on CW at 50% duty cycle and 50 Watts on AM and FSK. (Slightly lower on 10 meter and 160 meter bands.)
Microphone: 500 ohm dynamic type
Carrier Suppression: —40 dB
Sideband Suppression: —50 dB
Spurious Radiation: —40 dB
Distortion Products: —31 dB
Frequency Response: 300 to 2700 Hz ± 3 dB
Final Transistor: S2535 x 2

RECEIVER

Sensitivity: 0.25 μ V for 10 dB Noise plus Signal to Noise Ratio on 14 MHz
Selectivity: 2.4 kHz nominal bandwidth at 6 dB down, 4.0 kHz at 60 dB down on SSB, CW and AM. 600 Hz nominal bandwidth at 6 dB down, 1.2 kHz at 60 dB down with optional CW filter, 6 kHz nominal bandwidth at 6 dB down, 12 kHz at 60 dB down with optional AM filter
Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μ V equivalent to antenna input
Automatic Gain Control: AGC threshold nominal 3 μ V. Attack time is 8 milli-seconds and release time is selected from 3500, 1500 and 200 milli-second on front panel
Audio Noise Level: Not less than 40 dB below 1 Watt
Audio Output: 3 Watts to internal or external speaker at 4 ohm impedance
Audio Distortion: Less than 10% at 3 Watts output

FT-301D Accessories everything you want in a complete home station design.

YAESU's years of experience in the radio amateur field are exemplified in the FT-301D series. The FT-301D can be interconnected to its matching power supply and external VFO unit. This feature provides you with a completely integrated home station with transceive operation on either VFO split frequency or crystal controlled operation with a flip of the switch. The FP-301D with built-in speaker is a complete AC power supply and can be used for any of the following supply voltages 100/110/117/200/220/234 Volts, 50/60 Hz. A digital clock and automatic call sign identifier are an integral part of the power supply. The time display can be selected for either a 24-hour or 12-hour system with a flip of the switch on the front panel. A programmable identifier transmits your call sign in morse code automatically every ten minutes.

- **AC Power Supply FP-301D**
- **AC Power Supply FP-301**
- **External VFO FV-301**
- **Monitor Scope YO-301**

TUNABLE REJECTION TUNING

The tunable IF rejection filter utilizes sharp resonance characteristics of a crystal filter. The resonance frequency is tunable over the entire IF range to reject any interferences close to or inside the IF pass band.

PRICES	
FT-301D inc. AM Filter	$1147
FP-301	$169
FP-301D	$289
FV-301	$149
YO-301	$345

Above prices include S.T. Freight and Insurance is extra.
90 day warranty. Prices and specifications subject to change.

bail **ELECTRONIC SERVICES**

60 Shannon St., Box Hill North, Vic. 3129. Phone 89 2213
Agents in all States and A.C.T.

FRED BAIL VK3YS
JIM BAIL VK3ABA

JAS7677-22

WIANEWS

A special report on the 1977 Federal Convention will appear in AR next month. It is not intended to duplicate news items from the Convention but one or two deserve earlier publicity.

"CB"

This is the Position Paper, relating to CB, adopted at the Convention after very considerable discussions in a working group and later in the Convention itself —

"1. That the Amateur Radio Service is accurately defined by ITU Regulations.

2. That the 'CB' type operations by non-technically qualified operators is entirely different in character from the amateur radio service.

3. That a 'CB' type service could not be regarded as part of the amateur radio service.

4. That it is highly undesirable and totally unacceptable to combine 'CB' and amateur radio on the same frequency band.

5. That all radio services should be subject to regulation and that regulation should be enforced. Unlawful use of spectrum space, particularly that allocated to legitimate services, should be subject to prosecution.

6. That without expressing judgement on a 'CB' service as such, other established services should not be required to give up frequency allocations for such a service.

7. That the usage of frequency by a 'CB' type service should not be in derogation of the ITU Convention and Regulations (e.g., an avenue for International communications).

8. That the introduction of a 'CB' type service must not in any manner result in or contribute towards the reduction or unwarranted variation of conditions applicable to the amateur radio services or which would result in the imposition of conditions less advantageous to the amateur in respect of present technical standards."

ARNOLD REPORT

After very considerable discussion the Convention authorised the issue of the following statement about the Investigator's Report by Bob Arnold (as published in AR April 1976) —

"In not adopting the Report the Federal Council noted that the organisational proposals were not considered to be appropriate at this stage, but that the other recommendations were being actively considered by the Executive and in a number of cases had already been adopted and implemented, namely —

Federal News: 1. News Tapes:

Communication has been improved between the WIA Executive office and members by the use of weekly broadcast tapes for propagating up-to-date information. Not only are these tapes being used for Divisional broadcasts but they are also being used as part of broadcasting stations' Amateur Radio News programmes (in Victoria 3CR and 3HA make use of tapes supplied by the Victorian Division).

2. WIANEWS:

In addition to the broadcast tapes stop press information to members and clubs has been stepped up via WIANEWS and inserts in Amateur Radio magazine. This regular feature aims to cover relevant items of news from sources both within Australia and overseas."

CALL BOOK

The Institute has been successful in negotiating a new contract with the P and T Department for the publication of call books over the next 10 years. These call books will be making use of the Institute's EDP (computer) records to improve accuracy and reduce the workload associated with the publication of this very imporant document.

MEMBERSHIP DRIVE

In an effort to increase membership of the Institute a campaign ("8000") was implemented during 1976. This membership drive is especially important when it is realised that WARC 79 is only two years away. It is proposed to continue this campaign with vigour.

WIA PUBLICATIONS

The Institute is currently investigating the feasibility of publishing an "Amateur Radio Year Book" for sale to the public through normal commercial outlets. The present procedures for publishing and distributing Amateur Radio magazine have also been reviewed and at this time are considered to be satisfactory as they stand.

(Note by Editor: Any ideas about what the Year Book should contain and anything else relating to it would be most welcome.)

P AND T DEPARTMENT DISCUSSIONS

The relationship between the WIA and the P and T Department continue to be close and cordial. During the year constructive discussions have been held on such matters as Novice licensing, the Call Book, WARC 79, "CB", repeater licensing conditions, amateur examinations, etc. It was also noted that officers of the P and T Department attended the 1977 Federal Convention (as they have in the past) and many views were freely exchanged.

OFFICE

Executive office procedures have been reviewed and streamlined wherever possible to achieve maximum efficiency at minimum cost. This question is under constant review.

FINANCIAL

The Convention passed a motion that the Federal element of the 1978 subscriptions be determined not later than 31st August, 1977. Another motion was passed "That for funding WARC 79 expenses a levy be imposed on each Division at the rate of $2.00 per member at the time of the 1978 subscriptions invoicing, such sum to be paid prior to 31st March, 1978, by the Divisions in respect of their members". A budget for 1978 was adopted.

MORE "CB"

A meeting was held in Canberra with the Minister for Posts and Telecommunications, Mr. E. Robinson, during the evening of 27th April. Mr. D. Large, who wrote the report to the Minister on the introduction of a Citizens' Band Service in Australia, attended. On the WIA side were the Federal President, Dr. D. Wardlaw VK3ADW, Mr. M. J. Owen VK3KI, Mr. T. Mills VK2ZTM, President of the NSW Division, and various members of the NSW Division "CB" Investigating Committee, including Mr. S. Kuhl VK2ZSK, C. Jones VK2DD, and D. Dwyer VK2ZCC. Mr. E. W. Howell VK1TH, also attended.

The Minister was unable to extend his stay at the meeting but discussions with Mr. Large continued.

WIA PROJECT AUSTRALIS

The Annual Report of the Chairman of the WIA Project Australis Group was received and adopted by the 1977 Federal Convention. Mr. D. J. B. Hull VK3ZDH highlighted several problems in his report but one of the more important of these was the fact that because of other commitments he wished to step down from the role of Australis chairman in order to concentrate what time is available to him to the command station role. We noted that a number of enquiries from some very capable interstate people over the years offered help with the hardware, etc., but could not be taken up because of co-ordination difficulties. Further action relating to this activity was left in the hands of the Executive.

WICEN

The Federal WICEN Co-ordinators' annual report was very well received at the Convention as it highlighted a number of problems. Many members seemed apprehensive about joining WICEN but in discussions it emerged that the procedures to be learned were simple, minimal and commonsense. Nobody need have any fears of tedious learning before being accepted into WICEN as the message handling procedures were easy to assimilate but more importantly meant that a disciplined back-up service, such as that offered by amateur radio, was more likely to be accepted and used by State emergency service for the benefit of the community as a whole. An undisciplined rabble involved with radio communications was something everybody feared. It was agreed to look into the feasibility of holding a WICEN Co-ordinators' meeting in the near future. ■

QSP — continued

RUSSIAN SIGNALS VEHICLE FOR WIRELESS ELECTRICITY?

OTTAWA (CP) — A communications department official said Tuesday the Soviet Union has sent out since July a series of powerful radio signals that have disrupted communications at various times throughout the world.

The signals have also fuelled speculation that the Soviets are trying to develop a system of transmitting electrical power without wires, a possible solution to global energy troubles.

W. W. Scott, director of the department's operations branch which has been monitoring the Soviet signals, said the experiments prompted a rash of protests, including from Canada, Great Britain, the US and Scandinavian countries, which were particularly affected by the disruptions.

As a result, the Soviets cut back the experiments, "but they had been just go, go, go almost on a continuous basis," Mr. Scott said.

He said there is no evidence about the purpose of the signals, which he called amazing and puzzling. "But you have to keep an open mind. There are so many strange things going on today in science."

Followers of the turn-of-the-century Yugoslavian inventor Nikola Tesla are convinced, however, that the signals are part of a Soviet attempt to transmit electrical energy by using the earth as a conductor, one follower said.

Andrew Michrowski, an Ottawa architect and member of the Planetary Association for Clean Energy, an international group trying to resurrect Tesla's work, said the implications of such a system are overwhelming.

Mr. Michrowski said in a telephone interview that Tesla's invention, called a magnifying transmitter, would make it possible to send electric power anywhere in the globe at the speed of light with up to 15 per cent less energy loss than present systems and without costly networks of wires and transmitters.

The technique could also be an efficient means of tapping solar energy, of controlling the world's climate and of enabling plants to grow with less sunlight and water, Mr. Michrowski said. Although the exact effect has not been worked out, it could result in oranges growing in Saskatchewan.

The magnifying transmitter also has enormous potential for destruction if abused or misused, he said. For instance the system could cause earthquakes.

In simplified terms the Tesla system links the generally negative particles of the earth's atmosphere with the generally positive particles of the earth's atmosphere with the generally positive particles in the earth, Mr. Michrowski said.

Tesla is said to have had one of his machines working in northern Quebec and it was used for several years to power a laboratory about 100 miles away, Mr. Michrowski said.

From "The Tribune", Winnipeg, Manitoba, 2-2-77.

Submitted by Frederick Phillips VK2ZQ. ■

AFTER THOUGHTS

The values given in Table 1 for the article "Transitions in Coaxial Lines" (AR April 77, page 20) and reference No. 1 were incorrect. The correct values are as follows:

D/D_1	Δ/D_1	
	50 ohms	75 ohms
1.2	0.055	0.065
1.4	0.105	0.12
1.7	0.165	0.17
2.0	0.215	0.22
2.5	0.29	0.295
3.0	0.35	0.36
3.5	0.415	0.42
4.0	0.475	0.48

References.

1. SANDORF, H. N., Amateur Radio, **38:** 7 (1970). ■

THE EFFECT OF GROUND ON THE DIRECTIONAL PATTERN OF A 14 MHz ANTENNA

A light aeroplane was used to measure the directional pattern of VK3MO's 14 MHz antenna system. Two three element monoband beams are stacked at 30 m (100 ft) and 14 m (45 ft). Field strength measurements were taken in two directions which have differing ground conditions. This allowed an estimate of the effect of the ground conditions on the performance of the system. It was found that the lobe in the preferred direction was 2 S points stronger than the direction with less favourable ground conditions, and this lobe was at one half the angle of radiation.

A. G. Bolton VK5TT,
and I. J. Williams VK3MO
3 Ilford Street, Vale Park 5081, S.A.

There are considerable advantages for the ham whose antenna has a low angle of radiation. Openings occur sooner for him, and last longer, because he can use the ionosphere which is just coming over the horizon. His neighbour must wait for the lonized region to rise higher above the horizon.

Also, even when the band is open to both hams, the lower angle of radiation means the DX can be reached with fewer ground and ionospheric reflections. Each of these reduce the strength of the signal.

Ground conditions considerably effect the direction of the major lobe of an antenna system. They can reduce the available signal power because of the effects of resistivity. Perfect ground, which is a flat ideal conductor, would give greater power to the lobe than a resistive ground. But how much power is lost, and by how much is the angle increased? The direct measurements from the plane were to help find out.

THEORETICAL PREDICTIONS

The effect that flat resistive ground has on the magnitude of the lobe can be computed theoretically. It has been shown to[1] slightly reduce the magnitude of the maxima of the directional pattern of the antenna". A representative figure for this effect has been given as .1 dB, the sea being .1 dB better than dry earth.[2]

The angle of the directional pattern of the antenna over ground is determined by both the free space pattern of the antenna and the directional characteristics of the ground.[1] It has been suggested that the directivity of the free space pattern does nothing to the vertical angle of the lobe.[2] This would mean a 3 element yagi would have the same angle of radiation as a dipole. However this is not the case. The contributions of the ground and of the antenna are superimposed; it is the product of the two which gives the overall pattern.

The antenna under test has stacked 3 element yagis. The higher yagi is at 30 m (100 ft), and on the 20 metre band this is 1.5 wavelengths. Theoretically, a dipole at this height would have a lobe at 9.6° to the horizontal.

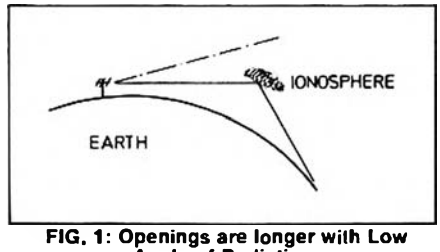


FIG. 1: Openings are longer with Low Angle of Radiation.

MEASUREMENT TECHNIQUES

A TS520 receiver was taken aboard a light plane which had a 1.5 metre long antenna tied securely between the landing wheels. The S meter of the TS520 was used for the field strength readings, and the antenna under test was energized with a 5 watt carrier signal. Later, a calibration curve for the S meter was obtained using reasonably accurate instruments.

The plane flew at various heights and 2 sets of signal strength readings were taken. In the westerly direction one set was at 3 km from the antenna, and the other set was a 1.5 km. Then the antenna was turned south and the signal strength measurements were repeated, south of the antenna this time at distances of 2.5 km and .8 km.

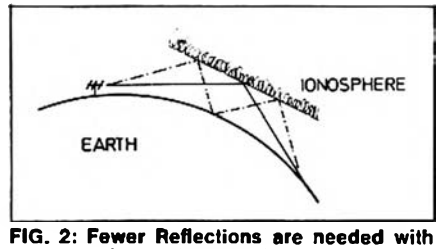


FIG. 2: Fewer Reflections are needed with a Lower Angle of Radiation.

RESULTS

The directional pattern of the antenna was calculated using the calibration curve for the S meter of the TS520, and by making allowance for the distance of each measurement from the antenna. For the purpose of calculating this distance and the angle of the radiation it was assumed that the emitted radiation was from midway between the stacked 3 element yagis.

Diagram 3 shows the field intensity as a function of the angle of radiation for each of the 4 sets of readings. Diagram 4 shows the terrain in the western direction, and diagram 5 shows the terrain in the southern direction.

INTERPRETATION OF THE RESULTS

1. The comparison between the readings in the western direction at 3 km and at 1.5 km show the radiation pattern changes even after distances in excess of 50 wavelengths. This suggests that ground conditions at this distance still have an important effect on the performance of an antenna system such as the system under test. It would be reasonable to assume that the ground conditions at these distances would be less important with less directive antenna systems.
2. The angle of radiation of the lower lobe (4 degrees) clearly illustrates the importance of free space antenna directivity on the directivity of the antenna system over real ground. The contribution from the ground alone is at 9.6 degrees to the horizontal.
3. The signal to the west is far stronger than the signal in the southerly direction. There is a 12 dB advantage and it has half the angle of fire. These advantages could be attributed to three factors.
   (a) The house and garage south of the antenna. These are .5 wavelengths away horizontally, and only .25 wavelengths below the lower beam.
   (b) The rise to 10 m and 120 m from the antenna in the southern direction. This field also has 20 m high trees on it.
   (c) The differing soil resistivities. The soil in the preferred direction is volcanic and south of the antenna the soil is sedimentary.

It is difficult to isolate the individual contributions of these three effects. The average rise of the ground south of the antenna is 4° for the first 150 m. This might account for the rise in the angle of fire of the antenna in this direction of approximately 4°. The trees at 150 m are 20 m tall and therefore level with the top

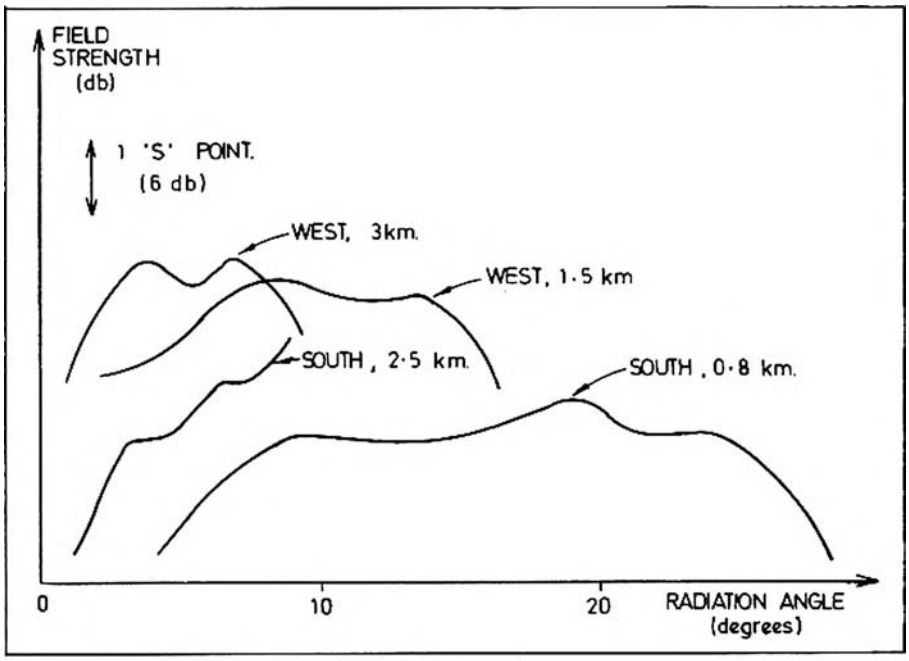


FIG. 3: Results of Field Strength Measurements.

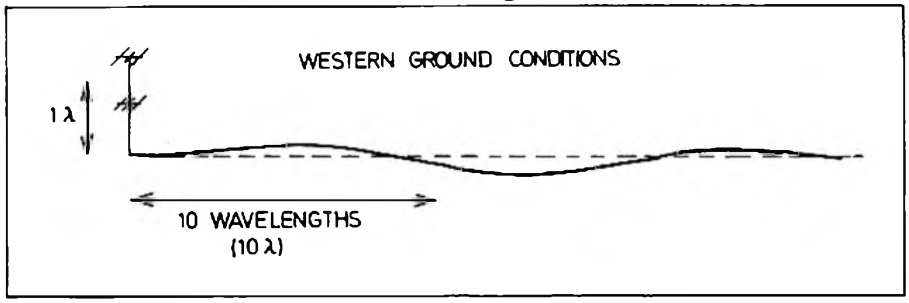


FIG. 4

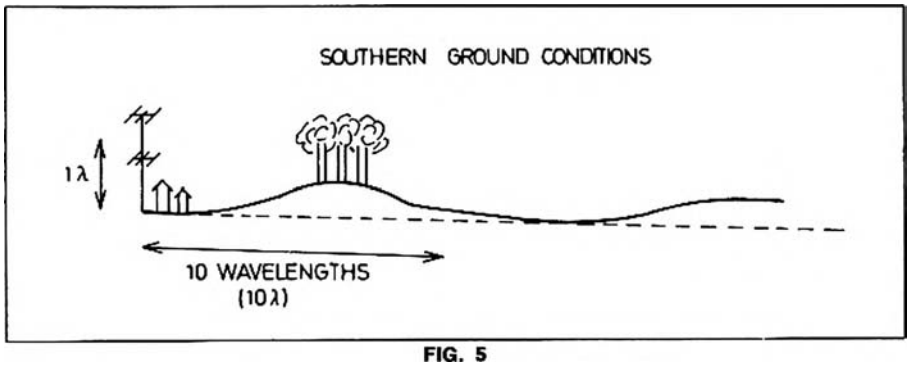


FIG. 5

of the antenna. This might account for the lower power in the lobe, though the antenna pattern would also be modified by the proximity of the house. It seems unlikely that the house would account for a difference of more than 3 dB in signal intensity, since the yagis are fed at the same power level. The resistivity of the soil may also account for a considerable loss in lobe strength, though simple theory suggests otherwise.

One point is clear, level conductive soil is worth at least 2 S points over ground conditions which are still better than most.

SUGGESTIONS FOR FURTHER WORK

It was very rewarding to actually measure the field intensities of an antenna system from an aeroplane. There was a wealth of information available. Using this method, for example, it was possible to count no fewer than 10 minor lobes in the direction of fire of the antenna. However there are a few suggestions for those undertaking further work.

Measurements should be taken at a greater distance than 3 km from the antenna. The results obtained in this test were adequate to demonstrate the considerable effect of the ground conditions, but accurate measurements of the final directional pattern must be made much further from the antenna.

The problems involved with using a light plane need careful consideration. We were fortunate to have the enthusiastic support of Mr. Arthur Gloster. Arthur is a foundation member of the Kyneton Aero Club, and is also involved with antenna patterns professionally. This experience helped a great deal in the planning stages.

Do not underestimate the difficulty of flying to a particular point in the sky. The experience of our pilot, Mr. Paul Tetley, includes aerial photography and crop dusting. This is very important if reliable measurements are to be made.

CONCLUSIONS

With planning, the use of aeroplanes in antenna measurements is convenient and extremely informative. The measurements made during this test confirmed our worst suspicions that hams already have about the importance of a good location. It remains to show the relative importance of individual factors such as hills, trees, soil resistivity and adjacent buildings. Further measurements to isolate these factors would be invaluable to the ham who is choosing a location.

ACKNOWLEDGEMENTS

We are very grateful for the invaluable help of Mr. Arthur Gloster who helped us plan the details of the navigation, antenna installation on the plane and the method of obtaining the measurements.

Also, Mr. Paul Tetley's skill in piloting the plane with sufficient accuracy was essential to obtaining the test results, and we appreciate this contribution.

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1. R. E. Terman. Electronic and Radio Engineering (4th edition), pp. 885.
2. QST November 1975. pp. 21. "Pattern Factors for Elevated Horizontal Antennas Over Real Earth." H. K. Landskov.
3. Radio Handbook (18th edition), pp. 45

QSP

REPEATERS

A compilation of 2m repeaters within a 60 mile radius of the Empire State Building in New York reveals 97 all told. QST February 77. And we think we have problems here!

7th SEANET CONVENTION

A letter from HS1WR, President of RAST, advises that the 7th Annual SEANET Convention will take place at the Erawan Hotel, Bangkok, from Friday, 18th November, 1977, to Sunday, 20th November. Details, including special tours such as the Festival of Lights and the Elephant round-up at Surin, and forms for attendance are available on application SASE to the Executive office in Toorak. Advice is also given about the SEANET 77 Contests on CW 9/10 July and phone 20/21 August — details available from 9M2FK. Visitors to Thailand should note that the importation of communications equipment is forbidden except on prior authorisation from the Royal Thai Government.

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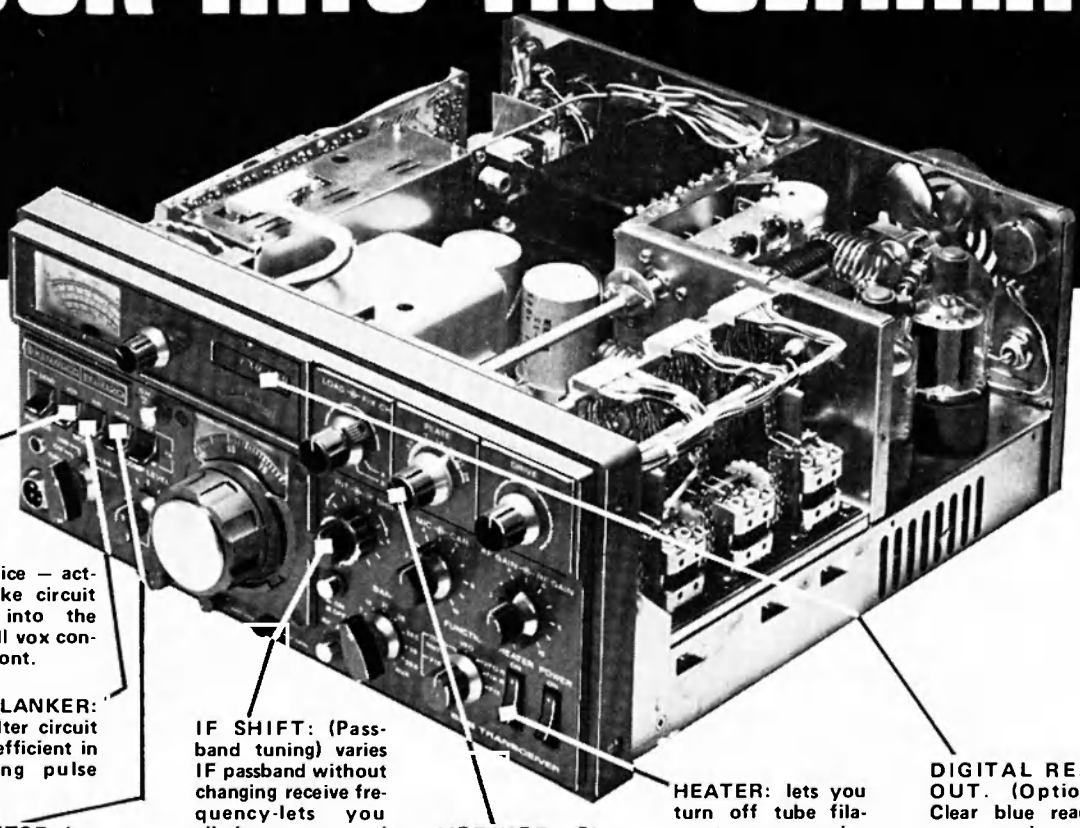

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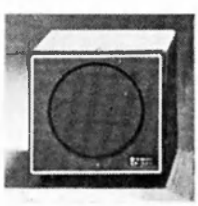

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WECAR1

AN AUDIO PHASE-SHIFT NETWORK FOR SOLID STATE PHASING SSB

Roger Harrison VK2ZTB
14 Rosebery Street, Balmain 2041

While investigating suitable circuits for a solid-state phasing SSB rig I came across an article by Robert Cheek (then W3LOE) in the November 1948 issue of CQ (page 17) entitled "Single Sideband For Everyone". Naturally, it described a valve rig, but it used a passive phase-shift network that not only intrigued me, but exhibited very good characteristics. The circuit was an R-L-C network and is given in figure 1.

It has the advantage of a low-to-medium input impedance and thus may be suitable for solid-state circuitry, together with the unique advantage that the quadrature output ports can drive a low impedance — in the order of 400 to 600 ohms. Just what the doctor ordered for solid-state gear! The sort of audio phase-shift networks popularized at that time involved either active or passive R-C networks. The latter inevitably required very high impedance loads on the quadrature output ports or a stable, well-defined high impedance load. Solvable, but awkward. Active audio phase-shift networks, while attractive for other reasons, do not have the elegant simplicity of the passive networks, increased circuitry is required and the alignment necessary is a drawback in many circumstances. Besides, I didn't feel like getting into that just yet.

Anyway, however the circuit was going to turn out, I was interested in giving it a go. The original article specified a modified audio transformer for T1 and L1 and a power supply choke for L2. Some modernisation was necessary and so some suitable pot cores were tried. The results of design and adjustment are given in the parts list.

COMPONENTS:

According to the original article, components are relatively non-critical and standard 5 per cent or 10 per cent types may be used. The main requirement is that each 40 mH inductor must resonate with the 1 uF capacitor at 800 Hz. The exact values appear to be uncritical so long as components of the nominal value specified are used. L2 and the 6.2 nF capacitor must also resonate at 800 Hz. The exact frequency has no particular magic about it, 800 Hz being the geometric mean between 160 Hz and 4000 Hz which adequately covers the speech band. It is sufficient to ensure that each LC circuit resonates to the same frequency. The reactance of each of the 1 uF capacitors and the 40 mH inductors is about 200 ohms at 800 Hz.

Another alternative for the 40 mH inductors would be to use the 88 mH toroids beloved of RTTY enthusiasts. These consist of two 44 mH coils wound on a toroid and connected in series. They can be obtained quite cheaply from local sources or overseas. Using a CRO or VTVM and an audio oscillator it is a simple matter to resonate a 44 mH winding and a 1 uF capacitor to 800 Hz. Remove turns from a 44 mH winding until resonance is achieved. This sort of method may be used regardless of what coils are used.

Locally available toroids may be used to construct T1, L1 and L2 if desired, and details are given in the parts list.

The transformer, T1, consists of two windings connected in series, each having equal numbers of turns wound on the same core and resonated to 800 Hz with the 1 uF capacitor. The dots in figure 1 indicate corresponding ends (start or finish) of each winding.

CIRCUIT CHARACTERISTICS:

The input impedance is approximately 5K and should be driven either by a transformer, a phase-splitter stage or a differential amplifier. The quadrature output terminals, A and B, can drive a load impedance of around 400 to 600 ohms as mentioned previously, the characteristics of the network being largely unaffected by the actual load impedance — a distinct advantage over passive R-C networks which are quite sensitive to load impedance variations.

The speech amplifier preceding the network needs to include de-emphasis of about 4 dB per octave below 800 Hz as the network has a rising response in this region.

The characteristics of the network, from the original article, are as follows:—It will maintain the 90° phase difference between the output terminals within 2° from 300 Hz to 4 kHz and the amplitudes of the two outputs within about 0.3 dB of each other over the same range. There is a much smaller variation in both parameters between 400 Hz and 3 kHz. Thus, the opposite sideband suppression that may be obtained is 35 dB at worst at the extremities of the speech band and at least 40 dB across the substantial portion of it. A sharp cutoff above 3 kHz (at least 12 dB per octave) is recommended for the speech amplifier. A similar cutoff below 300 Hz is also recommended.

The network has a midband loss of about 15 dB and thus the speech amplifier needs to have sufficient gain to overcome this loss and provide sufficient output for the following circuitry. Similar comments apply if the network is used in receiver applications.

The low output impedance of the network makes it eminently suitable to drive diode balanced mixers without messy matching problems.

The author's prototype performed much the same as that in the original article.

Well, don't just sit there — get your soldering iron out!

PARTS:

- **L1** = 176 turns of 26 B&S enamelled wire on single bobbin of VINKOR LA2330 pot core assembly
- **Or** ~ 93 turns of 38 B&S enamelled wire on NEOSID toroid 12.7 mm OD by 6.35 mm ID by 9.52 mm height of F9 material.
- **L2** = 2090 turns of 42 SWG enamelled wire on single bobbin of VINKOR LA2330 pot core
- **Or** ~ 7052 turns of 38 B&S enamelled wire on NEOSID toroid 38.1 mm OD by 25.4 mm ID by 19.05 mm height of F9 material.
- **T1** = Two windings, one on each half of a double bobbin of VINKOR LA2330 pot core, 176 turns of 34 B&S enamelled wire for each winding. The dot indicates the start of each winding.
- **Or** ~ 2 x 93 turns (bifilar) of 38 B&S enamelled wire on NEOSID toroid the same as for L1.

*The 4.3K resistor, R1, may be a 3.9K in series with a 390 ohm, or 4.7K parallelled by a 56K resistor.

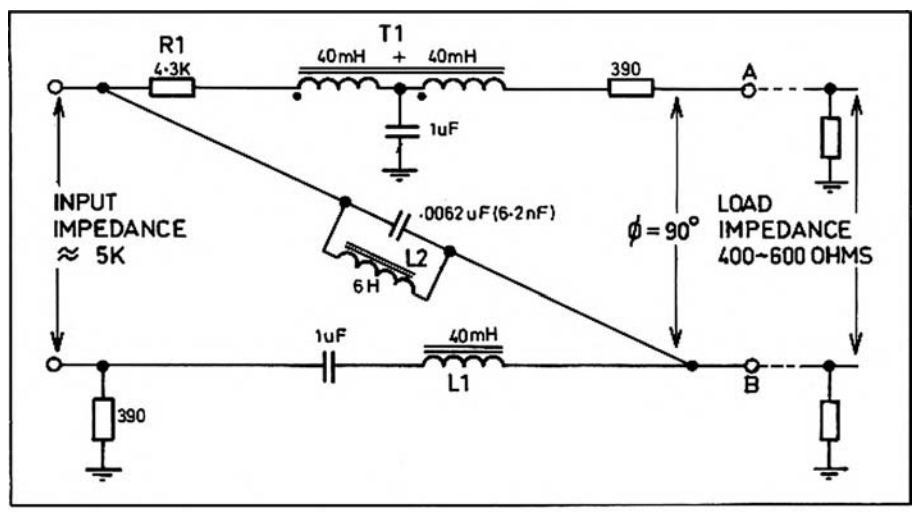


FIG. 1: R-L-C- Audio Phase-Shift Network as described by Robert Cheek in Nov. 1948 issue of CQ.

SIMPLIFIED AUDIO FILTERING

Maurie Evered VK3AVO
13 Sage St., Oakleigh, 3166

If you wish to become an authority on audio filtering or construct a multistage audio filter of well defined characteristics read no further but pass to the adequate list of references at the end of this article. If, however you wish to construct a cheap and simple but very effective audio filtering system to help extract signals from background noise then read on.

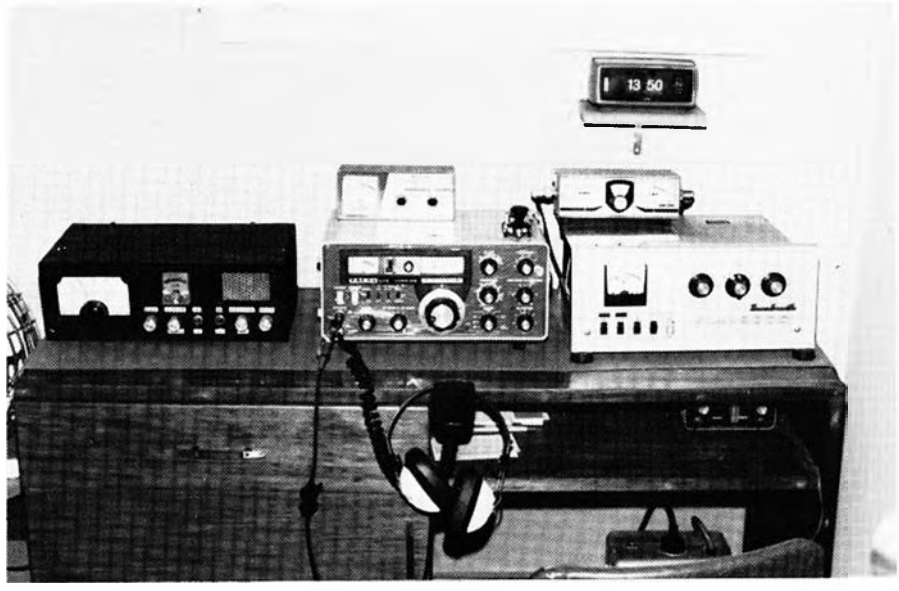
This system was inspired by three other AR articles (references 1.2 and 3). Experience has shown that you need to be able to apply attenuation to both high or low frequencies depending on background noise conditions and the particular mode being received for example "high cut" removes excessive background hiss, "low cut" removes unwanted low frequencies from static or some particular voice characteristics heard on SSB.

The need to apply these principles was accentuated by the ever present background noise at this QTH, a light industrial area with 6 kV power lines about 50 metres from the antenna.

This situation is worsened when you consider the state of the Dx bands at present; signals are much weaker than at the sun spot maximum of 1970 or so. The FT101 noise blanker is very effective against "ignition" type interference but varies in effect against power line noise.

Let us examine briefly the principles we can apply to attenuate unwanted frequencies. I will call these the series and parallel methods. The series method requires inductance for high frequency attenuation (inductive reactance increasing with frequency) and capacitance for low frequency attenuation (capacitance reactance decreasing with frequency).

The parallel method requires capacitance for high frequency attenuation and inductance for low frequency attenuation. This approach was used as the parallel connection of components does not require the opening of any circuit wiring.

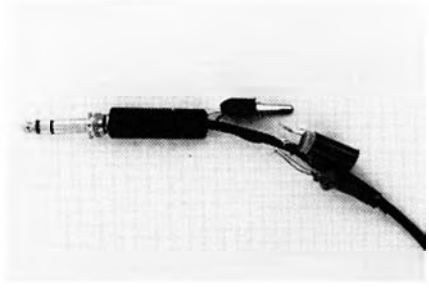


VK3AVO's NEAT SHACK.

The audio filtering was applied in my case to a pair of eight ohm headphones which I always use for listening except when pottering in the shack. This method has the advantage that you do not have to modify your transceiver as all components are added "outboard".

This technique is shown schematically in Fig. 1. You connect either capacity or inductance across the phones to achieve either high cut or low cut as required; leave both disconnected and you have normal receiving conditions. You can mount these components directly onto the phone plug and use a clip to connect to either one (see photograph) or you can build the unit into a box that connects in series between phones and receivers.

The values of capacitance and inductance in Fig 1 were found by trial and error. To achieve the desired results you may have to alter them in any particular case. A little experimentation will soon show what values of capacitance and inductance are needed.



CLOSE-UP OF AUDIO FILTER INSTALLATION.

In practice I use high cut for all CW and strong local SSB signals, low cut is useful when copying weaker SSB signals with a high static level.

One last word. Do not knock this little filter because of its extreme simplicity, at least not until you have tried it. Anyone visiting my shack is welcome to a demonstration and I think you will be surprised with its effectiveness.

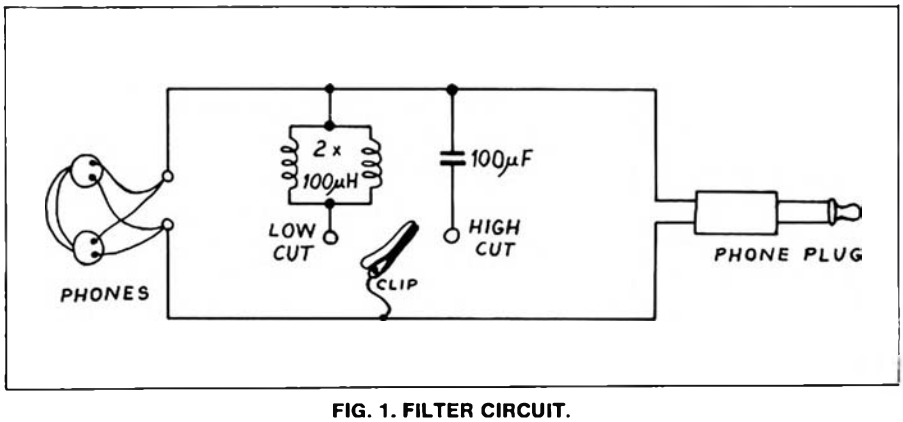


FIG. 1. FILTER CIRCUIT.

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2. Improvements to the Loudspeaker Filter. — B. Mann VK3BM and P. Williams VK5NN, AR February 1975 p. 22.
3. Commercial Kinks. — R. Fisher VK3OM AR September 1975, p. 25.
4. Filter Designs Part 1 and 2. — Electronics Theory Handbook, p. 12 and 15.
5. ARRL and RSGB Handbooks. — Appropriate Sections. ■

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PART 6

MORE ON AN RTTY CONVERTER WITH ACTIVE FILTERS

The diagrams referred to in this article are the same as those published on pages 11-14 of last month's issue of AR.

The description of the DJ6HP system is concluded in this article.

As in the circuit shown in Fig. 2 the converter shown in Fig. 6 has a capacitor added in parallel with the feedback resistance R R (R_{tr}), thus causing the circuit to have a low pass filter characteristic.

For the adder in Fig. 2 the following applies:

$$-Ua = \frac{RR}{Re1} \cdot Ue1 + \frac{RR}{Re2} \cdot Ue2 \quad \ldots(7)$$

The time constant which the parallel capacitor causes has the value . . .

$$T = RR \cdot C \quad \ldots(8)$$

You can therefore find the boundary frequencies for the circuit:

$$f\,max = \frac{1}{2 \cdot \pi \cdot RR \cdot C} \quad \ldots(9)$$

If the two input voltage swings are nearly equal you get at the output an alternating voltage swinging about O with a maximum frequency determined by T. For RTTY amateurs, you set f max to 40-50 Hz such that you can be sure that the signal will pass the filter.

After the low pass filter follows a non-inverting Schmitt trigger which is also made with the aid of an operational amplifier. This is shown separately in Fig. 4(a). The input and output waveforms are shown in Fig. 4(b).

For this circuit, the following apply (refer to Fig. 4(b)):

Switch on level . . .

$$Ue\,PA = -(R_1/RR) \cdot Ua\,min \quad \ldots(10)$$

Switch off level . . .

$$Ue\,AV = -(R_1/RR) \cdot Ua\,max \quad \ldots(11)$$

Coupling hysterisis . . .

$$Ue = (R_1/RR) \cdot (Ue\,max - Ue\,min) \quad \ldots(12)$$

For a large input voltage U e becomes U a = U a max. If you lessen U e, U a will remain at the value U a max until U e reaches value U e off. At this time U a jumps to U a min. This switching action is started by U e, but thereafter it is decided by the coupling of R R.

The stable value U a min is maintained until U e exceeds the value U e on. In Fig. 4(b) is shown the input and output voltage waveforms. For a supply voltage of ± 15 volts for IC type 709 U a max will be about 12-14 volts, U a min about —12 to —14 volts.

The following transistor T1 (5) acts as an inverter. It is coupled in or bypassed depending on whether normal or reverse shift is required, i.e. a higher or lower tone frequency could represent a mark frequency signal.

Transistor T2 is the keying transistor for the magnet current to the teleprinter. Here the current is supplied to the magnet through a variable resistance. The second magnet lead is coupled to earth through T2.

Transistor T2 must be able to break and close a supply voltage of 200 volts. (Alternatively a constant current low voltage driver could be used. Refer to AR Vol. 44, No. 3, March 1976, p. 7.—Ed.)

RTTY CONVERTER COUPLING

Operational amplifiers OP6 and OP7 in Fig. 5 are connected between the receiver low frequency output and the converter's diode input K (Fig. 6) and operate as additional active selection circuits with an amplification factor of about 25. OP6 lets 1050 Hz signal through). A 3 dB bandwidth of 50 Hz is chosen so that the slot keying impulses of 20m sec can swing fully and reach the maximum amplitude.

OP7 works in the same way at the same bandwidth, but here three preset shift frequencies can be selected by means of S1.

P14 is a 10 turn potentiometer and with the aid of this you can in position 1 cover a shift range from 0 to 1000 Hz continuously. P14 and P4 may be omitted if you limit yourself to fixed shifts.

At point K the signals are brought together and passed to the diode limiter at the input of OP1 and at the output of this they appear with a constant amplitude of about 25 volts peak to peak.

By using P1 and P2, Fig. 6, the input level for the resonant circuits OP2 and OP3 may be adjusted so that at the outputs MP4 and MP5 (after resonance adjustment) always appears as 8 volts peak to peak. Amplification factor for both circuits is about 0.5.

All other values match those for OP6 and OP7. If you use variable shift-adjustment, it is recommended that P4 and P14 be mechanically coupled to enable operation of both selection circuits together so that they "track" together. Otherwise you adjust P4 first and then set P14 on the same scale adjustment.

The signal which is rectified by D3 and D4 goes into an active low pass filter OP4 where the limit frequency is again chosen such that the short key impulses increase to full amplitude.

The following Schmitt trigger has, with the stated resistance combination, a hysteresis of about 0.8 volts. You can also make the hysteresis variable by putting in a potentiometer of 500k ohm as R R (R15). This potentiometer must be limited to a minimum value of 50k ohm. The circuit hysteresis can be altered between 2.5 and 0.25 volts.

You can also wire OP5 as a comparator (change over plus and minus inputs and omit R15). It has been found advantageous to have hysteresis, otherwise OP5 will couple in with the weakest noise signals and the teleprinter will type nonsense.

The circuitry for T1 and T2 needs no further explanation. S2 takes care of switching from "normal" to "reverse" shift. S3 switches to "stand-by".

ADJUSTMENT OF THE CONVERTER

Necessary equipment—tone generator and oscilloscope.

(1) Remove D3 and D4. Select the lowest DC range on the oscilloscope and adjust the zero point on the screen when the probe is earthed. The probe is the set on MP8 and you adjust P9 till the scope reads 0 volts.

D3 and D4 are soldered in place.

(2) Point K is uncoupled from the rest of the converter. You set the scope to MP3 and adjust to zero reading by means of P8 (fairly critical).

(3) You supply to point K a signal of 1050 Hz and about 1 volt peak to peak. The probe is set to MP4, the output voltage adjusted to maximum with P3.

Then the voltage on MP4 is adjusted to 8 volt p/p by means of P1.

(4) You connect to point K a signal of 120 Hz and about 1 volt p/p. Probe is set to MP5; output voltage set to maximum by means of P5. Then set the voltage of MP5 to 8 volts p/p by means of P2.

(5) Connect to point K a signal of 1475 Hz at 1 volt p/p. Voltage at MP5 is set to maximum by means of P6.

(6) Connect to point K a 1 volt p/p 1900 Hz signal. Voltage at MP5 is set to maximum by means of P7 (S1 must naturally in each case be at the right setting).

(7) Point K is reconnected to the rest of the converter.

(8) You connect to the input of the converter a signal of 0.1-0.2 volt p/p and frequency of 1050 Hz. The oscilloscope probe is connected to MP1. MP1 is adjusted to maximum voltage by means of P10.

(9) Repeat the same procedure at MP2 with P11, P12, and P13 with 1220 Hz, 1475 Hz and 1900 Hz as in instructions 2, 3, and 4.

(10) Disconnect X deflection of the oscilloscope. Points X and Y are joined to the corresponding X and Y inputs of the oscilloscope. The Y amplifier is adjusted to 0.5 volt/cm and X amplifier to the same value.

COMPONENT LIST FOR FIGURES 5 AND 6

OP1, OP5: 709 (without phase compensation, see Fig. 6(a)).

OP2, OP3, OP6, OP7: 709 (with phase compensation, as shown in Fig. 6(c)), **or** 741 wired as in Fig. 6(b)).

OP4: 709 with phase compensation **or** 741. See Fig. 6(c)).

D1-D6: Si-diode IN914.

T1: BC107 or similar.

T2: NPN transistor for 250V breakdown or similar.

P1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13: Carbon (trimmer) potentiometer 0.25W.

P4, 14: Wire wound 10-turn potentiometer (Beckmann, Helipot or similar).

R1-R18: 0.25W.

R19: 1W.

R2, R29: 1% tolerance.

C1-C6: 30V.

C7: —400V.

BUILDING AND OPERATION OF THE CONVERTER

The construction of the apparatus and selection of components is not critical; you can use parts easily obtainable on the market. (Refer to the WIA disposals lists and the advertisers in this magazine.) The capacitors In the resonant circuits are not critical, it is not necessary to use styroflex capacitors. The resistances in the prototype have 5% tolerance. The apparatus is completely reproducable.

It is essential that the received signals and the station receiver must be extremely frequency-stable when the converter works as "two circuits" (AM reception) and with a bandwidth of 50 Hz. It will only show its advantages when the signals are maintained between these limits. If you want to operate surely over 10 minutes, the maximum allowable frequency drift is 25 Hz in any amateur band. Fortunately the higher frequencies usually come from mixing the VFO signals with signals from crystal oscillators, so that the stability requirements given here are realistic for good operation.

The converter compares favourably with the ST5 and ST6 systems. In the presence of QRM signals will usually be received more accurately with this converter. With this type of test you get a lessening of printing errors in proportion 2 to 3 provided the abovenamed stability needs are met.

The measurements are necessarily subjective but there are no norms which can give objective results.

Therefore I will not commit myself to the given typing error improvements as this will require the same measurement conditions.

In connection with typing errors because of fading disturbances, the converter described will be equally useful as the ST5 and ST6 when you use the same principle to counteract this.

On the other hand, the performance of the ST5 and ST6 will fall sharply in comparison to the converter described where QRM from strong carrier waves is concerned.

Finally, it should be noted that this converter can neither perform miracles nor conjuring. ■

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Syd Clark, VK3ASC

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History and Highlights of New Zealand Amateur Radio; The Zedel Keyer; A Controlled Hot-Me-Upper for Your Crystal; Power Input Measurements for the Argonaut and Triton.

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KC4NI Navassa Island 1974; Logic Probes, A Simple One; The Two Metre Fishing Pole; Victory at Sea; Heathkit SB-614 (Review); Another 5/8 Wave Antenna for 2 Metres; Relativity in the Ham Shack; A Free Standing Crank-Up Tower for $30.

October/November 1976
Destination Agalega; A Modular Linear Amplifier; An Intermittent Ten; Long, Long Dipoles; Try This for Selectivity; Heathkit HR-1680 Receiver (Review); Sleuthing the Russian Weather Satellite.

HAM RADIO September 1976
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November 1976
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QST August 1976
Meet the Microprocessor, Part 1 of 3: Another Look at Reflections, Pt. 7; An RF Sensed Antenna Changeover Relay; Designing Small Vertica Antennas; That's a Big 12 Volts; A Unique Digital Mixer; Rid Your Model 28 TD of Distortion: Loops vs Dipole, Analysis and Discussion; One Shoe Drops; Once Upon a Time; Radio Fox-hunting in Europe; Put the Ham in the Closet; The Value of Special-Events Stations.

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CQ April 1977
Jungle Flea Power; The Millen 90673 Antenna Bridge; Heathkit SB-230 1 kW Conduction Cooled Linear; The Palomar Engineers R-X Noise Bridge; Slow Scan Television Overview 77, Pt. 3; The Multi-band Trap Antenna, Pt. 3; Broadcasters Threaten Take-over of Amateur ULF Band at WARC 79.

RADIO COMMUNICATION March 1977
A Third Method SSB Generator; Modifying 120/128 Line SSTV Equipment to Transmit and Receive 240/256 Line Video; Monitoring for Auroral Propagation; The Yaesu FRG7 Receiver; RTTY Beginners' Terminal Unit.

SHORT WAVE MAGAZINE January 1977
Digital Electronic Keyer; Transceiver for Eighty Metres; Transmitting Antennas for Small Gardens; Vehicle Noise Suppression for Mobile Operation (Morris 1000).

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QSP

RECIPROCAL OPERATING

February 77 QST contains a short article reporting that the Soviet Union's IARU Society RSF announced that foreign amateurs might operate in the Soviet Union under a permit good for the thousands of club stations there, and possibly some individual stations. Applications must be made well in advance, through your local IARU Society (the WIA), giving a mass of information about your itinerary, etc.

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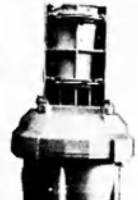
The popular VC2 covers 3-150 MHz with power measurement 12/120 watts. Will handle up to 1000w. 50 ohms impedance, twin meters. This quality tru-line instrument is ideal for the shack or for permanent mobile installation $36 + P&P

$36 SWR/PW METER

ART-3000



ROTATOR

NEW

ART3000C Heavy Duty $189
ART8000 Super Duty $450

MODEL NO	ART-8000	ART-3000A
Rotating Torque	2,500kg/cm	850kg/cm
Braking Torque	10,000kg/cm	1,700kg/cm
Maximum Vertical Load	2,500kg	250kg
Control Accuracy	± 5°	± 5°
Drive Type	Gear	Gear
Power Requirements	(May be modified upon request)	
Operation Temperature	−40° ~ +80°C	−40° ~ +80°C
Forward/Reverse Delay	3 seconds	3 seconds
Maximum Continued OP	20 minutes	3 minutes
Mast Clamp	48 ø ~ 78 ø	34 ø ~ 55 ø
Cable Requirement	9 conductor	6 conductor
Net Weight	26kg	5.7kg
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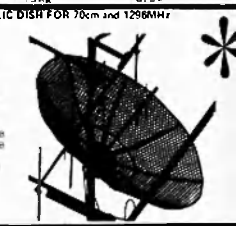

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CL66 500w pep, 3.5 thru 29MHz, input imedance 50-70 ohms, output impedance 10-600 ohms unbalanced. Includes 4 position coaxial switch. $139

CL65 500w pep, 2.5 thru 29MHz, input impedance 50-70 ohms, output impedance 10-600 ohms unbalanced. $128

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CL99 for two meters. Max power 200 pep, output 10-200 ohms unbalanced. $59

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The UNIDEN 2020 PLL digital transceiver has hit Australia by storm! This unique rig features usb/lsb/cw 8 pole filters (normally extras on other rigs), pcb modules, 6146B finals with regulated screens for low distortion products and dual RIT. Superbly engineered for the serious DXer. The 2020 comes complete with mic, ac and dc cables, English manual and VICOM 90 day warranty. Price $772, External VFO $145, Matching speaker $46.

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8Y/2M 8el, 9.5dBd, 1Kw peak	$29
10Y/2M 10el, 11.4dBd, 1Kw peak	$57
10XY/2M 10el crossed yagi, 11.3dBd	$66

70cm

D8/70 twin 8el, 12.3dBd, 1Kw	$46
PBM18/70 18el, 14.9dBd, 1Kw	$57
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HW20 (20 metres) Resonant freq 14.2MHz, bandwidth 250KHz $31
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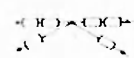
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SPECIFICATIONS

Model OB-330 DC 20000/V AC 8000/V
TAUT BAND METER. METER PROTECTED

· DC V: 0 – 0.25, 0 – 2.5, 0 – 25, 0 – 100, 0 – 250, 0 – 500, 0 – 1000V · AC V: 0 – 10, 0 – 50, 0 – 250, 0 – 500V · DC mA: 0 – 50 μA, 0 – 5mA, 0 – 50mA, 0 – 500mA · Ohm: 0 – 2KΩ, 0 – 20KΩ, 0 – 200KΩ, 0 – 2MΩ · Accuracy: ±3% at FS value on DC range / ±4% at FS value on AC range / ±10% at indicating value on Ω range. · Battery: 1.5V (UM-3) × 1 · Audio power: 0 – 12W, 0 – 300W at 8Ω Z line. 20Hz – 100kHz ±1dB · Field Strength Meter: 1.9MHz – 500MHz · Dimensions: 125 × 95 × 45mm · Weight: 330grs.

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NEW PRODUCTS

VICOM has pleasure in introducing the HAL range of products to Australia. This month we detail the KSR 3000 RTTY terminal which handles both ASC11 (8 level) and Baudot code, switchable from the front panel. The terminal uses the powerful 8080A microprocessor family of integrated circuits to achieve full cursor positioning and editing facility, display up to 1152 characters and non overprint capability. The terminal accepts demodulated signals and provides a composite video signal to the video monitor. The KSR 3000 is the send/receive model with full keyboard and selectable baud speeds 60,66,75,100 and 132 wpm. Incoming data is normally written from the top line of the display down. After the bottom line on the page has been filled, the page scrolls up and the new data is entered on the bottom line. On transmit optional modes are switchable:

1. CONTINUOUS TRANSMISSION MODE: data is entered into the 256 ch output buffer and transmitted as soon as the key is pressed.
2. WORD TRANSMISSION MODE: Data is displayed as soon as a key is pressed but is transmitted only when a character following a space is typed. This allows for individual word editing by backspacing and re-typing.
3. LINE TRANSMISSION MODE: Data is entered into the buffer and held until the RETURN key is pressed. Thus an entire line can be typed and edited before transmission. The cursor can be moved to any position on the page and the necessary changes made.

The terminal also features "word wrap-around". If a word extends past the end of the line. This prevents splitting of a word at the end of a line by the automatic line sequence. Another feature – "blankfill" allows for transmission of blank codes whenever the output buffer is empty. This keeps the receiving terminal running at full speed even though the typing speed might be less than full speed.

WRITE (SENDING SAE) FOR COMPLETE SPECIFICATIONS

VICOM CONTINUES TO BRING THE AMATEURS OF AUSTRALIA THE LATEST IN TECHNOLOGY.

Manufactured by:

HAL Communications Corp.

NEW

THE HAL KSR 3000 RTTY TERMINAL

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The IC215 is the take-anywhere 2m fm portable which puts good times on the go. Change vehicles, climb a hill, take it in the boat, the ICOM quality communications go right along with you. Features fully collapsible antenna (with optional "rubby ducky") 15 channels, dual power (3w/400mw) crystals are the same as the IC22 series. Your new IC215 comes complete with mic, carrystrap, dry cells, plugs, English manual, VICOM 90 day warranty and three popular channels. Price $199. Rubber Ducky antennas $13.

IC202 2M SSB portable transceiver $219
IC502 6M SSB portable transceiver $219
IC3PS matching power supply $115

PORTABLES

IC-211

ICOM 2 M MULTIMODE
IC211 ac/dc, ssb/fm/cw, digital.
$785

NEW! IC-245
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IC245 synthesised, digital readout – optional ssb adapter

A licence is required for all transmitting equipment.

The IC22S Australian model is a PLL synthesised rig with PROM for frequencies 145 – 148MHz. Simplex, duplex or duplex reverse is achieved by a flick of a switch on the front panel. This fabulous rig features ceramic discriminator, IDC, electronic rx/tx switch, full swr protection and VICOM 90 day warranty. Your new IC22S comes complete with mic, mobile mounting bracket, plugs and dc cables. Matrix is factory programmed for WIA bandplan repeater and simplex channels and a supply of spare diodes for private channels is provided. Price $269 (freight extra).

IC22S

GENERAL

SEMICONDUCTOR COMPLEMENT:		
	TRANSISTORS	34
	FET	7
	IC	13
	DIODES	33 to 128 depending on channels
FREQUENCY RANGE (For Specification)		146-148 MHz
VOLTAGE		13.8 VDC NEGATIVE GROUND
CURRENT REQUIRED	TX	2 AMP @ 10 W 0.9A at 1 W
	RX	700 MA AT MAX AUDIO
		400 MA SQUELCHED
SIZE		58 MM (H) x 156 MM (W) x 218 MM (D)
WEIGHT		1.9 KILOGRAMS
ANTENNA IMPEDENCE		50 OHMS
NUMBER OF CHANNELS		23 Channels selected from the Australian 25 KHz band plan
FREQUENCY CONTROL		Stabilized Master oscillator PLL programmed by diode matrix
TRANSMITTER:		
POWER OUT		10 WATTS or 1 WATT, Selectable
MODULATION WIDTH		5 KHz
MICROPHONE IMPEDENCE		500 OHMS
SPURIOUS LEVEL		LOWER THAN - 60 DB Below carrier
RECEIVER:		
MODULATION ACCEPTANCE		16F3
TYPE		DOUBLE SUPERHET, 1st I.F. 10.7 MHz, 2nd I.F. 455 KHz
RECEIVER SENSITIVITY		4 DB BELOW 1 UV OR LOWER (.4 micro V)
1 Microvolt S+N/N		30 DB OR BETTER S+N/N
SPURIOUS RESPONSE		60 DB OR MORE ATTENUATION
BANDPASS		+/-7.5 KHz/-, +/-15 KHz/-60 DB
SQUELCH SENSITIVITY		-8 DB BELOW 1 Microvolt
AUDIO OUTPUT		1.5 watts or more into 8 OHMS

ATLAS RADIO INC.

STATE - OF - THE - ART FROM ATLAS RADIO

ATLAS 210x/215x

ATLAS 350-XL

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

This month a couple of handy hints, one for the ICOM IC 21A and the other a simple improvement to the popular Yaesu FRG-7 receiver.

THE IC-21A

Over the years this transceiver has proved to be extremely reliable. The one I use was one of the first sold in this country and has run up many hundreds of hours of use, completely trouble free, except for the dial and indicator lamps. They burnt out in the following order. S meter, discrinimator meter, receive indicator, and finally the main channel indicator. The transmit indicator is still going. Its life will depend on how much you talk. Enough to say that if you are an IC-21A owner it is worth having a couple of spare lamps on hand, they are easily obtainable from VICOM in Melbourne. In general they are easy to replace except for the main channel selector. More on this one soon. All connections go to a tag strip just to the centre of the S meter behind the sub front panel. Do not try to unsolder an individual connection — cut it off with a pair of small side cutters as close to the soldered joint as you can. It seems that all the leads were twisted together originally, so of course trying to remove one will result in quite a mess.

To replace the channel indicator lamp it is necessary to remove the front panel. Proceed as follows. Disconnect antenna mic and power cables. Invert the set and remove the bottom plate. Now remove the cabinet. Remove the eight knobs plus the plastic washers behind seven of them. The front panel is held by four Philips head screws, one in each corner going from the sub front panel back into mouldings on the rear of the front panel. It will now come away but held to the main chassis with the connecting leads to the power and other switches. There is enough length on these to separate the panel and so gain access to the lamp. Next remove the black painted metal mask that surrounds the discriminator meter. This is held by two screws. You can now remove the discriminator meter and the two light baffles held by the meter mounting bolts. Be careful not to lose the two small nuts at the rear. Now with the meter out, the globe can be pulled from its grommet and replaced. Carefully retrace all the above steps.

All other lamps can be replaced with the removal of the cabinet only.

THE FRG-7

Having just acquired a Yaesu FRG-7 receiver I have been looking to see if any small improvements can be made. Over the next few months I hope to come up with a few more. One of the first things noticed with the FRG-7 is that it is very difficult to read the S meter. The illumination of this depends on light reflecting from the main kHz dial. Unfortunately as the meter is set well forward of these lamps the scheme does not work, and so the meter face is in a shadow. Remedy: obtain one of the miniature 12 volt lamps with leads attached and secure it above the meter with a spot of contact adhesive. Take the leads to the three lug strip above the chassis just to the rear of the main dial. Modification complete, and the meter will now stand out like a searchlight. ■

IARU NEWS

PRESENTATIONS

At the 1977 Federal Convention in Melbourne Mr. M. J. Owen VK3KI, one of the four Directors of the IARU Region 3 Association, presented an engraved plaque to Mr. P. D. Williams VK3IZ In recognition of Peter's role in the establishment and early years of the Association. Mr. Owen also presented a very handsome medallion to the Federal President of the WIA from the Philippines Amateur Radio Association (PARA).

In speaking to the Federal Council Mr. Owen, as IARU liaison officer of the WIA, said he would be attending an IARU International Working Group meeting in the UK during June as part of his duties in the IARU. The IWG would be preparing material at different levels for use by IARU Societies in their approaches to their Administration for WARC 79. He referred to problems expected to arise in connection with amateur geostationery satellites for which a technical paper was required, as an example of the upper levels of sophistication.

Amateur radio is now entering the pre-WARC 79 period of increasing activities to detect and define the areas of frequency clashes. The IARU had accepted the role of co-ordinating and assisting societies, especially the smaller societies, towards influencing their Administrations. In the larger countries, WARC 79 work was well advanced and their experience would be valuable in identifying the problem areas. Much work and many difficulties lay ahead, not least being the comparative dearth of accomplished experts in the Region for so vast a project as WARC 79.

Next year, said Mr. Owen, would see the third Region 3 Convention to be held in Bangkok. The WIA would need to consider representation by two delegates for various reasons, particularly relating to WARC 79 the following year. During the year the President of IARU, Noel Eaton VE9CJ, would be embarking on a world tour as a contribution towards societies' work for WARC 79. Various problems with the IARU Region 3 Association's Constitution also required to be tackled. In considering WARC 79 some preliminary assessments were made relating to air fares to Geneva, accommodation expenses and the fact that hotel bookings at so large an international gathering would be difficult to obtain. The WIA was hopeful that an Institute delegate would be included in the Australian delegation. Work on this was proceeding. It was most pleasing to report the very large voluntary contribution being made towards the upkeep of the Region 3 Association by Japan, and Mr. Owen paid tribute to the work of the Association's Secretary, Mr. David Rankin 9V1RH/VK3QV.

Federal Council expressed thanks to Mr. Owen for his report and work in IARU and recorded appreciation for the work being undertaken by IARU President Noel Eaton.

The Federal President advised that so far very little feedback had derived from the last APG meeting at which the frequency requirements for all services had been submitted. Mr. Owen asked that thought should be given to fall-back positions and the necessity to consider details relative to the three new bands of 10, 18 and 24 MHz proposed for the amateur service. The order of merit of the various options must always be kept in mind More information was required in respect of amateur work in the microwave region.

It is refreshing to record in this day and age the enormous amount of valuable work being carried out by the IARU for WARC 79 in contrast to the almost negligible contribution, so far as the WIA was concerned, prior to WARC 1959. Judging the IARU co-ordination role alone the amateur service is unlikely to lose much at WARC 79 by default or inattention to detail. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,

Have just received a copy of February my AR and noted the segment "Notes from IARU" on page 3.

I am afraid that the segment contained an error of fact in it concerning the number of Societies in Region III. The correct figures are:—

No. of known Societies within Region III, 17; No. of Region III Societies also members of IARU, 15; No. of Region III Societies members of Region III Association, 12.

The AR item stated that there were only 9 IARU member societies in Region III. This is not correct — there are 15.

The other comments concerning countries having no amateur society are unfortunately correct and it is particularly distressing to note that the following countries in this category are also known to be active in ITU affairs:—

Afghanistan, Bangladesh, People's Republic of China, Iran, North Korea, Laos.

There is virtually no amateur radio in any of these countries except Iran and so

it is cause for great concern — which way will these countries vote at WARC 1979 as it seems highly likely that they will have delegates in attendance at Geneva.

David Rankin 9V1RH/VK3QV,
Secretary IARU, Region 3.

The Editor,
Dear Sir,

May I, through your pages, thank all those many kind Amateurs who have shown such deep sympathy to myself and our family in the loss of my husband, Ron VK3AKC.

It made us very proud that so many people really cared.

To Ron, being an Amateur was not just a hobby — it was a way of life. I don't think anyone else could have got more pleasure out of every phase of it. He appreciated every contact on the air and was even more pleased if he could follow that up with an "eyeball QSO". No one appreciated more than he that the saying "No man is an island", is doubly true in Amateur Radio, and he was always very sincere in his acknowledgement and gratitude for the very many Hams who were always willing to help him in every way they could.

He has often said that, without them, he could not have done the things he has done.

We, his family, thank you, too, for making his Amateur life such a rewarding one for him and we thank you for helping us to bear our very heavy loss.

Mary Wilkinson.

The Editor,
Dear Sir,

NOVICE LICENCE SYLLABUS

What are you trying to do — destroy the Novice concept?

This was my first reaction as I started reading page 24 of April AR. For the most part no indication of treatment depth is indicated, although part way through some qualifying notes appear, e.g. — "elementary facts only for Novice", so a "judgement" is difficult to make.

The point I want to make is — let's not get carried away with academics. At the AOCP level we are not trying to train people to become engineers, it is after all only a hobby — albeit a tec one. How much more must this thought apply to the Novice level.

If a prospective Novice operator is confronted with the proposed syllabus I believe there is a good chance he will throw up his arms in despair and then be attracted to the ranks of the CB pirates.

Enthusiasm for the preparation of a syllabus and subsequent writing of a course should be tempered by realism with the ultimate objective in view. That objective, of course, is the attainment of a licence.

For the five years ending 1975 I conducted the VK5 AOCP class under the auspices of the Department of Further Education; I had a break last year, but am back with it again this year. The course runs for two terms, one night per week from 7-9 p.m. (about 26 weeks total), finishing just before the August AOCP exam (we plan starting a Novice course in May for the November Novice exam).

The students don't complete the course knowing all there is to know about amateur radio, but then who does? However, most of them pass at the exam, they are satisfied and I am gratified — getting them through is what counts.

The above is not intended to be a criticism of the efforts of others, just a view of things from a different perspective and I trust it will be received as such — comments were asked for. I am anxious to get licensed amateurs on the air.

M. R. Burford VK5ZQ

The Editor,
Dear Sir,

Since 1936, some short time contacts have been made for the worked All Continents Award, all without prior arrangement or skeds. First was in 1936 in 50 minutes operating on 14 MHz CW, followed on 6-2-48 in 28 minutes on 14 MHz AM. From here on WAC many times in under the hour, but the best times were in 14 minutes on 22-2-72, 14 MHz SSB, and in 11 minutes on 5-7-73, all 14 MHz SSB.

I have been unable to ascertain from the USA if these times have been bettered, and would like to know if any VK stations have made WAC in a lesser time. Prior to 1964 power was 50 watts input and later 200 watts.

VK4DO

Try and beat this.—Ed. ■

VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.900
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea	50.110
KG8	KG6JDX, Guam	50.110
KH8	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

All these plus numerous TV stations located to the north as per the listing last month. Keep a copy by your receiver.

SIX METRES

Although 6 metres has been relatively quiet from an Es point of view, quite a bit has been happening via TEP and other modes with stations to the north and north-east. Much of this was observed by Steve VK3OT who was going to write to me with specific details of the various openings, but at time of writing such information has not arrived so it will not be complete. As best I can I have placed together the following information gleaned from contacts on the air.

On 9/4/77 ten metres was open most of the day, and tests were run between VK3OT and KG6APP in Guam and KH6IAA, the latter having access to the KH6EQI beacon on 50.110. The 6 metre band opened 0746 to 0829Z, with KG6APP being worked 5 x 9 at 0746, receiving a SMIRK number 1725. KH6IAA heard 0746-7053Z. An AM station was noted on 52.050 peaking NNE. 0753-0759 opened to JA with JA1 to 4-5 x 9. Prior to all this the KH6EQI beacon had been copied from time to time between 0512 and 0746. There is a lot more information which I have not got! On 10/4 Steve noted strong telemetry signals on 52.090 peaking NNE. He mentioned also there appeared to be little relationship on this occasion between the availability of signals on 28 MHz and those on 50 and 52 MHz.

Signals from Japan on 6 metres were available here in VK5 on 9/4 for several hours. I arrived home from a special Saturday job to find the band almost closed but did manage to work JA2TTO, and was called by four others all on the same frequency but did not work any due to the QRM, after which the band closed. I had noted earlier that, before going to work about 1000 local, 28 MHz was fairly lively to Japan, so I was not surprised to hear the band had been open to there.

On 11/4 six metres opened to VK4 from here for about an hour with some very good signals, and I worked VK4ALM, VK4DO, VK4RO, VK4ZWB, and VK4ZHW (1 watt), as well as Robert VK3AUR on back scatter. Ross VK4RO mentioned JA's had been around since 29/3, and were 5 x 9 on 9/4, but mainly working the northern VK4 area, to VK4ZAZ, VK4FU. Lindsay VK4ALM and Frank VK4FU in Rockhampton had also been hearing the Brisbane beacon (on 2 metres) which was a distance of 300 miles and a bit rare for them.

It would appear from all this that the various continual promptings I give through these columns to keep an eye on six metres at times other than high Es periods, is paying off. In addition to the equinoxes there is always the chance of mid-winter DX through June and July. And despite what Steve said about the lack of correlation between 28 and 52 MHz on the occasions he mentions, I am still of the opinion that for many occasions 28 MHz does serve as a good pointer, and I am currently looking around for a reasonably good receiver which will give me complete coverage between 30 and 50 MHz so that any rises in MUF may be noted.

Still on the six metre scene, I have to hand a letter from Graham VK8ZCJ who writes from Darwin to say the VK8VF beacon is definitely back on the air on 52.200 MHz, with Trevor VK8ZTW and Brian VK8VV getting it going again. It provides about 25 watts to a ground plane antenna 40 feet high, and located at East Point as before, with panoramic sea views from south-west to north-east.

He further reports six metres has been interesting but not outstanding, with a total of six openings to JA to mid-April, two in the afternoon about 1600 local, and four in the evenings about 2100 local.

A local commercial beacon L5SA operated throughout March on 48.450 MHz. The beacon is involved with TEP investigations and runs about a kilowatt. It is off the air at present but has been around for many years so we expect it back on in the future some time.

Locally we watch for a signal on 49.750 which is the Russian/Chinese channel R1 video frequency. This is a good indicator here of evening band conditions. Signals are also heard on 49.305 (wideband FM — origin unknown) 51.750 (Hong Kong TV), 53.750 (Malaysian TV audio). All of these signals have been heard this year as well as TV signals to over 60 MHz.

You are probably aware of the activity of KL7HAM on Shemya Island in the Aleutian Islands. He is a keen six metre man and is looking for JA contacts on the low end of the band. It is possible to work KL7 from Australia, as such signals were heard in 1970 up this way.

The opening on 10/4 was very widespread with VK1, VK4 and KG6 in on the action. At least three KG6 stations were on the low end of the band with massive JA pile-ups. No signals were heard here. Also DU1 area has about eight 6 metre operators, but operation is irregular. Ten metres is a mine of information for 6 metre activity with almost continual chatter about 6 metres taking place. Of interest was a relay of VK4RO by a JA9 from 6 metres to 10 metres for the information of VK3AMK on 10/4. This gave us warning of an impending opening to VK8.

On 12/4 the TV on 49.750 built up to fantastic strength. Birdies were to be found to 50.3 with strengths well over S9 effectively blocking the low end of 6 metres. Absolutely no amateur signals were heard and we suppose that it was probably Nanking or China that we heard, being an evening opening.

Activity in Darwin remains as before, VK8VV, VK8ZCU and myself, VK8ZCJ, on 6 metres. VK8VV and myself have odd chats on two and activity is

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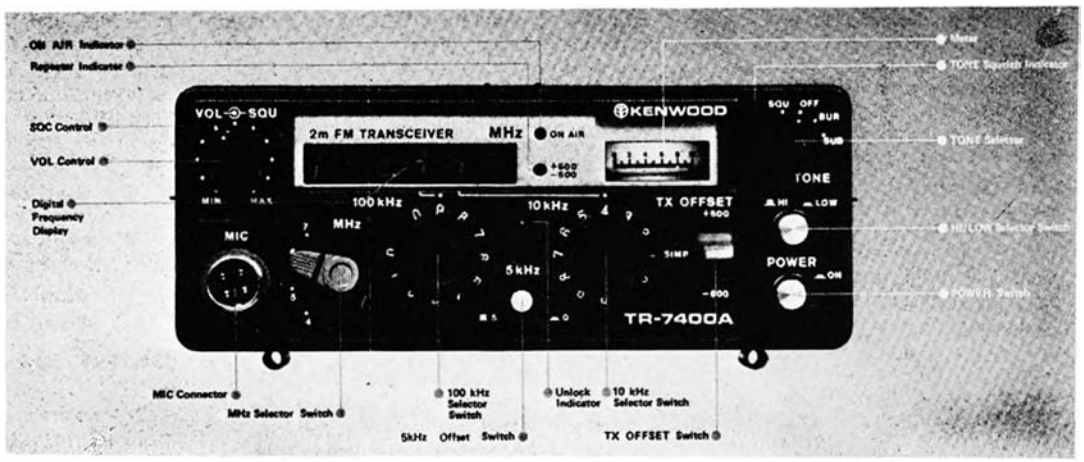

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SHARING

Amateur radio by definition means communication, an involvement with other people and ideas. Remember the next time you flip on that switch you're sharing part of yourself with someone else and getting part of someone else in return. Amateur radio is people. CQ March 77.

MAKE IT ON 70 cm FROM YOUR MOBILE OR HOME STATION, 2m RIG

NEW RELEASE — TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE OR ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.

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Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

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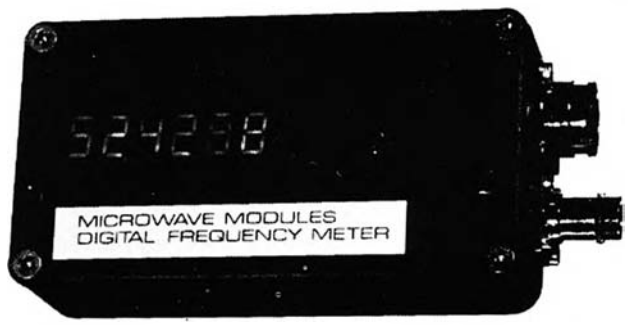
Model MMT432/144 — Price $260

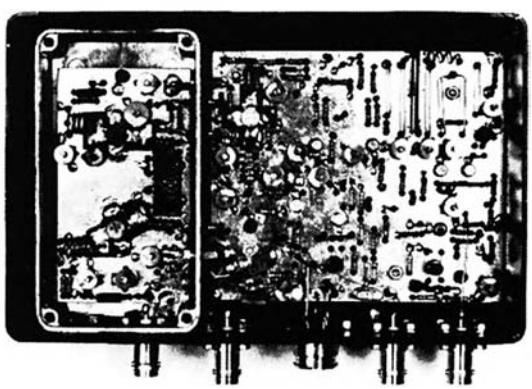
TRANSVERTER MODEL MMT432/28

FEATURING COMBINATION OF A LOW-NOISE RECEIVE CONVERTER AND A LOW-DISTORTION TRANSMIT CONVERTER PRODUCNG A SPURIOUS-FREE LINEAR SSB SIGNAL. PARTICULARLY WHERE HIGH STABILITY AND SENSITIVITY ARE OF IMPORTANCE.

Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern Microstrip Techniques ★ Power requirements 12 volt nominal at 150 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432 — Price $215





MMT432 TRANSVERTER

New Release – 500 MHz COUNTER

This counter has two ranges which are selected by supplying + 12 volts to one of two pins on the DIN socket. Internal diode switching brings the input in the 0.45 - 50 MHz range to a wide-band amplifier which drives a high speed TTL divider in the main counter logic. On the 50 - 500 MHz range the diodes switch in a high speed ECL prescaler and the demical point is changed accordingly.

A low angle AT cut quartz crystal is used giving a typical temperature stability of 0.5 ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 200 Hz at 50 MHz, or 2 kHz at 500 MHz.

The counter has reverse polarity protection and operates satisfactorily from a nominal 12V DC supply. A suitable 5 pin DIN plug is supplied.

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD500P — 500 MHz Prescaler, $55.

Model MMD050/500—500 MHz Counter, $175. **Model MMD050—50 MHz Counter, $130.**

TRANSVERTER MODEL 144/28

This 144 MHz Solid State Linear Transverter is intended for use with 28 MHz transceiver to produce a highly reliable transceive capability for satellite or terrestrial communication ★ Power output 10W min. ★ 28 MHz drive ★ IF at 500 mW or 5 mW ★ Receiver gain and noise, typical 30 dB and 2.5 dB ★ Internal Antenna changeover ★ Case size 187 x 120 x 53 cm ★ Power requirements 11 to 13V at 300 mA to 2.2 amp. peak ★ Spare 144 MHz input socket.

Model MMT144/28 — Price $185

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2 silicon pre-amplifier stages. MOSFET mixer. All UHF circuits in microstrip technology. Noise figure: typ. 3.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. **Price: $51.**

144 MHz MOSFET CONVERTER
Noise figure: typ. 2.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz, 9-15 V 20 mA.

Price: $45.

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quite low. Reports of the VK8VF beacon are solicited and QSL's will be provided for reports received. Thanks, Graham, for the news, all this helps us in the south to keep abreast of the northern activity and tends to keep us listening just that more often!

A further letter from the Darwin area, this time from Sue, VK8SU advises that the Darwin Amateur Radio Club Inc. wants it known the VHF calling frequency in the Darwin area is Channel 50 FM. It is believed some visitors to the area have not been aware of this. Thanks, Sue.

Tony VK6BV in Kalgoorlie writes as follows: Just a quick note to say I took your advice (AR April 1977) and turned the beam north and heard JA activity on 16/4 on 50.1 to 50.3. Called on 52.005 and heard a JR2 come back. That was all I copied. Nothing for the next few days. On 19/4 again JA signals on 50 MHz, called same frequency and worked three JA stations. Signals peaked to 5 x 7 for the 15 minute opening, with the JA's running about 20 watts, and I received 5 x 9 plus 10 for 120W PEP. Thanks, Tony, pleased to know you are sharing in the across the equator openings during the equinoxes.

TWO METRES

I cannot report on this band at the moment, although I know there have been some excellent openings across southern Australia. My operating hours for the past few weeks have been rather limited due to unfortunately having two very close friends in hospital diagnosed as having serious cancer infections, one being a terminal illness. Please accept my explanation as being the reason for not gleaning the news in the usual way, that is, off the air!

GENERAL NEWS

I am pleased to report what is probably a world record for an RTTY two-way contact on 432 MHz which occurred on 9/2/77, between Bob VK5PB and Aub VK6XY, with signals to 599 and 10 watts each way. Bob used a 16 element KLM at 92 feet and Aub a 15 element yagi at 27 feet. This information did get to me on a prior date closer to the happening, but don't know where the note got to, but even if mentioned rather late, congratulations are still in order for you two gents, and we hope the claim for the record does come a fact.

Incidentally, I did have a State visit from Aub VK6XY recently while he was returning from his extended holiday tour from the eastern States. It was pleasing to meet Aub again after a long period, and to learn a bit more about the happenings in Albany.

How many of you are aware of the ARRL list of do's and don'ts for those who use repeaters. I am sure if they were followed out by all the repeaters could become a source of pleasure all over the country!

DO keep all transmissions short. Emergencies don't wait for monologues to finish. If you talk to hear your own voice, what you need is a tape recorder, not an FM rig.

DO think before you transmit. If you can't think of anything worth saying, don't say anything.

DO pause a couple of seconds between exchanges. Someone with a high priority need for the repeater may want to break in.

DO identify properly.

DO be courteous. A repeater is like a telephone party line, and its use requires the same kind of co-operation.

DO use simplex wherever possible. Leave the repeaters for those who need them.

DO use the minimum power necessary to maintain communication.

DO support your local repeater club, even if it does not require all users to be members. Maintaining a good machine is expensive.

DON'T break into a contact unless you have something to add. Interrupting is no more polite on the air than it is in person.

DON'T forget that amateur radio is allocated frequencies because it is a service, not just a hobby. Don't neglect the public service aspects of VHF/FM communication, such as accident reporting, emergency preparedness.

DON'T try to prove what a great operator you are on the air by criticising the techniques of others. Instead, set an example which others will be proud to follow.

DON'T monopolise a repeater. The best repeater users are the ones who do a lot of listening and little transmitting.

DON'T forget that what you say over a repeater can be heard over many square miles by anyone with an inexpensive **public service band monitor.** These people are potential amateurs; if they like what they hear they may join us. Don't leave them with a bad impression of our hobby by making thoughtless or off-colour remarks.

There's food for thought in the above rules.

Have you given any thought to the suggestion of an HF net for the exchange of information about VHF and UHF activities which was mentioned recently through these columns? You must be all still thinking about it because I have not had a single letter from anyone yet for or against. Aub VK6XY while here spoke of the suggestion favourably, so that's one on the list. How about the rest of you saying something?

From the columns of the Gold Coast Radio Club Newsletter is a note from Frank VK4VN warning about TVI. Frank has been hit with this problem for some time and attributes a lot of his problems to the use of transistor distribution amplifiers, a common type which has a gain of 40 dB. This particular type is fitted with two pots for individual gain adjustment on HI and LO bands.

The major source of trouble appears to stem from the detection of strong signals on a faulty (high resistance) antenna (TV). A high pass filter in the input to the amplifier cures this one every time. Frank says the constant K type of filter as sold by an American chain of Radio Shacks is useless for this purpose, and advises anyone with this problem to construct the filter described in the ARRL handbook. Alternatively, you may contact Frank direct for some good first hand information.

MOONBOUNCE REPORT

From **The Propagator** comes news of the scheduled tests by VK2AMW on 26/3/77 which yielded the following results: OZ9CR — called but nothing heard, and the same results with F2TU. The echoes from VK2AMW at that stage were peaking 7 dB over noise. G3LTF — contact made with M signal reports both ways. A contact was also made with F9FT who called near the end of the contact with G3LTF. Visitors to the shack during the above tests were Peter Venner and two friends. VK2ALU and VK2ZEN operated.

Lyle advises the following: Should anyone wish to come along to Daplo to see what goes on during moonbounce tests, then if they will give a phone number, on which they may be contacted a day or two prior to the test weekend, to either VK2ALU or VK2ZEN then one of us will phone to advise of the test period.

Monthly tests are scheduled for most stations interested in 432 MHz EME contacts by Cor Maas VE7BBG, who passes on the test schedules via the 432 EME News which is sent each month to all concerned by Allen Katz K2UYH. I don't usually get the 432 EME News until a few days prior to the test weekend.

VK2AMW is scheduled on over the period shortly after moonrise at our location for stations in North America and shortly before moonset for stations in Europe, as it is only during these periods that both stations concerned can each see the moon simultaneously. We would be happy to have visitors at any test.

I can recommend a visit to the VK2AMW shack during an EME test if only to observe the amount of work involved, and having been a visitor myself last year I came away with a much better appreciation of the obvious dedication Lyle and Charlie devote to this project, and they are to be congratulated.

That's about it for now, so will close with the thought for the month: "How often we fail to realise our good fortune in living in a country where happiness is more than lack of tragedy."

73. The Voice in the Hills. ■

TRY THIS

With the Technical Editors

HOW TO RAISE THAT MAST

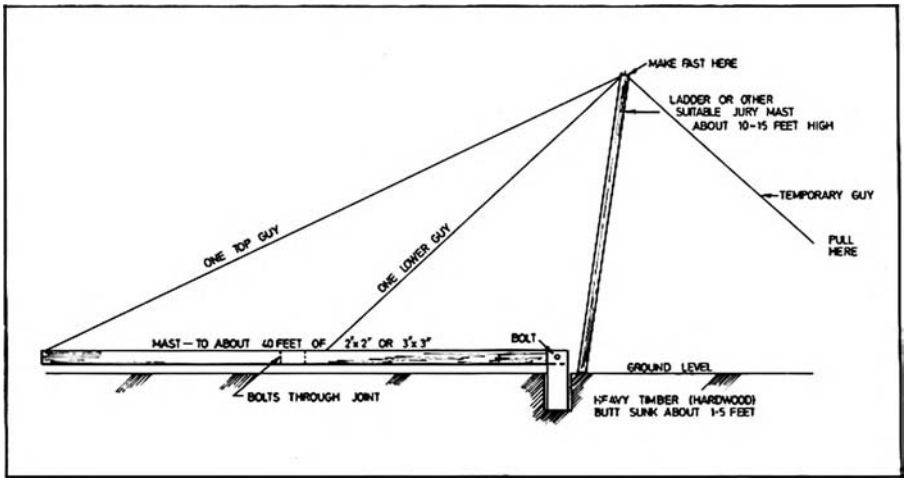
T. Laidler VK5TL.

Here is a sure method of raising and lowering a mast without incurring any damage.

The scheme is shown in the sketch. A couple of extra hands holding other guys to stop the assembly swinging on its way up or down are also desirable. Don't let anyone tell you he can hold it without the jury mast. He will be proved wrong and the mast might break in the attempt. Be warned.

If the "butt" in the ground is a short section of something like an old railway sleeper it will easily take a "U" section cut so that the bottom of the mast can swing in it easily.

An application of chlordane to the butt helps to discourage termites if there are any in the area. I have also used creosote for the same reason but I think chlordane is better. ■



AMATEUR EXAM — FEB. 1977

POSTAL AND TELECOMMUNICATIONS DEPARTMENT
AMATEUR OPERATORS' CERTIFICATE OF PROFICIENCY

February, 1977.

SECTION M (Theory)

(Time allowed — 2½ hours.)

NOTE: SEVEN questions only to be attempted. Credit will not be given for more than SEVEN answers. **All questions carry equal marks.**

1. (a) Draw a circuit diagram of a Plate-modulated radio-frequency amplifier and modulator stages of a 150 watts DC Input amateur band transmitter.
   (b) Describe *fully* how 100 per cent modulation is obtained.
2. (a) Describe the manner by which High-frequency radio waves may be propagated over long distances. Explain why communications between countries such as America and Australia is restricted to certain times in the HF bands.
   (b) Explain why communications over long distances as described in (a) is not possible using the VHF and UHF amateur bands.
3. With the aid of circuit diagrams describe the operation and meaning attributed to the following filter types:
   (i) High-Pass,
   (ii) Low-Pass,
   (iii) Band-Pass.
4. (a) With the aid of a sketch describe the construction and theory of operation of a crystal microphone.
   (b) Listing component values, show by means of circuit diagrams how this type of microphone is connected to an amplifier.
5. (a) A double-conversion type superheterodyne receiver is tuned to a signal on 14.1 MHz which is amplitude modulated by a 1000 Hz tone. Draw a block diagram of such a receiver and show typical frequencies present at the input and output of each stage.
   (b) Discuss the theory of operation of this type of receiver and list any advantages and disadvantages it may have in comparison with the single-conversion type.
6. (a) Draw a block diagram of an SSB transceiver and indicate on your diagram the common stages for both transmit and receive channels.
   (b) Explain the operation of the transceiver.
7. Assisted by a circuit diagram describe the operation of a Mains operated power supply which uses Silicon diodes. The power supply is required to provide a regulated output of 6 volts to supply a crystal oscillator and an unregulated output of 9 volts for a buffer stage of a transistor type transmitter.
8. (a) Show a circuit diagram of the final RF stage of a transmitter using a triode valve, and state step by step how you would neutralize it.
   (b) What effects would result from operating such an amplifier which was not neutralized? Explain your reasons.
9. Three resistors R1, R2 and R3 of 1000, 200 and 300 ohms respectively are connected in series across a 15 volts DC supply of negligible impedance. Calculate:
   (i) the potential differences across each resistor,
   (ii) the power dissipated by R2, i.e., 200 ohms,
   (iii) The voltage reading will be obtained if a voltmeter, having an internal resistance of 1000 ohms, is connected across R1, i.e., 1000 ohms.

The February AOCP examination continues the trend to keep the examination in line with current techniques. This has been evident in recent examinations in the insertion of questions on FM and the emphasis given to questions relating to spurious emissions and interference.

In the February examination the topic of filters was brought in after several years and a new question relating to current equipment was introduced.

Filters are an essential part of interference prevention and most equipment is now of the transceiver type making the new question most topical.

Similarly the topic of FM which has been in recent examinations is part of the current scene. The newcomer may well start off with FM equipment and the use of FM has become very widespread.

Maybe the next topics to be introduced may be FM repeaters and then simple Phase Lock Loops and Digital Counting.

For those intending candidates the study of previous examination question topics is still a very reliable means of covering the required theoretical knowledge. Questions on many basic topics must continue to cover the same ground as the basic theory is fairly constant over many years.

A survey of AOCP question topics shows the following for the period from February 1974 to February 1977:—

Transmitters, 9 questions; Microphones and Audio, 7 questions; Calculations, 5 questions; SSB, 5 questions; Propagation, 5 questions; Interference, 4½ questions; Receivers, 4 questions; PSU's, 4 questions; Antennae, 3½ questions; Test Equipment, 3 questions; FM, 3 questions.

During this period there were 6 exams with a total of 9 questions on each. ■

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Additionally, centre tapped configurations also available, e.g. 9V-0-9V, 7.5V-0-7.5V, 6v-0-6V, 4.5V-0-4.5V, 3V-0-3V and 1.5V-0-1.5V.

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Cat D-4622	Mag. base & lead ass.	$25.00
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Plus Dicks 1977 Catalog		(Priceless)
	YOU PAY:	$189.00

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CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

ROSS HULL VHF/UHF MEMORIAL CONTEST 1976-77 RESULTS

Trophy winner VK4DO, H. L. Hobler.
48 hour certificate VK8ZCJ, G. G. Baker.

Detailed scores—1st Column 7 day, 2nd column 48 hours.

Section (a) Transmitting Open:

VK7MC	2644	1248
3KK	1406	570
3AUQ	1146	
3VF	1138	584

Section (b) Transmitting Phone:

VK4DO	6053	2158
7ZAH	5620	1742
2ZFB	5392	1716
8ZCJ	5243	2064
1ZAR	4963	1536
3ASQ	4816	1412
4ZRF	4702	1382
4ZRQ	4321	1312
1RK	4299	1700
5LP	3809	1862
2YDY	3132	1070
6ZBW	2994	1466
2ZCT	2790	1202
4ZSH	2706	890
2BMX	2047	902
6ZKO	1933	1062
3AVJ	1920	890
P29GA	1902	1270
VK2HZ	1506	492
4ZJP	1475	1298
3AUI	1424	836
5ZMM	1141	450
7AK	895	

Section (c) Transmitting CW:

VK4XA	2048	800

Section (d) Receiving:

No logs received.

CONTEST CALENDAR

June

11/12	RSGB National Field Day.
11/13	VK2 VHF Mid-Winter Field Day.
18/19	All Asian Phone Contest.
25/26	ARRL Field Day.

July

2/3	DL Activity QRP Contest.
2/3	YV Phone.
9/10	IARU Radiosport Championship.
9/10	RAST SEANET WW DX-CW Contest.
16/17	10-10 Net QSO Party.

August

13/14	*REMEMBRANCE DAY CONTEST.
13/14	European CW Contest.
20/21	RAST SEANET WW DX Phone Contest.
20/21	SARTG RTTY Contest.
27/28	All Asian CW Contest.

September

10/11	European Phone Contest.
17/18	Scandinavian CW Contest.
24/25	Scandinavian Phone.

IARU RADIOSPORT CHAMPIONSHIP

July 9/10 UTC. Single and multi-operator, but no multi-transmitter. All bands 160 to 2 metres, and Oscar satellite may be used, but no crossband. Oscar counts as a separate band. Contacts within one's own DXCC country count 1 point, same continent 3 points, outside one's own continent 5 points. Multiplier is the sum of the number of different ITU zones worked on each band. Exchange signal report and ITU zone. Final score is QSO points times zone multiplier.

Send logs to IARU Headquarters, Box AAA, Newington, CT 06111, USA. Awards in the form of certificates will be awarded to the highest scoring CW, phone and mixed code entry from each ITU zone and DXCC country.

RAST-SEANET WW DX CONTEST

CW July 9/10, Phone August 20/21. Single band-single operator, multi band-single operator and multi band multi operator sections. 160 to 10 metres may be used. Contest call is CQ SEA for CW and CQ SEATEST on Phone. Send RS/RST report and a serial number starting at 001 and, increasing by 1 for each contact. Contacts between stations in own country will not be counted.

Scoring: SEANET area contestants to outside SEANET — 160 metres 10 points, 80/40 metres 5 points, and 20/15/10 2 points. Contacts between SEANET stations count 160 metres 6 points, 80/40 metres 3 points, and 20/15/10 metres 1 point. Multipliers: For SEANET and outside SEANET areas, 3 points per country, and between SEANET stations, 2 points per country. Final score is the sum of QSO points times the sum of the multipliers.

Use a separate log for each band, and log all times in GMT. Send logs and a summary sheet to: SEANET Contest Committee, Ismail Razak "Eshee" 9M2FK, 281-C, Jalan Pekeliling, Bukit Glugor, Penang, Malaysia. Logs must be received before October 31, 1977.

Restrictions: No crossmode, crossband or mixed CW/Phone logs will be accepted. Only one transmission allowed at any time. Only one contact per band with the same station will count.

SEANET area prefixes: A4, A51, A6, A7, A9, AC3, AP, BV, CR9, DU, EP, HL/HM, HS, JA/JE/JF/JG/JH/JI/JR, JD1, JY, KA, KC6, KG6, KH6, KX6, P29, S21, S79, VK, VQ9, VS5, VS6, VS9K, VS9M/8Q6,

OLD TIMER WINS ROSS HULL

VK4DO of Rockhampton, Queensland, was born in that city in 1906, and during a long spell in hospital from a knee injury when he was 14 years old, decided to do something about learning "wireless". Self taught from what he could read, in 1923 he acquired his first licence, A4DO, for 10 watts on 240 metres, and there being only two broadcast stations in Queensland at that time (in Brisbane), he entertained the few local listeners with music and records every Sunday morning. There were no pick-ups in those times. Harold would wind up the old portable gramophone, put on a record and drop the carbon mike down into the sound box. Using absorption loop modulation and 140 volts HT on a 202 valve he was heard in New Zealand. The "B" batteries for the HT became expensive, so a rectifier was made from aluminium and lead in a borax solution, placed in large glass jars. To prevent the evaporation of the solution (and keep the moths out) a layer of kerosene was floated on top and every few days the moths were skimmed off.

To improve the RAC note, he next acquired a 500 volt DC generator and with the DC note on CW was the envy of many of the old timers. In those days you could pick a station by the tone of his signal. Always trying to improve his station, he acquired a 210 valve to increase the power to 50 watts input. This tube served for six years and did a mighty job. With 500 volts on the plate if you held the key down too long the plate would get a cherry red from the centre outwards. Before it gave up its life, you could see the grid through a crack burnt through the plate.

In the mid 1920's receiving conditions were good and many times station KGO in Oakland, California, was received direct on 312 metres on a one and two valve set. Acquiring the AOCP in 1925, and being allowed to operate on the 80 metre band, the stage was set for better things. June 1926 saw the accomplishment of two-way QSO's with USA and Hawaii using very low power, for which he was awarded Queensland winner of the "Miles Per Watt Competition". In the same year his station was awarded an "A" grade certificate in the 1926 Trans-Pacific Tests by the WIA and ARRL for the reception of a 500 word test message across the Pacific Ocean. His First Class ticket for a sea-going operator came in 1928, the days of spark transmitters and one valve P1 receivers, with a 10 in. spark coil for emergency transmitter.

Around this time "Low Loss" receivers were very popular, the coils being home wound of 8 and 10 gauge copper wire. Harold made a two valve receiver, with a ¼ in. plate glass panel, the holes being drilled with a handdrill and broken off three-cornered files — a very tedious job. It was in June of 1928 that Sir Charles Kingsford Smith's plane, the "Southern Cross", flew from California to Brisbane. Signals were copied from the plane and supplied to the Rockhampton newspapers, which featured them as news items.

The following years brought several awards, namely Worked All Continents in the year 1936 in 50 minutes, first prize by "Short Wave and Television" (USA) for Best Amateur Station, DXCC, Worked All States (USA) in one year, Honolulu Club Emergency Net, WAZ for CW in 1950; for phone in 1958 and for SSB in 1969, including many placings in ARRL; "CQ", RD, "VK-ZL Oceania" and Ross Hull Contests. Best performance was working all six continents in 1973 in 11 minutes on 14 MHz SSB without any prior schedules.

In 54 years, VK4DO has been operative except for the war years. Just about every part for amateur radio has been home made except for valves. Over 64,000 contacts have been made in over 300 countries. A member of WIA for over 40 years and recently retired after nine years as CQ Branch President, you will still find this "Old Timer" around the bands.

The 1976-77 Ross Hull Contest turned out to be Harold's year with 6053 points in the seven day section, and 2158 points in the 48 hour section. ■

VU2, VU (Andaman, Nicobar, Laccadive Is.), XU, XV5, XW8, YB, YJ8, ZL, 3B6, 3B8, 3D2, 4S7, 4W1, 5Z4, 9K2, 9M2, 9M6, 9M8, 9N1, and 9V1.

12th ALL ASIAN DX CONTEST

Phone: 1000 GMT June 18 to 1600 GMT June 19, 1977.
CW: 1000 GMT August 27 to 1600 GMT August 28, 1977.

All bands to 10 metres may be used. Entry classifications are single operator-single band, single operator-multi band, multi operator-multi band. Exchange: For OM stations, RS(T) plus two figures denoting the operator's age. For YL stations, RS(T) plus 00. Point and Multiplier for non-Asian stations.

(a) Point — a perfect contact with an Asian station counts 1 point.

(b) Multiplier — the number of different Asian prefixes worked on each band.

Scoring. Sum of QSO points on each band times the sum of multipliers on each band. Send a summary sheet with a signed declaration. Use a separate log sheet for each band. Keep all times in GMT. Fill in the multiplier column only the first time worked per band. The log and summary sheet must arrive together at JARL, P.O. Box 377, Tokyo Central, Japan, on or before the following dates: (a) Phone — September 30, 1977; (b) CW — November 30, 1977.

Countries list of Asia: A4, A51, A6, A7, A9, AP, BY, CR9, EP, HL/HM, HS, HZ/7Z, JA/JE/JF/JG/JH/JI/JJ/JR, JD1 (Ogasawara Is.), JD1 (Okinotori I.), JT, JY, OD5, S21, TA, UA/UK/UV/UW9-0, UD6/UK6C D.K., UF6/UK6F.O.O.V, UG6/UK6G, UH8/UK8H, U18/UK8A-G.I.L.O.T.Z, UJ8/UK8J.R, UL7/UK7, UM8/UK8M.N, VS6, VS9M/8Q6, VU, VU (Andaman & Nicobar Is.), VU (Laccadive Is.), XU, XV, XW8, XZ, YA, YI, YK, ZC4/5B4, IS (Spratly Is.), 4S7, 4W, 4X/4Z, 70 (S. Yemen), 70 (Kamaran Is.), 8Z4, 9K2, 9M2 (West Malaysia), 9N1, 9V1 (Singapore). ■

1977 JOHN MOYLE MEMORIAL NATIONAL FIELD DAY RESULTS

24 HOUR DIVISION

Section (a) Tx Phone

VK 4XZ	2415	3AFI	162
4AL	2243	4HS	155
1JR	1549		

Section (b) Tx CW

VK 7HE	2092	3XU	1098

Section (c) Tx Open

VK 2CAX	3252	6YL	270
6QI	1414		

Section (d) Tx Multi-op. Phone

VK 3ATL	7407	4WIT	2921
2BSU	4077	3ANR	2517
3BGG	3911	3BH	1515
3XK	3023	4IF	762
5ACE	2988		

Section (e) Tx Multi-op. Open

VK 3ATM	6562	6WH	4542
8DA	6532	7LZ	3804
3APC	5656	3AWI	2724
2WG	4959	5LZ	1808
1WI	4761		

Section (f) Tx VHF

VK 3ZJS	1550	4ZIG	504
3AVJ	1296	7ZBL	451
2ZCT	824	4PV	330
7ZKC	723	6YL	130
4ZGB	560		

Section (g) Tx Home Stations

VK 3XB	1420	9ZM	375
6AU	620	4UG	335
3KK	585	5RK	195
1RH	465	7RY	110

Section (h) Receiving

L 4182	1465	30042	590
40592	1220	40018	580

6 HOUR DIVISION

Section (a) Tx Phone

VK 4QD	1410	3ADW	464
3KI	823	7BM	300
4ADC	791	3EF	122
3HE	465	6TU	10

Section (b) Tx CW

VK 5DL	714	2JM	142
3TX	307		

Section (c) Tx Open

VK 2EL	1380	6OI	746
3APZ	1151	3EZ	300
3VF	855		

Section (d) Tx Multi-op. Phone

P 29PNG	2051	3RV	764
VK 5KR	1156		

Section (e) Tx Multi-op. Open

VK 3OM	1434		

Section (f) Tx VHF

VK 2EL	166		

Section (g) Tx Home Stations

VK 5NO	2310	3ZVZ	100
6TU	145		

Section (h) Receiving

L 40592	580		

Section (h) Receiving Multi-op.

C. and S. Russel

VK 3	960		

Check Logs

VK 5VV

■

INTRUDER WATCH

Alf Chandler, VK3LC

The following is a precis of intrusions into the Amateur bands by stations located in Region 3, reported to our Administration and identified, up to and including March 1977.

1A. A3 — BROADCASTING —

Red China — Radio Peking, Fukien, Urumchi, Fuzhoa: 3500.5; 3534; 3535; 3540; 3560; 3585; 3640; 7010; 7020; 7025; 7035; 7050; 7055; 7058; 7060; 7065; 7080; 7090; 7095; 7120; 21030 (3rd harmonic 7050); 21180 (3rd harmonic 7060); 21280 (3rd harmonic 7095).

Radio Pyong Yang, North Korea: 3560.

Radio Pakistan: 7010; 7040; 7045; 7085; 7095.

Radio Republic Indonesia: 3502; 3535; 3550 (Timor); 3577; 7070; 7080.

1B. A3J — SSB —

Japanese fishing boats in Australian territorial waters: 3528; 3530.5; 3535.

Note: Although the 3.5 MHz band is shared equally between the Amateur, the Fixed and the Mobile Services in Region 3, the Australian footnote should be adhered to.

2. A1 — ICW — RED CHINA —

Observations disclose that the following intrusions are transmitted with the same style and procedure, and possibly by the same station or stations which systematically change their call-signs and/or their frequencies, thus contravening the International call-sign allocations as well as the frequency assignments.

The format of each transmission is as follows: "v" once, stn called thrice, "de" stn calling twice; e.g. "v UXDM UXDM UXDM de CMDS CMDS", an automatic caller tape at 15 wpm operating continuously until traffic eventuates which consists of four letter code at 25 wpm. The signal strength is invariably S9+ and the bearing 330-335° ex Melbourne, and 340-345° ex Sydney.

3535 XSJ2 calling QGAN, 6-75; 3547 MOEX calling DQVT, 1-75; 7002-6 CMS8 calling 94E6, 5-76; 7002.5 MJ7C calling 1JL8, 3-77; 7007 CMDS calling UXDM, 4-76; 7008.5 MWLF calling GOKR 12-76; 7010-15 7AGC calling GMWN, 4-76; 7011 NR2G calling E12W, 9-76; 7012 BP9C calling BUBM, 1-76; 7012 6LV6 calling A23L, 7-76; 7015 CMS8 calling 94E6, 2-76; 7016 NMOY calling WHQ4, 2-75; 7019.5 NR2G calling E12W, 7-76; 7020-25 NMOY calling WHQ4, 1-75; 7025-29 AAE1 calling 8NX9, 5-76; 7027 NR2G calling E12W, 7-76; 7028-33 G3LI calling 4XC1, 7-75; 7030-34 NMOY calling WHQ4, 1-75; 7031 54PE calling AZHO, 5-75; 7040 UM34 calling EK8Y, 4-75; 7042 NR2G calling E12W, 7-76; 7050 G3L1 calling 4XC1, through 75; 7058.5 QGSD calling PA29, 2-76; 7105 QGSD calling PA29, 10-76; 7076 I4PY calling AC4S, 2-77; 14020 CR2M calling DWBC, 5-76; 14020 MJ7C calling 1JL8, 3-77; 14021-2 QEBLY calling CBFN, 4-75; 14030-39 MOEX calling DVQT, 1-75; 14031 NJ7C calling 1JL8, 3-77; 14039-46 QEBL calling CBFN, 5-75; 14046 ZCPU calling YMBK, 1-75; 14080-115 ZCPU calling YMBK, 12-75, 1-76; 14126-28 DNOQ calling OUNC, 9-75; 14130-2 ZCPU calling YMBK, 12-75; 14134-7 SXGU calling SUDV, 2-77; 14150-5 SXGU calling SUDV, 3-77; 14152-62 SXGU calling SUDV, 3-75; 14155-67 SXGU calling SUDV, 3-76; 14190 ZCPU calling YMBK, 3-75; 14235-4 OGCQF calling TURX, 4-76; 14256-8 OGCQF calling TURX, 5-76; 21127 FI7V calling D912, 10-76. Other Red Chinese stations identified by the use of "HJ", etc. 7020 5AIG, 7-76; 7028 GG5 calling DKJ2, 2-76; 7080 ZIQ6 calling 4CL2, 10-76.

Taiwan: 3507 and 2nd harmonic 7012 — 3MA26/47, 11-76.

Indonesia: 14010-35 7BD2, 7BQ2, through 75-76.

3. F1 — FSK, RTTY —

Red China: 14336-39 BZP54/BZR66, read-outs submitted; 14337 BABJ, read-outs submitted; 14339 BAJA, read-outs submitted; 14340 BAA6/7/8/20/22/24, read-outs submitted.

North Vietnam: 14080 HZV, through 76-77.

Taiwan: 14012 YTLO, through 76.

From the above evidence it can be seen that by far the biggest offender in Region 3 is Red China, and at WARC 1979 this should be taken into account. ■

AWARDS COLUMN

Brian Austin, VK5CA

P.O. Box 7A, Crafers SA, 5152

ZMT (Czechoslovakia)

General:

1. The award is available to licensed amateurs.
2. Contacts on and after 26.4.1949 are valid.
3. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. The fee for the award is 5 IRC.
5. The address for applications is —
   Central Radio Club,
   Awards Manager,

Post Box 69,
Prague 1,
Czechoslovakia.

Requirements:

Confirmed contacts are required with at least one station in each of the following areas:

OK1, OK2, OK3, HA, LZ, UA1, UA2, UA3, UA4, UA6, UA9, UA0, UB, UC, UD, UF, UG, UH, UI, UJ, UL, UM, UN, UO, UP, UQ, UR, DM (three differetn regions), SP (three different districts), YO (three different districts), YU (three different districts — a total of 39.

WORKED/HEARD ALL JAPAN PREFECTURES

General:

1. The award is available to licensed amateurs (WAJA) and short wave listeners (on a "heard" basis) (HAJA).
2. Contacts on and after 30.7.1952 are valid with the exception of OKINAWA (JR6) where contacts on and after 15.5.1972 are valid.
3. All contacts must be with land based stations.
4. Do not send QSL cards. A list showing full details of the contacts including the location of the station worked, should be certified by the Awards Manager of an IARU Affiliated Society.
5. The fee for the award is 10 IRC.
6. The address for applications is:
   JARL Awards Manager,
   Post Box 377,
   Tokyo Central,
   Japan.

Requirements:

One confirmed contact is required with each of the 47 Japanese Prefectures.

Prefecture list:

Districts	Prefectures
JA1	Tokyo, Kanagawa, Chiba, Saitama, Ibaraki, Tochigi, Gumma, Yamanashi.
JA2	Shizuoka, Gifu, Aichi, Mie.
JA3	Kyoto, Shiga, Nara, Osaka, Wakayama, Hyogo.
JA4	Okayama, Shimane, Yamaguchi, Tottori, Hiroshima.
JA5	Kagawa, Tokushima, Ehime, Kochi.
JA6	Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima.
JA7	Aomori, Iwate, Akita, Yamagata, Miyagi, Fukushima.
JA8	Hokkaido.
JA9	Toyama, Fukui, Ishikawa.
JA0	Niigata, Nagano.
JR6	Okinawa.

The official countries list for the DXCC is to be published in the 1977 Call Book, which should be available in the next couple of months. ■

LARA

Ladies Amateur Radio Association

Regular readers of this column may recall that in April we presented an Introduction to Radio for the YL, including a glossary of regularly used, but obscure, terms. Several more suggestions have come to hand so we present Part II.

ADMINISTRATIVE SECTION

EXAMS

What every amateur has to pass before being let loose on air. These interesting events are held at six month intervals to assess the capabilities of would-be amateurs. Some of us seem to enjoy these cosy convivial evens so much that we return time and again. Which brings us to.

RESULTS

Theory has it that these subtle communications are posted to candidates as soon as the exams are marked. In practice, however, the results arrive just as the candidate is wondering whether or not to apply for the next exam six months later.

LICENCE

What the successful exam-sitter acquires eventually and which transforms her or him into a station. What has previously been referred to as a name now becomes a handle and any available space on the roof or on top of the car sprouts an aerial farm.

FLUORESCENT LIGHTS

What the top of a 5/8 whip on a car hits as you go into a drive-in or petrol station.

But I digress.

BLUEY

Not a name for a cattle dog or even a TV series but in fact an official expression of disapproval, dire warning and disciplinary measure. Sent to the evildoer who transgresses the Regulations.

REGULATIONS

Rules and restrictions which govern how, when, what, where and to whom an amateur can transmit a signal.

OPERATING SECTION

COMING UP

Transmitting a signal on air. Not coming up for air as in swimming.

SKED

Regularly arranged exchange of news, gossip, etc., between amateurs. Which brings us to the LARA sked which is held each Monday night on 3650 kHz at 8 p.m. Eastern Standard Time on which all YL operators or YL guests on other stations are welcome. Myrna VK5YW is our net controller and will welcome newcomers to the net so next week why not come up and join in.

33 LARA ■

20 YEARS AGO

Ron Fisher, VK3OM

JUNE 1957

Fifty and Over. So begins the Editorial of the June 1957 issue of Amateur Radio. Possibly only a few amateurs today know that the original Limited Licence holders were permitted to operate from 144 MHz up, the five metre band was not available for their use. The June editorial announced that Executive had received notice from the department that five was now part of the operating spectrum of the Limited Licence. Of course the sixe metre band was yet to appear on the scene.

Elsewhere in the issue details were printed of the two and five metre tests being carried out by VK0AA at Macquarie Island. Trans Pacific tests were also under way on six metres from California and Hawaii with the VK's able to reply on ten.

An event that attracted amateurs from far and wide was the famous Urunga Convention in New South Wales. Organised by Creiff Retallick VK2XO, the event usually scored a write up in AR, right down to a full list of prize winners. Many of the participants are no longer with us but who could forget a character like Dave Evans VK2AYE.

Technical articles in the June 1957 issue of Amateur Radio included part two of Modifying the AR7 Receiver, an Effective Low-Power 144 MHz Transmitter or Exciter by V. Kerr VK4LK. The circuit used a 6AQ5, 6BJ5, 5763 driving a single 6146 in the final. Frequency converters, that is a device separate to the basic receiver and designed to give improved performance on a particular d were discussed by N. Turton in his aticles "Approach to Conversion". When it comes to recording tape, we have come a long way in twenty years. I wonder how many can remember the old paper based tape. No, I don't mean plastic. I notice that Homecrafts were advertising it at three dollars for a 1200 foot spool. From what I remember it worked fairly well if the brakes on the old Pyrox worked in unison. ■

PROJECT AUSTRALIS

David Hull, VK3ZDH

JUNE 1977

OSCAR 6				OSCAR 7			
Date	Orbit No.	Time Z	Long °W	Date	Orbit No.	Time	Long °W
1	21155	01.38	85.85	1	11630	00.30	60.99
2	21167	00.38	70.85	2	11643	01.25	74.61
3	21180	01.33	84.60	3	11655	00.24	59.49
4	21192	00.33	69.60	4	11668	01.18	73.11
5	21205	01.28	83.35	5	11680	00.18	57.99
6	21217	00.28	68.35	6	11693	01.12	71.61
7	21230	01.23	82.10	7	11705	00.11	56.49
8	21242	00.22	67.10	8	11718	01.05	70.11

9	21255	01.17	80.85	9	11730	00.05	54.99	7	21605	00.05	63.45
10	21267	00.17	65.85	10	11743	00.59	68.61	8	21618	01.00	77.20
11	21280	01.12	79.60	11	11756	01.53	82.23	9	21630	00.00	62.20
12	21292	00.12	64.60	12	11768	00.53	67.11	10	21643	00.55	75.95
13	21305	01.07	78.35	13	11781	01.47	80.73	11	21656	01.50	89.70
14	21317	00.07	63.35	14	11793	00.46	65.61	12	21668	00.50	74.70
15	21330	01.02	77.10	15	11806	01.40	79.23	13	21681	01.45	88.45
16	21342	00.02	62.10	16	11818	00.40	64.11	14	21693	00.45	73.45
17	21355	00.57	75.85	17	11831	01.34	77.73	15	21706	01.40	87.20
18	21368	01.52	89.60	18	11843	00.33	62.61	16	21718	00.40	72.20
19	21380	00.52	74.60	19	11856	01.28	**76.23**	17	21731	01.35	85.95
20	21393	01.47	88.35	20	11868	00.27	61.11	18	21743	00.35	70.95
21	21405	00.46	73.35	21	11881	01.21	74.73	19	21756	01.30	84.70
22	21418	01.41	87.10	22	11893	00.21	59.61	20	21768	00.29	69.70
23	21430	00.41	72.10	23	11906	01.15	73.23	21	21781	01.24	83.45
24	21443	01.36	85.85	24	11918	00.14	58.11	22	21793	00.24	68.45
25	21455	00.36	70.85	25	11931	01.08	71.73	23	21806	01.19	82.20
26	21468	01.31	84.60	26	11943	00.08	56.61	24	21818	00.19	67.20
27	21480	00.31	69.60	27	11956	01.02	70.23	25	21831	01.14	80.95
28	21493	01.26	83.35	28	11968	00.01	55.11	26	21843	00.14	65.95
29	21505	00.26	68.35	29	11981	00.56	68.73	27	21856	01.09	79.70
30	21518	01.21	82.10	30	11994	01.50	82.35	28	21868	00.09	64.70
JULY 1977								29	21881	01.04	78.45
1	21530	00.21	67.20	1	12006	00.50	66.14	30	21893	00.04	63.45
2	21543	01.16	80.95	2	12019	01.44	79.76	31	21906	00.59	77.20
3	21555	00.16	65.95	3	12031	00.43	64.64				
4	21568	01.11	79.70	4	12044	01.38	78.26				
5	21580	00.11	64.70	5	12056	00.37	63.14				
6	21593	01.06	78.45	6	12069	01.31	76.76				

7	12081	00.30	61.64								
8	12094	01.25	75.26								
9	12106	00.24	60.14								
10	12119	01.18	73.76								
11	12131	00.18	58.64								
12	12144	01.12	72.26								
13	12156	00.11	57.14								
14	12169	01.06	70.76								
15	12181	00.05	55.64								
16	12194	00.59	69.26								
17	12207	01.53	82.88								
18	12219	00.53	67.76								
19	12232	01.47	81.38								
20	12244	00.46	66.26								
21	12257	01.41	79.88								
22	12269	00.40	64.76								
23	12282	01.34	78.38								
24	12294	00.34	63.26								
25	12307	01.28	76.88								
26	12319	00.27	61.76								
27	12332	01.21	75.38								
28	12344	00.21	60.26								
29	12357	01.15	73.88								
30	12369	00.14	58.76								
31	12382	01.09	72.38								

REPORT ON OSCAR 7 MODE B

The past three months have seen a number of newcomers to the operations of the 432.15-145.95 repeater of Oscar 7, these include —

VK1MP
VK2PU, ZN
VK4ZDA, RY, ZNC, ZDE, TL
VK5ZIW, ZIM, GW
VK6ZDA, ZED, ZCC, CU
VK7AZ
ZL1BDO, TFE, TFZ, TAA, AOO
ZL2TRT, ARW, TAX
ZL3THQ.

DX has been scarce during this period although WA6STC/KG6 has been worked frequently in the southern States and VK4ZNC reports working several JA's.

The expedition of ZL2TAX to Antarctica under callsign ZL5TAA was disappointing; Ted is hoping for better results during his next visit in December 1977.

Stewart ZK1AA in Cook Island now has a new transverter for 432 and will be looking for contacts with ZL and VK; it is possible for the Eastern States to work into ZK1, using Ascending Nodes 155-165.

Col VK6ZCC (ex VK2ZZU) is in Carnarvon and is about the longest VK overland distance from the Eastern States; ascending nodes over 200 give good contacts.

Late report: KC4AA reported on AO7 mode A late April. ■

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP/NAC

PREDICTIONS

Solar activity for February and March has been most varied. There have also been some quite spectacular geomagnetic disturbances. Sunspot activity in February was moderate (monthly mean 22.6) whilst March was low (monthly mean 8.0). April looked good with the solar flux reaching 86 then falling back to the low 70's. April produced four quite large geomagnetic disturbances, April 6-9, 16-17, 19-21, 25, quite the largest number in one month over recent times.

There has been some relatively good activity on 28 and 21 MHz together with the other bands. Particularly prior to the geomagnetic storms as the MUF rises in one direction and falls quite dramatically in the reverse.

For those interested in the running smoothed sunspot numbers for the period July 1976 to September 1976 here are the latest figures.

7/75—15, 8/75—14.3, 9/75—14.4, 10/75—15.4, 11/75—16.1, 12/75—16.2, 1/76—15.2, 2/76—13.2, 3/76—12.2, 4/76—12.6, 5/76—2.5, 6/76—12.2, 7/76—12.9, 8/76—14.0, 9/76—14.2.

At April 1 1977, the predicted running smooth numbers run 6/77—18, 7/77—19, 8/77—20, 9/77—21. These compare most favourably with NASA predictions made some years ago as 1/77—3, 4/77—15, 7/77—18, 10/77—21.

For the layman some figures on average characteristics based on the previous 19 cycles.

Sunspot minimum: The new cycle begins with the 12 month running smoothed number between 0 and 11, average is 5.

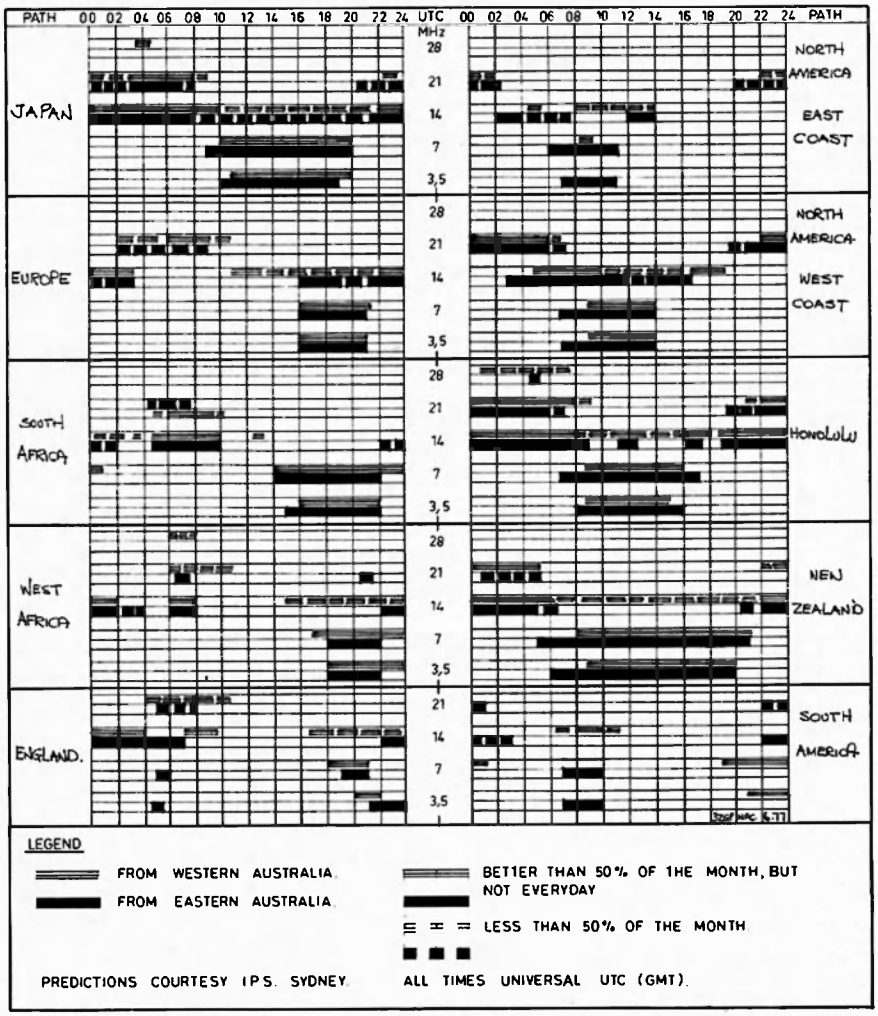
Ascending point to maximum value: Varies between 2.6 and 6.9 years with 4.1 as the average.

Maximum value: Ranges between 49 and 201 with 109 average.

Descending period maximum to minimum: Varies between 4 and 10.2 years with 6.7 as the average.

Period minimum through maximum to minimum: Average 10.8 years.

Interval between maximum of two adjacent cycles: Range from 7.3 to 17.1 years with an average of 10.9 years.



Cycle 20 began in October 1964 with a smoothed number of 9.6. It rose to a peak of 111 centred on November 1968. It looks like it bottomed around June 1976 at around 12. The anticipated maximum is 1984 with a peak of around 55 or half the average. It is not anticipated to reach a peak exceeding 100 until 2010, and that's a long way off.

It is apparent that 28 and 21 MHz are showing significant improvement over the past six months. With the advent of novice activity on 10 metres, openings previously gone unobserved are likely to be noticed. Here's hoping. ■

QSP

CROSS MODULATION

"If you've been wondering what effects CB is having on (amateur) radio, wonder no more. The plague of outlaw SSB CBers may force an end to the manufacture of linear amplifiers, bring point of sale licence checks, and FCC approval of all commercial equipment."

73 February 1977.

AM AND THE SWL

You know, if you stop to think, AM is what the SWL listens to, not SSB. It is astounding to learn how many present-day AM stations on 80 and 160 have received letters and phone calls from short wave listeners. No small number of these SWL's become amateurs because listening to AM is their introduction to amateur radio. Could the proliferation of SSB be a significant factor in the failure to attract newcomers to amateur radio? Dont' knock AM.

From CQ—March 1977.

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Carpenter relays $5. Several power supplies contain transformer 240/45-0-45, relays, alarm buzzer, diodes, diecast cabinets., etc., $6 each. VK3BBM. Ph. (03) 232 7084.

Clegg FM27M 2m FM transceiver. Full coverage 25w output, with lockable mobile cradle, manuals. Perfect condition. Also 12V 8A regulated adjustable computer type power supply, $310, ONO. VK2HS, 23 Brisbane Street, Bondi Junction, NSW 2022. Ph. (02) 387 2492.

Yaesu FT200 transceiver, exc cond, no mods, 11m xtal fitted, black colour, handbook and Yaesu AC supply, $380, ONO. Yaesu DC mobile supply, $80, ONO. ICOM IC202 SSB transceiver, as new, incl handbook, $200, ONO. Geloso 222 Tx 70w AM-CW 80-10, incl 11m, good cond, $70, ONO. VK2ADZ, QTHR. Ph. A.H. (069) 62 3718.

Mobile "Swan" MB 40A transceiver, 7 MHz, complete with mike and whip, $250. Test equipment as new: fet vom "TMK", $50. Audio sig gen. "TECH", TE22D, $55. Both as new. VK2CE, QTHR. Ph. (02) 871 7758.

Type S power supply conv to solid state with separate 250V and bias supplies (heavy), $20. 1677 TCA low band mobile unmodified w/circuit, $20. 6/40 2m FM linear with PS, $20. DCA audio oscillator, 30 push button frequencies, $10. Iroquois h/copter Tx, suitable for 6 m 4/5763, $8. VK4CY, QTHR. Ph. (071) 43 1485.

Brand new Mosley TA33 senior tri-band beam, still in carton, value $200. Will part exchange for Mosley TA33 junior or hy-gain TH3JR. DX engineering RF speech processor suitable for Drake TR3/4 transceivers, $80. VK2ASH, 25 Glendarrah S., Haze brook 2779. Ph. B.H. (02) 270 5184.

Hammarlund HX50 Tx, 10-80 metres, with table microphone and manual, $250. Also Drake 2B Rx and manual, $200. Both in use in shack until recently. VK3ACD, QTHR. Ph. (058) 21 2484.

Robot Slow Scan TV, model 70A monitor and model 80A camera, both as new condition, complete with cable and lens, $250 each. VK5AS, QTHR. Ph. (086) 82 2599, A.H. Cowell 144.

2 Pye 25W 2m FM Transceivers, type 8207, 1 unit 6 ch, $60, other unit 3 ch, $50, fits "D" type ctls, diags available, no Xtls supplied. Units complete with 100W 12V DC transistor PSU, cables, mics, and remote cont boxes. 1 STC 10W single ch 2m FM transceiver and 240V AC PSU, $60, including ctls for ch 40. 1 ex RAAF VHF AM Tx, tunes 100-156 MHz, $15. Contact VK3ANA, QTHR. Ph. (03) 57 3807.

Mobile Helical Whips, 66 in. solid fibreglass, ½ in. taper to ¼ in., ⅜ in.-24 std screw tg. Well proven, high efficiency. 80m, 40m, 20m bands, $15 each. VK3JQ. Ph. (03) 818 8743.

National HRO Rx, rack mtg model, coils cover 500 kHz to 30 MHz, band spread 80-40-20-10. Original and ex condition. Pwr supply, spkr, manual and spare valves incl., $150. VK3JQ. Ph. (03) 818 8749.

FT220 2m Transceiver, AC and DC operation on FM, CW and SSB, no mods, $400. Also Yaesu FT2FB 2m FM mobile 7 repeater and 5 simplex channels fitted, $150. VK3ATR, QTHR. Ph. (03) 336 1054.

FT221, brand new, $580. FT200, unmarked, extra PA, valves, AC supply, $320. Barlow Wadley, first class, $200. VK2KI, QTHR. Ph. (02) 78 4237.

Drake R4B Communications Rx, excellent condition, matching speaker, 1 kHz readout over 16 500 kHz bands, ideal ext VFO, notch filter, manual, $500, ONO. Bob Shaw VK6SY/4, 2/166 Drayton Rd., Toowoomba 4350. Ph. (076) 30 1300, ext. 63 (work).

Forest Phone, 10W all transistor transceiver, converted to 1825 kHz, $95. McLeod, 12W, valve type transceiver, converted to 1825 kHz, no power supply, $40. VK2BPX, QTHR. Ph. (02) 44 5549.

"AR" 1959 to 1966 inclusive, plus 50 odd copies. "Electronics Australia", 1960 to 1973 inclusive, 7 copies short. "Practical Wireless", 1966, May to September; 1967, July to November; 1968, April to August. "Break-In", 1970 to 1974, few short. Offers to Maurie Ball, R.S.D. Rokewood Junction, Victoria 3351.

Star SR700 amateur Rx covers 10 thru 80m, plus auxiliary bands, complete with manual and ext speakers $140, or swap for TH3JR or similar beam. VK2BJP. Ph. (060) 25 4580.

Yaesu FT221, as new, excellent condition, complete with mic and cables, original packing and handbook, $525, ONO. KEN KP202, as new, with nicads and charger, stubby helical, telescopic whip, leather case, fitted with BNC connector, xtals for channels 40 and 50, repeaters 2, 3, 4, 6, $150, ONO. Joe, VK3YSP. Ph. (03) 528 4545.

Radar Test Set, suit IFF sets AN/ARX6, etc., complete with manual, as new, $175, ONO. Metrix TV wobbulator, $25. TRIO 9R59DE Rx CW 2 m converter, $175 ONO. J. Pretty, 57 Bayview Ave., Earlwood 2206. Ph. 55 5430.

National Panasonic FM-AM 5-band AC-DC portable Rx model, RF 1150 lb, incorporating many features. Includes BFO and provision for external crystal, $120. As new condition. Two crystals suitable FT75B, f687.4 and f697.4, $15. Never been used as not suitable for novice frequency. One Hy-gain 14 AVQ antenna, $50, or near offer as new antenna is sought. VK4NAX, 16 Trevally St., Toolooa Estate, Gladstone, Queensland 4680.

Precision picture monitor, Astor VM14P CW, handbook, spare tubes, parts, good condition, $250. TCA R5223 communications Rx, not working but repairable, $100. Leader LSG11 signal generator, FET-ised, not working, $10. RTTY detector, AWA IG52740, working, $30. Much other stuff. R. Broughton VK3AEJ, 64 Armadale St., Armadale, week-ends.

Lafayette HA800B Rx, 80m to 6m, amateur bands only, AC or 12V DC, 100 per cent electrically and mechanically, handbook with Rx 18 mths old, $150. Also 2 x 813, 2 x 811, plus 2 x 830B, much too hungry on 12V DC! What offers? VK4ZBI, QTHR.

WANTED

2 only 7360 or 6AR8 valves. Price to VK4ZBI, QTHR.

"AR" 1974 March, May and November, 1975 January to October. "Practical Wireless" June 1973. Please quote prices. Maurie Ball, RSD Rokewood Junction, Victoria 3351.

1CAVT or 14 type vertical antenna, tuning unit, SWR, double meter. VK2OB, QTHR.

12V DC power supply for Galaxy III. Please quote price wanted. VK3YF, QTHR. Ph. (03) 83 2754.

Capacitor, few kV rating, as many uF as possible. For reconstructed Tesla. VK3TX, "Sonoma", Wellington Rd., Narre Warren East 3804.

Johnson matchbox or Millen transmatch. Price and particulars to J. Heaver, Box 27, Portland 3305.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. W. J. ERICH	**W6AL ex 3D2EK**
Mr. I. L. BROWN	**VK2RY**
Mr. LAWRIE KELSALL	**VK2AKV**
Mr. C. A. CULLINAN	**VK3AXU ex A3XW, DA3XW, VK7XW**
Mr. A. ROBERTS	**VK2TZ**
Mr. S. ADAMS	**VK3UE**

IVAN LESLIE BROWN **VK2RY**

Amateurs everywhere were saddened by the passing of Ivan on the 5th April, 1977.

A true CW man from 1930, when he gained his AOCP Ivan put these talents to work in WW2 when, as a member of the First Australian Discrimination Unit, he was largely instrumental in tracking down subversive radio influence in VK, and elsewhere.

He rose from Telegram boy to Traffic Officer in the PMG, retiring in 1967 through heart trouble. For the last couple of years he battled leukemia, but never complained of his problems.

A founder of the CW Net, his immaculate morse and cheerful personality will be sadly missed by those privileged to know him.

VK2SM.

STOLEN EQUIPMENT

Stolen from car parked at Lakeside Hotel, Canberra, Easter 1977, one Icom IC22A 2m FM transceiver, serial 5371. Reported to Canberra police. Any news of this transceiver please advise VK3LC, QTHR.

Swan 350 tcvr with mic., serial C468437. Swan 117 XC AC PSU, serial 1093. Multi 7 2m tcvr, mic and 12 xtls, serial 65132. Leader sig gen LSG-11. SWR meter 100 microA movement in grey-painted ali case. Any news of these to VK2AIM QTHR. Ph. (02) 871 5179.

Shack in North Box Hill was burgled during the night and the following item stolen:

Yaesu Musen FT221R, serial number 6J-09-1700.

It would be appreciated if anyone with information relating to this equipment, or being offered the equipment for sale, should please contact Box Hill CIB (03) 89 9496, or if inconvenient call QTH on (03) 85 4749 or (03) 20 2411 (bus. hrs.) Ken Constable VK3PN. ■

AROUND THE TRADE

SCALAR INDUSTRIES PTY. LTD.
NEW SCALAR COMPANY

Scalar Industries Pty. Ltd., Melbourne based communication engineers, and C. D. Townsend (Eng.) Pty. Ltd., sheet metal engineers of Sydney, have formed a jointly owned all-Australian company Scalar RFI Pty. Ltd.

The new company is to offer a specialist radio frequency engineering facility to Government departments and the electronics industry generally. The new company is in a position to execute the largest RFI shielding jobs where necessary.

Scalar RFI Pty. Ltd. have a new factory at 60 Barry Street, Bayswater, Victoria, phone 762 6583, and will also manufacture in Sydney.

Scalar Industries Pty. Ltd. will now concentrate on manufacturing and supplying the rapidly expanding communication antennae market in Australia with particular emphasis on development of new products not previously available from Australian manufacturers.

Scalar Distributors Pty. Ltd. will continue to expand its activities in the importation and marketing of electronic instruments and devices but with particular emphasis on communication antenna products and instrumentation. ■

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	2.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.90	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA30900	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	MISC	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458	LM1458	TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488	LM1488	UAA170	3.25		
CD4025	.55	CD4720	12.60			In some cases pin for pin substitutes will be supplied.					

POPULAR SEMI-CONDUCTORS STOCKED

7400	.48	7483	2.30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.95
7401	.48	7485	2.95	74S196	7.50	74LS175	2.70	BD437	2.80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
7408	1.09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5.95
7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	SEMICONDS		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3.20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	.90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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16 PIN	.54
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T-50	.85
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T-80	1.10
T-94	1.50

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OD3	P.O.A.
7360	P.O.A.
*QQE06-40	P.O.A.
*6146	P.O.A.
*6146B	P.O.A.
*6939	P.O.A.
*4-125A	P.O.A.
*4-250A	P.O.A.
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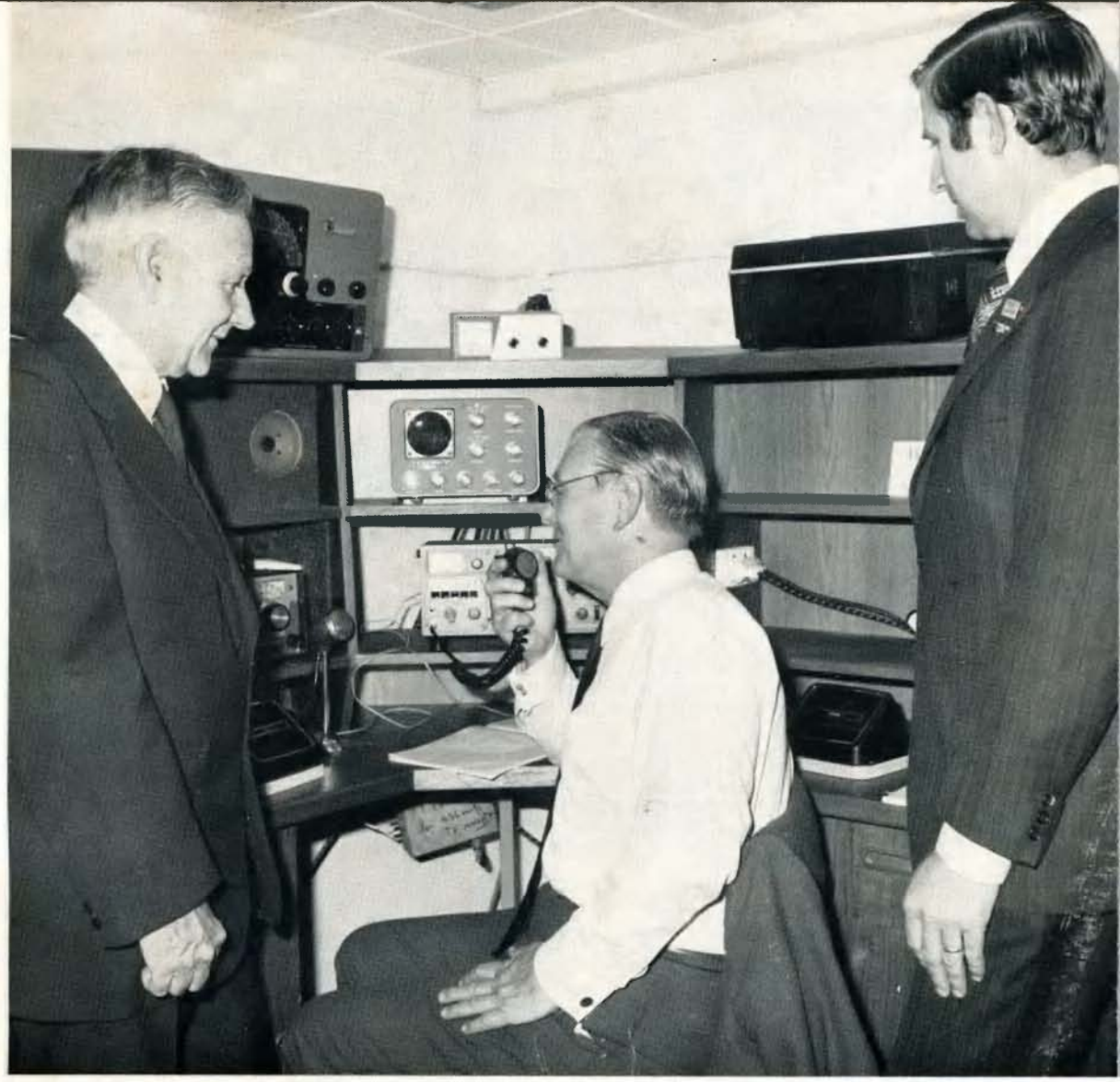
amateur radio



VOL. 45, No. 7 JULY 1977

CONTENTS

COVER PHOTO

At the opening of the new rooms of the VK5 Division at Thebarton in April, Phil VK5NN demonstrates part of the equipment at VK5BWI to Dr. Flaherty (left), Mayor of Thebarton Corporation. Divisional President VK5ZK (right) looks on.

— Photo by Christine M. Mahony

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

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Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

MODEL OL64 D/P MULTIMETER. Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB, Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available, Model C $6.90.

$29.90 Postage $2.20

MODEL CT-500/P MULTIMETER

Of intermediate size, this popular multimeter combines high accuracy with versatility over 24 ranges. Mirror Scale. Diode protected movement.

SPECIFICATION: 20,000 ohm/volt DC; 10,000 ohm/volts AC. **DC Volts:** 2.5, 10, 50, 250, 500, 5000. **AC Volts:** 10, 50, 250, 500, 1,000. **DC Amps:** 0.05 mA, 5 mA, 50 mA, 500 mA. **Ohms:** 12k ohm, 120k ohm, 1.2m ohm, 12m ohm. **Centre Scale:** 60 ohm, 600 ohm, 6k ohm, 60k ohm. **Decibel:** —20 to +62 dB. **Dimension:** 5½ x 3-5/8 x 1¾ inches. Carrying case available, Model B — $5.90.

Price: $27.90 — Postage $2.20.

MODEL AS100 D/P MULTIMETER

This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.

SPECIFICATION: 1000,000 ohm/volt DC 10,0000 ohm/volt AC. **DC Volts:** 0.3, 3, 12, 60, 120, 300, 600, 1,200. **AC Volts:** 6, 30, 120, 300, 600, 1,200. **DC Amps:** 12 uA, 6 mA, 60 mA, 300 mA, 12A. **Ohms:** 2k, 200k, 2m, 20m, 200m ohm. **Centre Scale:** 20 ohm, 2,000 ohm, 20,000 ohm, 200,000 ohm, 20m ohm. **Decibel** —20 to +57 db. **Dimensions:** 7-3/5 x 5-2/5 x 2-3/5 ins.

Carrying case for model I — $7.90.

Price: $52.50 — Postage $2.20.

TIMEBAND ELECTRONIC DIGITAL ALARM CLOCK Model C-500

A fully solid state clock that continuously displays the hours and minutes with large, easy-to-read LED digits. Seconds are displayed along with the last digit of the minutes at a touch of the Doze/Seconds button. Unlike mechanical alarm clocks, which normally have an alarm accuracy to within only eight minutes of the desired setting, this model will sound its alarm at the exact minute desired, anytime during a 24-hour day.

- ✻ 24-hour AM/PM alarm with nine minute Doze feature.
- ✻ Alarm accuracy to the exact minute.
- ✻ Special indicators for Alarm On, Power Failure, and AM/PM.
- ✻ Silent operation.
- ✻ Contemporary compact styling.

$22.90 — Postage $1.50

YAESU FRG-7

THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER

The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

$328

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19 TRANSISTOR MULTI-BAND RADIO — 9 RANGES

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1. AM 535 to 1600 kHz. 2. Marine 1-5 to 4 MHz. 3 & 4. Combined SW 4 to 12 MHz. 5. 30 to 50 MHz. 6. 88 to 108 MHz. 7, 8 & 9. Combined VHF Aircraft 145 MHz-174 MHz incorporating weather band.

Slider control, Dial light, Fine tuning control, Flip-up Time Zone map, Telescope antennas complete with batteries.

SPECIAL PRICE **$65** Post Pack $3.00

MULTI-BAND RADIO

SPECIFICATIONS:

Circuit: 16 Transistors, 15 Diodes, 1 Varistor and 2 Rectifiers.
Frequency Range: AM 535-1605 kHz, FM 88-108 MHz, TV1 56-108 MHz, TV2 174-217 MHz, AIR/PB2 110-174 MHz and WB 162.5 MHz.
Power Source: AC 240 Volts 60 Hz 4 Watts, DC 6 Volts.
Power Output: 350 mW (max.) 250 mW (undist.)
Dimension: 9⅜" x 3¾" x 8".
Weight: 4¼ lb. (approx.)
Supplied Accessories: Earphone, Batteries (4 size D).

$49.00 — Postage $2.50

HANIMEX AM/CB/FM SOLID STATE PORTABLE RADIO Model 2818

OWNER'S GUIDE — Operating Instructions.

SPECIFICATIONS:

Semiconductor Complement:
22 Solid State Devices (11 transistors, 11 diodes).
Frequency Range:
AM540-1600 kHz, CB channel 1-40, FM 88-108 MHz.
Intermediate Frequency:
AM/CB 455 kHz, FM 10.7 MHz.
Output Power:
300 mW Maximum, 10% Distortion 200 mW.
Speaker:
3" 8 ohm Dynamic.
Power Source:
Battery 6V "A-A" size.
Antenna:
AM Ferrite Bar Antenna, CB/FM Rod Ant.
Dimensions:
7" Height x 3.5" Width x 1⅞" Depth.
Weight:
1 lb. (without Battery).

$27.90 — Postage $1.50

CB POWER SUPPLY

240V in, 13.8 out. 1 amp continuous.

$34.00 — P&P $1.50.

SPECIAL

9" x 6" SPEAKERS

Brand new, in carton, 4 ohm impedance. Ideal for car cassettes, radios, etc.

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amateur radio

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QSP NATIONAL SECRETARIAT OF WIA CANBERRA — WHEN?

A special committee of the ACT Division has been set up to examine the feasibility of acquiring a suitable site and building for a National Headquarters, and has sent Executive a proposal for acquiring this under very favourable terms.

Essentially these are —

(1) A site opposite the Royal Mint in Deakin.
(2) A 50 year lease under less stringent financial terms than a commercial lease.
(3) Permission to sublet half of any buildings the Institute erects.
(4) To commence building within 12 months.
(5) To complete building within 30 months.
(6) Building must not cost less than $100,000.
(7) Building must have a minimum gross floor space of 450m, and a maximum of 900m.

Federal Convention has a policy which calls for a move of Executive to Canberra when the P & T Department is moved. Although this is not at present contemplated as far as we can determine, it may not be possible to find a suitable site under such favourable terms when the time comes.

In addition the Committee has found a very suitable prospective tenant very interested in the sublease. This tenant's operation is compatible with the WIA. The National Capital Development Commission is pressing for a decision, and the prospective tenant is anxious to know our intentions.

Long term the financial outlook is very favourable, but our immediate need if we decide to go ahead, is for the "deposit gap", say $75,000 in our case. Executive and Council will have to make a decision, one way or the other, before this QSP reaches members. The whole matter will be thoroughly debated and our needs for the immediate future taken into consideration, but we trust that you, the members, will respond adequately should it be decided that we go ahead.

K. V. ROGET VK3YQ,
Federal Treasurer (Hon.). ■

WIRELESS INSTITUTE OF AUSTRALIA INFORMATION

WIRELESS INSTITUTE OF AUSTRALIA
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Federal Council:
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Executive Office: P.O. Box 150, Toorak, Vic., 3142. 2/517 Toorak Rd., Toorak, Ph. 24 8652.
Divisional information (all broadcasts are on Sundays unless otherwise stated):

ACT:
President — Mr. S. W. Grimsley VK1VK
Secretary — Mr. D. J. Farquharson VK1ZDF
Broadcasts— 3570 kHz, 27.125 & 146.5 MHz: 10.00Z.

NSW:
President — Mr. T. I. Mills VK2ZTM
Secretary — Mr. I. A. Mackenzie VK2ZIM
Broadcasts— 1825, 3595, 7146 kHz, 27.125, 28.5, 52.1, 52.525, 144.1, 146.4, 147 MHz: 01.00Z. (Also Sunday evenings 09.30Z and Hunter Branch, Mondays 09.30Z on 3595 kHz).

VIC:
President — Mr. A. D. Kerr, VK3JQ (Acting)
Secretary — Mr. J. A. Adcock VK3ACA
Broadcasts— 1825, 3600, 7135 kHz — also on 6m, 2m SSB and 2m Ch. 2 repeater: 00.30Z (Also on Radio 3CR Mondays 10.15 and 3 HA).

QLD:
President — Mr. D. T. Laurie VK4DT
Secretary — 1825, 3580, 7146, 14342 kHz, 27.125, 146.5, 145.7, 146.8 (Ch. 4), 431.965 MHz: 09.00 EST.

SA:
President — Mr. C. J. Hurst VK5HI
Secretary — Mr. C. M. Pearson VK5PE
Broadcasts— 1815, 3550, 7125, 14175, 27125 kHz, 6m and 2m (Ch. 8): 09.00 SAT.

WA:
President — Mr. R. Greenaway VK6DA
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President — Mr. R. K. Emmett VK7KK
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Broadcasts— 3570, 7130, 27125 kHz: 09.30 EST.

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VK1 — P.O. Box 1173, Canberra, 2601
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VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 41 3535 Sat 10.00-12.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001.
VK5 — G.P.O. Box 1234, Adelaide, 5001 — HQ at West Thebarton Rd., Thebarton (Ph. (08) 254 7442).
VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (Incl. with VK5), Darwin AR Club, P.O. Box 1418, Darwin, 5794.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3580 kHz.

WIANEWS

NOVICE EXAMS

A telex from central office received during May advised representations had been made that the November Novice examination date coincided with school examinations. Consequently the November theory and regulations Novice exam date is advanced to Tuesday, 25th October, 1977. Applications should be made by 16th September.

It was also stated that if the new date proves satisfactory this year consideration will be given to holding the Novice exams from next year on the 3rd Tuesday in April and October. If anyone wishes to make any comments on this please write to the Executive Office, Toorak.

The November Novice morse exam date however remains unchanged as Tuesday, 15th November, the same date for all grades morse exam. Closing date for applications remains unchanged as 1st November.

NOVICE EXAM SYLLABUS

Graeme Scott VK3ZR, the Federal Education Co-ordinator, writes to say that "Since the publication of the first syllabus from Roger Davis VK4AAR in April, a further revised copy has been received by the Executive. This revised edition was a joint effort by Roger, Rex Black VK2YA, Ken Hargreaves VK2AKX, Keith Howard VK2AKH and a number of other interested amateurs.

The revised syllabus has been forwarded to the P & T Department, RFMD, for comment and ultimate official adoption. Once the Department has responded, the finally accepted version of the syllabus is intended to be published in AR.

Executive considers that the best approach is to hold the printing of the revised syllabus until central office has examined and accepted it.

One unofficial comment from the Department to me by telephone was that the syllabus is a very comprehensive one and doubts were expressed that it could be a little high in level. I reassured the Department that this was always under review but a syllabus can only outline fully what SHOULD be taught in a course. The depth of coverage is up to the individual teacher's discretion. Furthermore, the examiner has a wider scope for questions on a comprehensive syllabus, however he should only probe to what is considered a fair depth when framing his questions. We are not ALL graduates in the amateur radio world!

CALL BOOK

Work is proceeding on the 1977 Call Book. A number of problems arose with changes to the computer programme which now appear to have been overcome. It is anticipated that call sign details for members will be correct up to mid June and for non-members up to February 1977. Delivery to retail outlets should occur late in July or early August. Printing costs estimates have not been completed hence the cover price cannot be finalised yet. ■

QSP

DANGER — HIGH MOBILE ANTENNAE

During the last week in May, a fault developed on on State Electricity Commission's 22 KV system on a feeder from Croydon to Mt. Dandenong (Vic.)

The fault operated the circuit breaker at Croydon and power was lost to an area including the TV transmitters at the mountain top.

A patrol of the line was made, and at the end of the 22 KV line at Mt. Dandenong the fault was found — a "CB" antenna was found welded to the HV conductors, and hanging in mid air. The antenna had been burnt off at the base where it was originally attached to a vehicle, and obviously the vehicle had driven off, possibly at high speed, with a very disturbed "CB" operator driver at the wheel, and possibly minus a "CB" transceiver in doubtful state of repair.

This item is brought to your notice, not only for CBers but for Amateurs also. The DANGER of high mobile antennas is considerable when in proximity to overhead power systems.

Hopefully, the CBer involved suffered no injury, but was only frightened by this incident.

The USA has had 125 fatalities so far from "CB" antennas fouling overhead systems.

Please, fellows, watch the height of your mobile antenna and live to work some more DX.

— From VK3AN.

QSP

UK EXAMS

"The Radio Amateurs' examination (City and Guilds of London Institute) from 1979 will be in the form of objective tests containing multiple-choice questions. In the preparation for this change it is the Institute's policy to pretest objective questions, trying them out on candidates who have reached examination standard. Pretests are intended to test the performance of individual questions and syllabus coverage. Information is obtained which assist the Institute's reviewing panels in judging whether each individual question should be included in the question bank for use in future examinations."

Short Wave Magazine, April 1977.

28 MHz BEACONS

"The (International Beacon) project continues to advance steadily and to meet the recommendation of the Warsaw (IARU Region 1) Conference that beacons should

ve to the 28.2-28.25 MHz portion of the band, it is being suggested to the national societies and other responsible bodies that the new frequencies should be planned on a 'mirror image' above the common frequency of 28.2 MHz instead of the present allocation which is below 28.2 MHz." The following is a list of IMP 28 MHz beacons in use showing the past and proposed frequencies:—

	Old	New
DL0IGI—W. Germany	28.195	28.205
3B8MS—Mauritius	28.190	28.210
GB3SX—UK	28.185	28.215
5B4CY—Cyprus	28.180	28.220
VE3TEN—Canada	28.175	28.225
ZL2MHF—NZ	28.170	28.230
VP9BA—Bermuda	28.165	28.235
A9XC—Bahrain	28.155	28.245
WA1IOB—USA	28.150	28.250

A number of other beacons are under construction or being planned to slot into the recommended 2.5 kHz spacing. These are:—

9J2BBB—Zambia	28.2025
W4—USA	28.2075
ZD9GI —Gough Is.	28.2125
VK2WI—NSW	28.2175
YU—Yugoslavia	28.2225
F3THF—France	28.2275
PY1CK—Brazil*	28.24
OA4VHF—Peru	28.185

* Being reconstructed.

Source — IARU RI News, May 1977.

RECIPROCITY — POLAND

IARU RI News, May 1977, reports that guest licence applications may come from any country but reciprocal agreements are in force between Poland and the UK and Canada. Allow three months for processing, send copy to PZK, the Polish Amateur Society, no charge for licence and no mobile provisions.

MEDIA PUBLICITY

Ever thought about publicity for amateur radio activities? Have a look at what the ARRL Public Information Officer wrote in April QST and ponder the situation as it affects us in Australia. "How many times within the last six weeks have you picked up a newspaper that carried at least one story on CB? You probably said to yourself, 'Why don't amateurs get the same coverage?' There are many reasons, some of which have to do with sheer numbers and the economics of the media. Some of it has to do with old attitudes and old habits.

For example, suppose that we create a mythical disaster — swamp draining: Early one morning Providence decides that it is time to drain the swamp. Draining the swamp, of course, disrupts normal communications; therefore, amateurs wade in to help the victims of the swamp draining. The news media hears about the swamp and sends a reporter out to find out what is going on. Maybe he stumbles across the amateur and maybe he doesn't. If the reporter does find the amateur, he starts to ask a lot of questions. Meanwhile the amateur is up to his knees in alligators and tells the reporter to find some quicksand and go swimming.

Two weeks after it is over the amateur calls the reporter and asks if he needs more information. The reporter tells him that the story has no news value now and to call him the next time amateurs are involved in a swamp draining. The amateur then sends the details into QST, which immediately prints the story. Everyone pats everyone else on the back and we all rest assured that 150,000 amateurs know how that amateur did a good job!"

LINEAR AMPLIFIER BAN — USA

FCC dockets 21116 and 21117, according to an article in April 1977 QST contain proposals to ban the manufacture and sale of external power amplifiers capable of operating on any frequency between 24 and 35 MHz and (21117) would put all commercially manufactured transmitters and external power amplifiers under the FCC's type-acceptance program. "If you're wondering what amateurs have done to make the FCC want to ban 10 metre amplifiers, you're headed in the wrong direction," states the article. "The problem is not with the Amateur Radio Service but with the illegal use of these amplifiers in the CB service. A recent FCC study of 30 random TVI cases found that 60 per cent involved the illegal use of amplifiers by CBers. To compound the problem, some manufacturers and dealers appear to be catering to this illegal market." "Is it proper to take privileges away from a service known for its good operating practices and self-discipline in order to control illegal practices in another separate and distinct service?" The article suggests that these are alternatives to this heavy-handed action. Provisions are in the dockets exempting home-brew own-use amateur linears and personal barters. (Please refer to paragraph numbered 8 under "CB" in AR June 1977, page 5.—Ed.)

USA SITUATION

April QST editorial comments on the discontinuance of fees for radio licence applications in the USA from 1-1-1977. FCC is faced, it says, with an ever-increasing flood of work — caused mainly by more licence applications and the need for more enforcement of the regulations. Some 980,000 CB applications and 21,500 amateur applications were received by the FCC in the month of January 1977 alone. The FCC, despite all this, has not been able to obtain approval of a budget large enough to cope. In order to survive, the CB licence-issuing process has been streamlined so that it costs less than a dollar to issue a CB licence and many of the recent actions taken and proposed by the FCC were designed to reduce the cost of regulating the amateur service. "New programs, even though beneficial to the amateur service, can't be considered at this time, according to the Commission, because to implement the programs would cost money, and there is no money." The licence fees which were collected went directly into the general fund of the USA and the FCC had to work on a budget that may have been less than the fee receipts and was generally inadequate. The ARRL believes that radio licence fees ought to be channelled back directly to FCC or a more realistic budget should be authorised.

CAVEAT EMPTOR

A quote from ARNS Bulletin of March 1977 taken from a radio club publication by W9QKE describes the painstaking work involved in putting together a device which in the end never worked. Why? Because a check on the transistors and IC's used showed several were not only defective but were other than stated on the covers. It seems there are unscrupulous dealers around who purchase scrap lots for re-marking or re-labelling in counterfeit style. Now you know.

FIJI LICENSING

An article by ZL2SS in Break-In May 1977 advises that anyone visiting 3D2 and wanting to operate should apply to the P & T Department, Box 40, Suva, at least two months beforehand. The usual photostat copy of your own licence and certificate is required and the licence fee was $1 for a week or $4 for a year. After applying you will be asked to complete a long application form and supply two character references. Applications from non-British subjects require the special approval of the Minister which is understood to be difficult to get. Also required will be details of the gear you wish to take into Fiji, for which an import permit is necessary to qualify for duty free admission as transceivers (but not radio receivers) are liable to duty. If all goes well you would then await a reply saying you will be issued with a temporary licence to be collected personally when you arrive.

DIGITAL COMMUNICATIONS

The Canadian special edition of the ITU Telecommunication Journal of March 1977 contains much interesting information on modern techniques on information transfer which are inherently either analogue (speech generates a continuous waveform) or digital (teleprinters emit pulses). Thus the telephone is an analogue device from the very beginning but digital communications have been with us for a very long time in the form of morse code, N. American Indian smoke signals, drums of Africa, etc. Modern technology has only recently become available for high-speed digital processing. There is little doubt that past evolution in telecommunications will seem as nothing compared to the revolution now well under way and the more radical developments promised for the future, states an article on Digital Telecommunications. The article goes on to state there are two sets of world digital standards recognised by CCITT: one based on the 1544 kbit/s primary level multiplex of N. America and Japan, and the other on the 2048 kbit/s primary level multiplex used extensively in Europe. The common foundation for both standards in the 8000 Hz sampling rate of the voice channel and the resulting 64000-bit rate for encoded speech. The importance of the work going on in CCITT to reduce differences between both sets of standards is aimed to facilitate system interworking having regard to the enormous outlays in capital equipment involved.

HFers

April 1977 QST reports an FCC public notice about persons using SSB on various frequencies, particularly between 27.4 and 28.0 MHz, with equipment intended for amateur radio and using false call signs. The FCC considers out-of-band operation a major enforcement priority, says the notice. To underscore the notice, FCC has designated for hearing the application of John H. Randall, president of HF International (one of the SSB groups referred to in the notice) for renewal of a CB service licence. The call for the hearing mentions a number of illegal activities urged or condoned by HF International and its publication.

CANADIAN QUALIFICATIONS

DOC has proposed a clarification of the classes of certificates of proficiency required to qualify persons as operators of amateur radio stations. Holders of 1st and 2nd class radio operators' certificates, special radio operator's certificate, advanced amateur radio operator's certificate or an amateur radio operator's certificate are to be permitted to operate amateur radio stations. March 1977 QST.

COMPONENTS PRICES VARIATION

Due to possible foreign currency rate fluctuations in costs related to the import and supply of components purchased from the VK3 Division, it is possible that the prices quoted on the order form could change without notice.

A SOLID STATE VIDEO MODULATION SYSTEM

G. C. Brown VK3YGB
18 Hedderwick Street, Essendon, 3030

This unit provides video and sound modulation for either a solid state or valve transmitter. Sound modulation is achieved by use of a 5.5 MHz subcarrier injected in with the video.

The resulting spectrum produced by the transmitter is two video sidebands with carrier, plus two sound subcarriers (FM) displaced 5.5 MHz either side of the vision carrier. This output is suitable for reception of sound and vision using a standard domestic television receiver with an appropriate frequency converter.

The video modulator, Fig 1, consists of an isolator stage, an adjustable clamp (black level set) and a wideband DC amplifier. The 5.5 MHz FM sound signal is produced by a free running oscillator and a varicap diode as shown in Fig 2.

Option A, for a solid state transmitter, has been in use for over three years in a 16 watt 70 cm ATV transmitter. Results over this period have been good and operation mobile/portable using a 12V battery, as well as from the home station has produced favourable reports.

Output from the modulated RF power amplifier may be fed into a varactor diode tripler to enable operation on other bands. The tripler retains the relationship between the sidebands, carrier and subcarriers while providing an overall frequency shift. This mode of operation has produced excellent results on both the 70 cm and 23 cm bands.

Option B provides a means of modulating a valve transmitter. The valve may be in the grounded grid configuration as is the case with the APx6 transponders. This modulator has been used successfully with a modified APx6 as a tunable 23 cm ATV transceiver.

Adjustment of the black level is best done with a greyscale generator, demodulator probe and CRO, but any video signal may be used. Injection level for the sound signal may also be monitored using the above equipment. The correct ratio for peak vision to sound power is 10:1 and may be set by varying the values of the 100 pF coupling capacitor to the modulator.

Acknowledgement: VK3ZPA for co-operation in development. ■

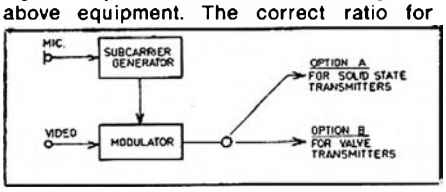

FIG. 1. BLOCK DIAGRAM

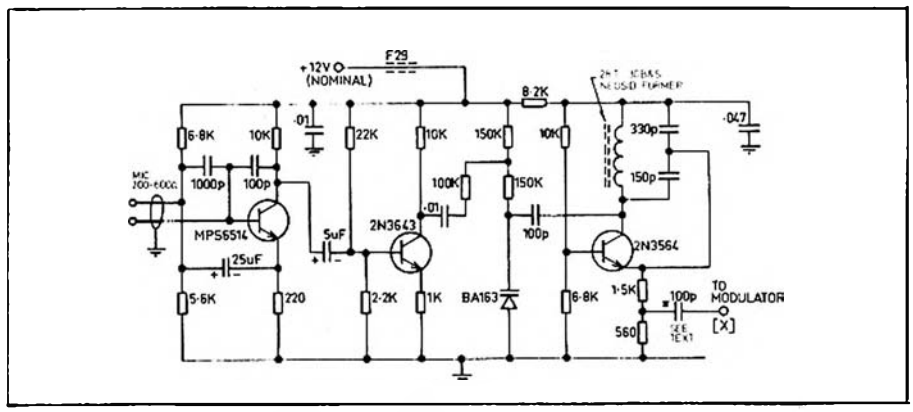

FIG. 2. SUBCARRIER GENERATOR. 5.5 MHz (PCB UNIT)

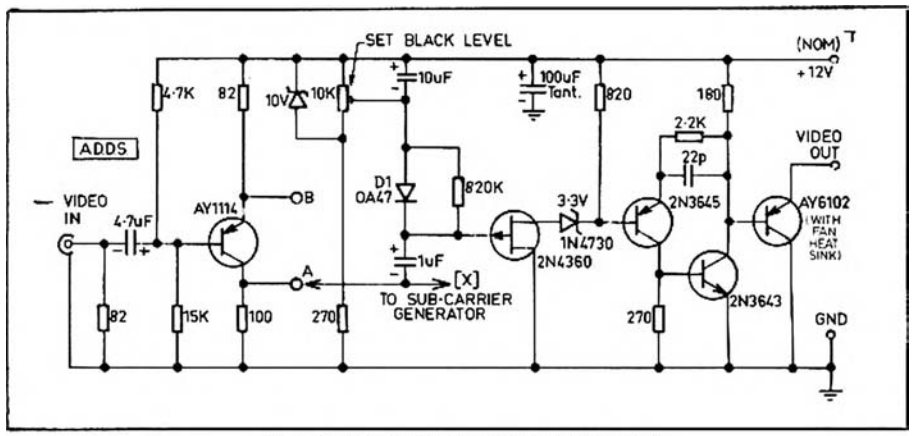

FIG. 3. VIDEO MODULATOR (PCB UNIT)

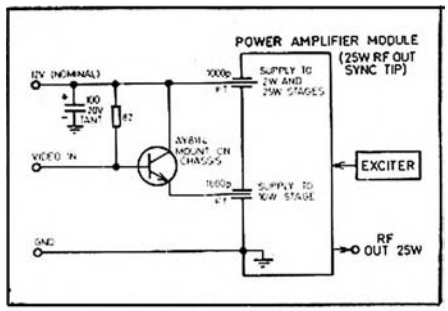

FIG. 4. OPTION A — TO MODULATE SOLID STATE TRANSMITTER

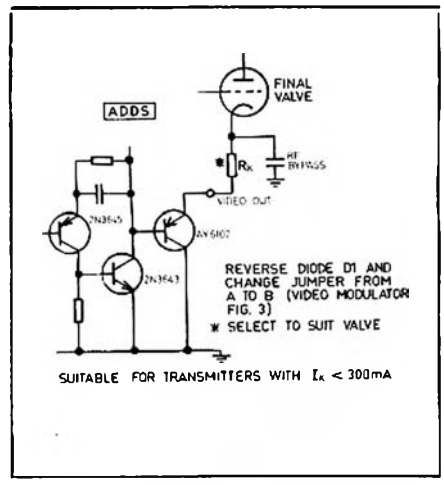

FIG. 5. OPTION B — TO MODULATE VALVE TRANSMITTER

A WEATHERPROOF 2 METRE GROUND PLANE

John Kolm VK3YJK.

Described here is an unusual construction method for a conventional ground plane antenna. Advantages include complete weather protection for the point of connection to the antenna, extreme ease of attachment to the mast, physical strength, and a very low SWR.

The feed impedance of the aerial has been raised to 50 ohms (for 52 ohm coax) by the fairly conventional method of lengthening the radiating element and resonating this introduced inductance with a capacitor in parallel (see Fig 1). The same method can be used to yield a feed impedance of 75 ohms, using numerical values from the ARRL Antenna Handbook. Below are given numerical values for the ground plane for the 2 metre band, with a feed impedance of 50 ohms.

Length of radiating element: 53.4 cm.

Length of each radial element: 48.9 cm.

Resonating capacitor: 14 pF. Use a 3-33 pF variable of the "beehive" type.

The constructor will require approximately 3 metres of ⅜ inch aluminium tubing, three solder tags, five very small nuts and bolts, one SO-239 type coaxial UHF panel socket, and the capacitor mentioned above. Also required will be approximately 80 cm of polythene tubing with a wall thickness of at least 5 mm to ensure rigidity and an internal diameter fractionally larger than the external diameter of the mast on to which it will fit, as well as a small amount of at least 3 mm thick polythene sheet. Polythene (polyethylene) MUST be used if stray capacitance problems are to be avoided.

The first step is to seal one end of the polythene tube, with a disc cut from the polythene sheet. Since this seal must be completely waterproof, it is advisable to try and get it done with the proper equipment. Failing this, a good seal can be made by placing a thin sheet of hot metal (not too hot) at the points where the two plastic surfaces are to be joined, and causing the surfaces to melt into one another. This seal should be tested. Figure 2 should be referred to for the rest of this article.

Carefully cut two discs out of the polythene sheet. One disc should fit tightly inside the polythene tube, and the other should fit snugly but not tightly. Through the centre of the looser-fitting disc, drill a hole slightly less than ⅜ inch in diameter, so that the aluminium tubing fits very tightly inside it. Put this disc aside for future reference. Through the centre of the tighter-fitting disc, drill or cut a hole large enough to fit the barrel of the coaxial panel socket. Push the socket into the hole so that the flange of the socket is on the TOP side of the disc (see Fig 2), and drill holes through the disc to accommodate the socket mounting bolts.

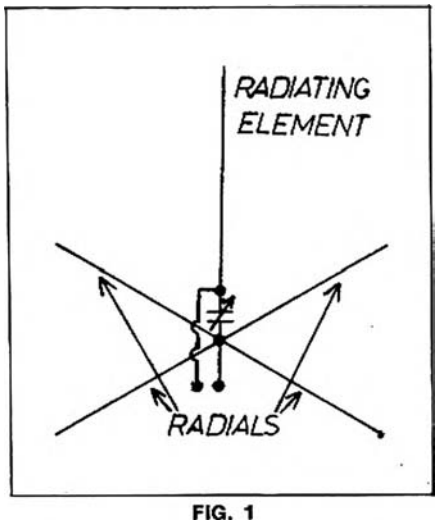

FIG. 1

Refer to figure 3 in this section. Cut the radiating element to length. 1 cm from one end, drill a bolt-sized hole right through both walls of the tube, and drill an identical hole 5 mm from the same end. Solder the centre point of a 5 cm length of flexible wire to the centre connector of the coaxial panel socket, and thread the ends of the wire through the lower set of holes (see Fig 3). Put a bolt straight through the upper set of holes, and use it to bolt one solder tag to either side of the aluminium tube. Solder the ends of the wire to these solder tags, and cut off the excess (see Fig 3).

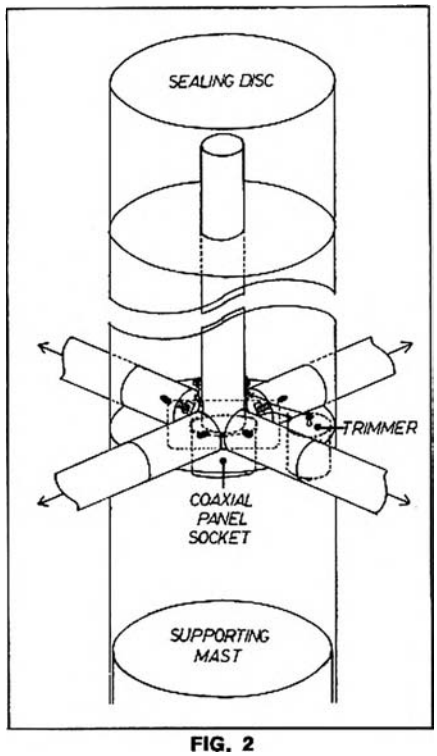

FIG. 2

Drill two holes in the polythene discs to accommodate the centre and outer lugs of the beehive capacitor (see Fig 2). Insert these lugs (from the BOTTOM side of the disc), and use stiff wire to solder the centre lug to one of the solder tags on the radiating element. Place a solder tag where one of the coaxial socket mounting bolts will eventually bolt it, and solder a wire from this tag to the outer lug of the beehive capacitor (see Fig 2). Keep all wires as short as possible.

Drill four holes in the walls of the polythene tube, 20 cm from one end. These holes should tightly fit the ⅜ inch aluminium tubing, and they MUST be at right angles to each other (see Fig 2).

Cut the radial elements to length. Drill a bolt-sized hole through each element, 3 mm from one end. Push a nut into the end of each tube until the hole in the nut lines up with the holes in the tube (see Fig 4). Push the four coaxial socket mounting bolts through the polythene disc and through the holes in the socket flange, but do not let them protrude from the flange (i.e. push the bolts only PART WAY in).

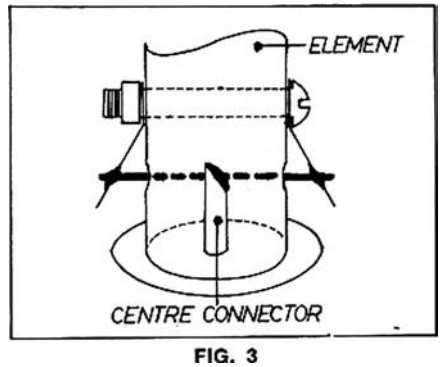

FIG. 3

Push the polythene discs with the ⅜ inch hole on to the free end of the radiating element, and about 5 cm down (see Fig 2). Pick up the completed assembly

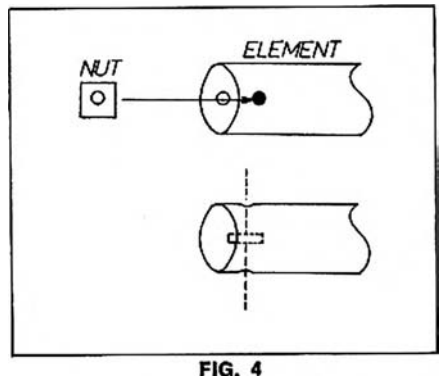

FIG. 4

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.90	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA3090Q	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	**MISC**	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458	LM1458	TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488	LM1488	UAA170	3.25		
CD4025	.55	CD4720	12.60								

In some cases pin for pin substitutes will be supplied.

POPULAR SEMI-CONDUCTORS STOCKED

7400	.48	7483	2.30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.95
7401	.48	7485	2.95	74S196	7.50	74LS175	2.70	BD437	2.80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
7408	1.09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5.95
7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	**SEMICONDS**		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3.20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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6" x 6" S.S.	1.60
8" x 6" S.S.	2.20
12" x 4" D.S.	2.90
12" x 12" D.S.	6.00
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24 PIN	.95
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T-50	.85
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T-94	1.50

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PLENTY OF PARKING AT REAR STD 02

(the element and its two discs), and slowly push it into the polythene tube. Ensure that the holes in the tube wall line up with the mounting holes on the coaxial socket such that, when inserted, the radials will all be at right angles to each other (see Fig 2). Push the assembly in until the top of the base plate is 2 mm lower than the bottoms of the four holes in the tube (see Fig 2).

Take one radial. Insert in into one of the holes in the tube, nut end first, and aligned so that the bolt can be inserted into the nut. Very slowly push the radial in, until the bolt can be pushed (with a screwdriver) through the hole in the radial and into the nut, and tightened. This will take a little trial-and-error, but it is not very difficult. Repeat the procedure with the other three radials. The aerial is now complete, but seal the ends of the radials, and the places where the radials leave the polythene tube, with araldite. This will make the aerial completely rainproof.

A small amount of stray capacitance is introduced by this construction method, however it is less than 14 pF and therefore causes no bad effects. The only effect is that the antenna resonates with a capacitor setting which is somewhat lower than expected. The beehive capacitor is adjusted by a "tweaker" made from a 2 cm length of rubber tubing, 1 cm of which has been pushed on to a glass rod. To resonate the antenna, connect it to a transmitter via a SWR bridge, and adjust the capacitor for minimum SWR. The Standing Wave Ratio for this antenna is between 1 : 1.1 and 1 : 1.05.

To attach the antenna to the mast, run the coax up inside the mast and attach it to the aerial via a UHF-type plug. Then simply push the polythene tube 15 cm down over the mast (see Fig 2), and tighten it on with two hose-clamps. ■

WIDE BAND QUADRATURE RF PHASE-SHIFT NETWORKS

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RF phase-shift or phase-splitting networks that have two outputs that maintain a constant phase difference of 90 deg. have quite a variety of uses in communications circuitry and techniques. Probably the most familiar application to amateurs is the RF phase-shift networks in phasing type SSB generators.

I recently became interested in phasing SSB generators and had thoughts of "direct conversion" SSB transmitters. That is, generating SSB directly on the desired output frequency. This technique has some real advantages. The only spurii one has to contend with are the opposite sideband suppression and intermodulation distortion, both of which are considerations in heterodyne systems of SSB generation in any case. Then there's the simplicity of the circuitry. It should be remembered that one of the motivations behind the development of the highly sophisticated complexity of modern IC's is simplification of the external circuitry. What used to require a whole rack of equipment can now fit on one PC board. So, circuit conplicity is not to be frowned upon. Circuit complexity is not necessarily synonymous with sophistication or "the state of the art".

REQUIREMENTS

To generate SSB directly on the desired output frequency, and cover a complete amateur band, or a major portion of one, requires an RF phase-shift network that will maintain its characteristics over the required frequency range. Opposite sideband suppression suffers if this condition is not met. A phase error of 2° and/or an amplitude difference of 4 per cent results in a maximum opposite sideband suppression of 35 dB. This figure may be regarded as acceptable in amateur practice. However, if the phase error is about 1° maximum, and the amplitude difference about 2 per cent, the maximum opposite sideband suppression would be 40 dB — a much more acceptable figure.

An RF phase-shift network that covered the 14 MHz band was described by Richard Taylor W1DAX in the September 1969 issue of QST, used in a direct conversion receiver. The article was subsequently reprinted in the ARRL's "Single Sideband for the Radio Amateur", fifth edition 1970. The circuit described in this particular article is claimed to maintain the 90° phase-shift, and the output amplitudes within 0.8 dB, between 13.8 MHz and 14.6 MHz.

Now, the drawback of this circuit is that it is single band, although it does cover 800 kHz — but when compared to the 14 MHz operating frequency, it isn't exactly "wideband".

Quadrature RF phase-shift networks that operate over an octave or more frequency range have been described many years ago. However, one has to search

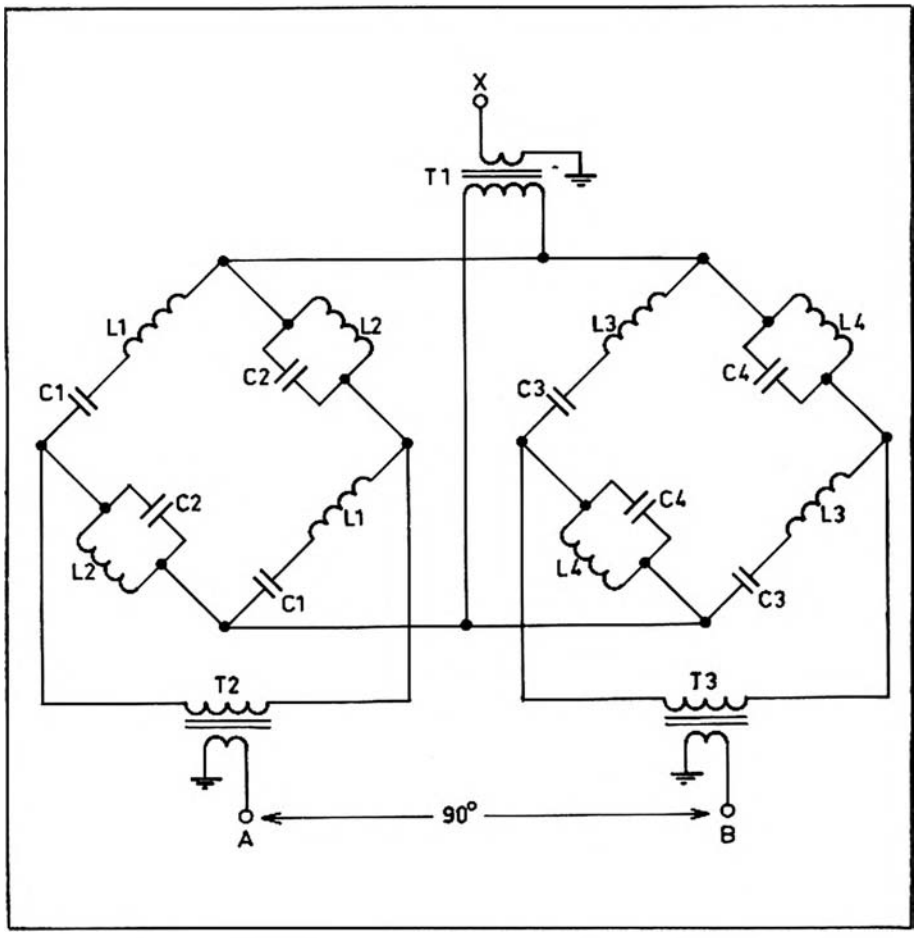

FIG. 1: Circuit of Wideband Quadrature Phase-Shift Network. Maximum Phase Difference Error of about 1 deg., overall Loss from X to Port A or B of about 6 dB. Component Details in Table 1.

the literature on Antennas and Circuit Theory to find them.

The network presented in figure 1 is courtesy of Jim Koehler VE5FP/VK2BOV who designed it from a 1951 paper on circuit theory, for application in a circularly polarised antenna system while he was on sabbatical leave in Australia during 1974-75. Two bridge networks provide 45° phase-shift each over the design range resulting in a differential phase-shift of 90° across that range. The performance of this type of network is excellent. The maximum phase error is about 1°, and the amplitude differences between the outputs is less than 0.5 dB, across the frequency range. The component data for the circuit in figure 1 lists values for the frequency ranges 1 MHz to 15 MHz and 3 MHz to 30 MHz.

This circuit makes direct conversion phasing SSB over the whole HF spectrum possible

Direct conversion SSB receivers covering the same range are also a possibility. "Third Method" SSB generation with the output directly on any desired frequency across the range is also a possibility.

The input and output impedances of each bridge in the network is 200 ohms. The transformers T2 and T3 transform this down to 50 ohms. Although the inputs of each bridge are in parallel, making the input impedance 100 ohms, T1 may be constructed the same as T2 and T3 as the mismatch has no serious effect on the performance of the network. The three transformers are constructed as wideband baluns having a turns ratio of 2 : 1. Small toroids or dual-hole balun cores such as the Neosid 1050/1/F14 are suitable. The input and output transformers must be physically isolated.

CONSTRUCTION

To construct a suitable transformer using the Neosid dual-hole balun core proceed as follows: Twist together three 180 mm lengths of 26 or 30 B & S enamelled copper wire at about two twists per 10 mm. Wind three turns through the two holes (i.e. around the centre leg) and connect two of the wires in series to make the 200 ohm winding.

If so desired, the secondaries of T2 and T3 may be arranged to drive diode balanced modulators directly.

It is important that coupling between the tuned circuits in each arm of each bridge, and between each bridge in the network, be kept to a minimum. Also, the Q of each coil must be at least 50 or 60 (at the resonating frequencies shown). Consequently, toroids have been suggested although standard coil former and screened can assemblies (with ferrite cup-cores) have been used successfully. Each arm is constructed individually and the inductor adjusted to resonate with the capacitor at the frequency indicated. Each series L-C combination is temporarily connected as a parallel tuned circuit to enable adjustment. This is very simply done with a GDO, using a monitoring receiver to establish the frequency more precisely. Sufficient accuracy is easily obtained. Alternatively, using a general coverage receiver, each tuned circuit combination may be connected as a parallel-tuned trap in the antenna lead and the circuit tuned for a null at the required frequency. Of course, if you have access to a network analyser or a phase meter, the job is a little simpler.

APPLICATIONS

The circuit of a suggested wideband, passive, phasing type SSB generator/detector is given in figure 2. Transformers T1, 2, 3, 4 are wideband 4 : 1 transformers as described above. A 7 dB resistive pad/matching network is shown at the input to the RF quadrature phase-shift network. This may be replaced by a transformer like those used for T1-4. The phasing of the secondaries of T3 and T4 is important otherwise the generator/detector will not function. They must be *series-aiding*. The diodes used in the two balanced modulators should, ideally, be matched. Matched quads of hot-carrier diodes would be best. The two 1K pots are to provide balance alignment. The audio phase-shift network must be a passive type if the bi-lateral function is desired. The quadrature output ports of the audio phase-shift network should be low impedance. I have described a suitable circuit in a separate article.

The network described has other applications apart from phasing SSB or Third Method SSB generators/detectors. Antennas consisting of a combination of

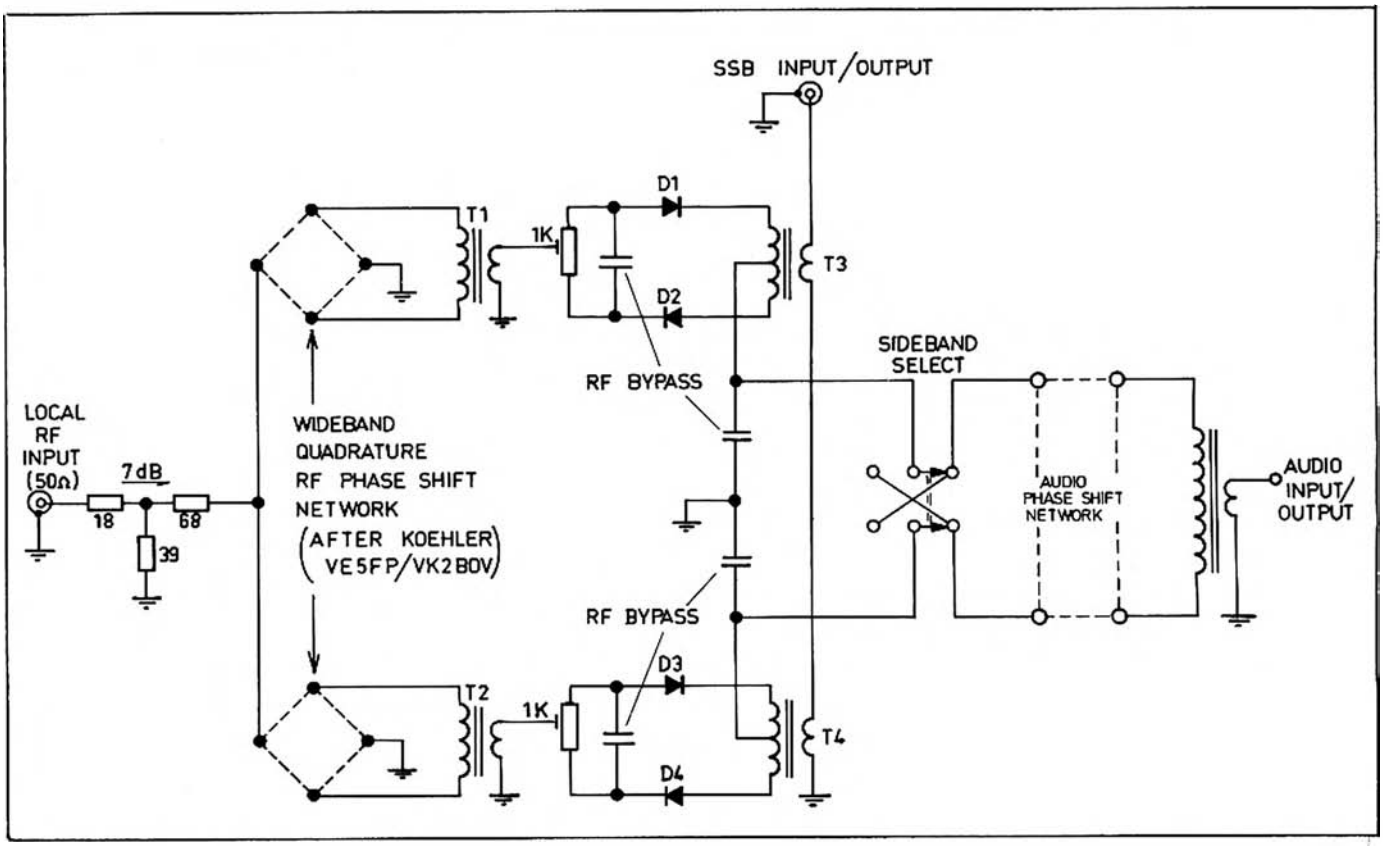

FIG. 2: Suggested Bilateral Wideband Passive Phasing Type SSB Generator/Detector. The 7 dB Pad may be replaced by a Wideband RF Transformer as used for T_1 - T_4 (see text).

phased elements driven 90° out of phase (i.e. with ¼-wave phasing lines) could make use of the network. If used for transmitting, suitably dimensioned components would be necessary of course.

TABLE 1

COMPONENTS FOR WIDEBAND RF QUADRATURE PHASE-SHIFT NETWORK

component	1-15MHz	3-30MHz
L1	1.05 uH	0.465 uH
L2	15.4 uH	6.13 uH
L3	4.36 uH	1.84 uH
L4	64.2 uH	24.2 uH
C1	386 pF	153 pF
C2	26.3 pF	12 pF
C3	1605 pF	604 pF
C4	110 pF	46 pF

NOTES

For the 1-15 MHz network, each L1/C1 and L2/C2 resonate at 7.9 MHz; and each L3/C3 and L4/C4 resonate at 1.9 MHz. For the 3-30 MHz network, each L1/C1 and L2/C2 resonate at 18.8 MHz; and each L3/C3 and L4/C4 resonate at 4.77 MHz.

COIL DETAILS

0.465 uH = 4 turns, 26 SWG on NEOSID toroid 12.7 x 6.35 x 3.18/F25, spread out a little.

6.13 uH = 14 turns, 30 SWG on NEOSID toroid 6.35 x 3.18 x 3.96/F25 around approx. half circumference.

24.2 uH = 34 turns, 30 SWG on NEOSID toroid 12.7 x 6.35 x 3.18/F25 around most of circumference.

1.05 uH = 6 turns, 26 SWG on NEOSID toroid 6.35 x 3.18 x 3.96/F25 spread out a little.

15.4 uH = 27 turns, 30 SWG on NEOSID toroid 12.7 x 6.35 x 3.18/F25 spread around 2/3 of circumference.

4.36 uH = 12 turns, 30 SWG on NEOSID toroid 6.35 x 3.18 x 3.96/F25 spread around half of circumference.

64.2 uH = 24 turns, 30 SWG on NEOSID toroid 12.7 x 6.35 x 3.18/F25 spread around about ½ of circumference.

CAPACITORS

12 pF = 12 pF, 5 per cent NPO ceramic or silver mica.

46 pF = 47 pF, 5 per cent NPO ceramic or silver mica.

153 pF = 150 pF, 5 per cent NPO ceramic or silver mica.

604 pF = 680 pF, 5 per cent NPO ceramic or SM in series with 5600 pF, 5 per cent polyfilm capacitor.

26.3 pF = 27 pF, 5 per cent NPO ceramic or silver mica.

110 pF = 100 pF in parallel with 10 pF, both 5 per cent NPO ceramic or SM.

386 pF = 390 pF, 5 per cent NPO ceramic or SM.

1605 pF = 2700 pF, 5 per cent and 3900 pF, 5 per cent polyfilm capacitors in series. ■

THE QUEENSLAND AMATEUR RADIO LICENCE STUDY PACKAGE

Information provided by R. Davis VK4AAR

Following the success of last year's Novice study package in VK4, several improvements have been made and the study guide extended to include additional material as well as several sets of typical multiple choice exam questions. We thus have a self-contained set of notes for the AOCP "A" Course. (Persons who intend sitting for the Novice exam are recommended to read one of the Introduction to Amateur Radio type of books such as Understanding Amateur Radio by ARRL or the RSGB — GUIDE TO AMATEUR RADIO by Pat Hawker, in order to supplement the theory with a little general knowledge of Amateur practice. If a student is going straight on to the "B" course then his reading of one of the handbooks will cover this requirement).

THE ADVANCED RADIO COURSE STUDY GUIDE has just been completed and together with one of the AMATEUR RADIO HANDBOOKS — either ARRL or ORR, provides a course of study for the full AOCP. The "B" course assumes the student has done the "A" course or an equivalent standard. In the study guide there are 5 chapters: (i) syllabus, (ii) study guides for ARRL and ORR in 15 sections each with self testing questions, (iii) answers to suitable of those questions, (iv) past AOCP exams, (v) sample answers to past AOCP exams — 4 past exams (88 pp.).

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We would like to package the lot to save handling costs as well as our voluntary unpaid time. However, the options selected should suit the majority of our members — any enquiries will have to be treated as they arrive. Obviously those who already have a Novice Pack will now want only the "B" course and perhaps as well the "C" course (last 3 morse cassettes).

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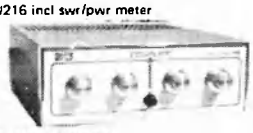

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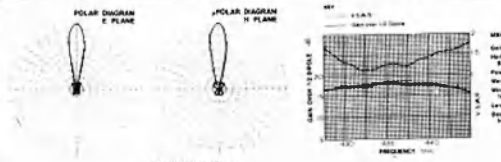

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RADIO TELETYPE *PART 7*

Transistorised Phase-Shift Oscilloscope for RTTY

Jostein Gjerde LA7MC

(Reprinted from NRRL — A.R. — No. 6, 1972)

Now you have a FB TU for RTTY you will need some assistance with tuning the signals. A cross display scope or tuning meter of the type used in the ST5 or ST6 is fine for tuning normal RTTY signals. Yet under QRM a phase-shift scope will be preferred to sort out the right mark/space frequencies.

This phase shift monitor scope uses signals direct from the receiver output (or the TU input) and shows a rotating line on the oscilloscope screen. The angle of slope of the line is a measure of the frequency, while the length indicates the amplitude. At a glance, you can determine the frequency-shift on either the receiver or transmitter frequency and you can quickly adjust the signal so that it passes through the TU filters. The frequency difference to interfering signals can also be determined.

THEORY OF OPERATION

The heart of the phase-shift indicator is the simple RLC network shown in Fig. 1. The series LC circuit is in resonance near the centre of the frequency range of interest. Near resonance, the impedance of the LC circuit will be minimum. ET approaches zero while EL is large and gives a phase displacement which changes rapidly about the resonant frequency. If two noise waves are supplied to the deflection plates of a cathode ray tube they give a figure which is dependent on the phase and amplitude relationships between these two sine waves. With the two sine waves in phase or 180° out of phase a straight line will be seen on the CRT and the angle of slope of this line will depend on the amplitude of the two signals. With 90° phase difference an ellipse will appear where the eccentricity is dependent on the relative amplitudes of the two signals.

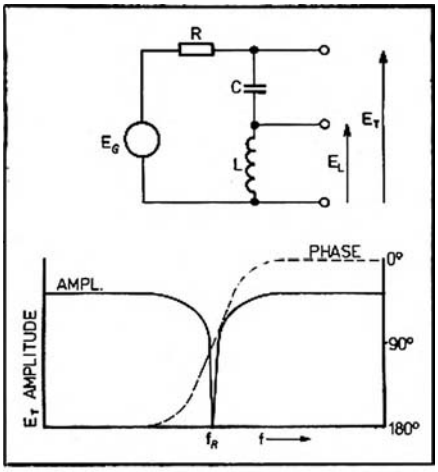

FIG. 1: RLC Phase Shift Network.

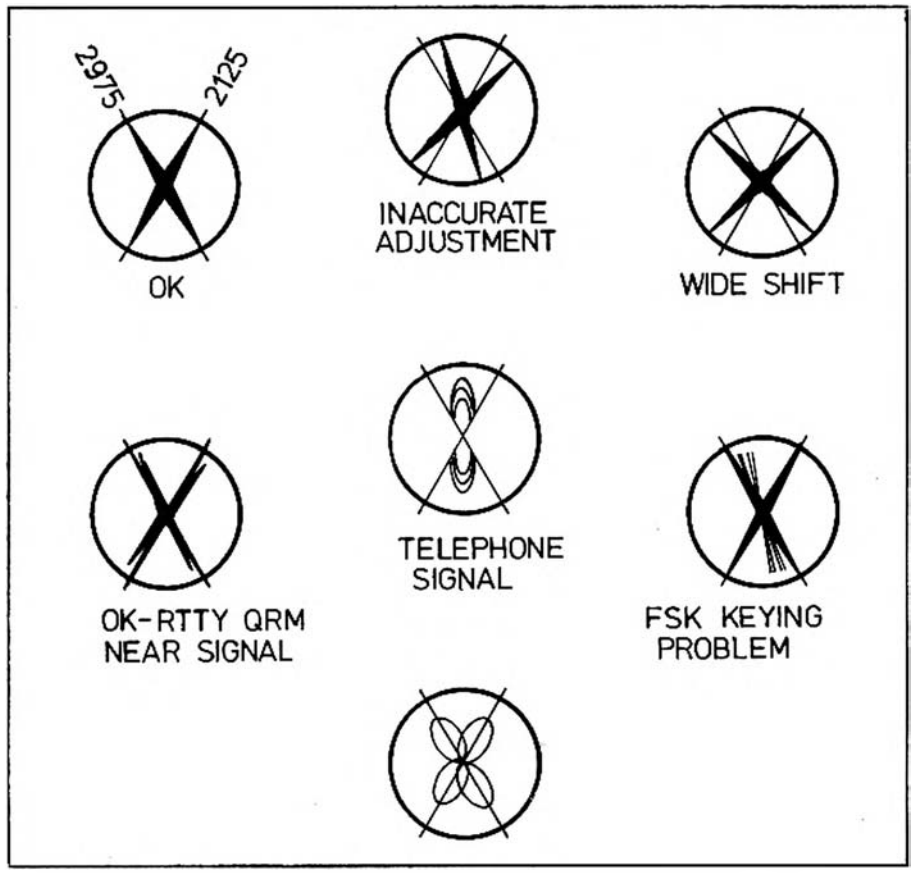

FIG. 2: Phase Shift Oscilloscope Patterns. Lower Figure shows 2 Harmonic Distortions. (Width of Shift is exaggerated.)

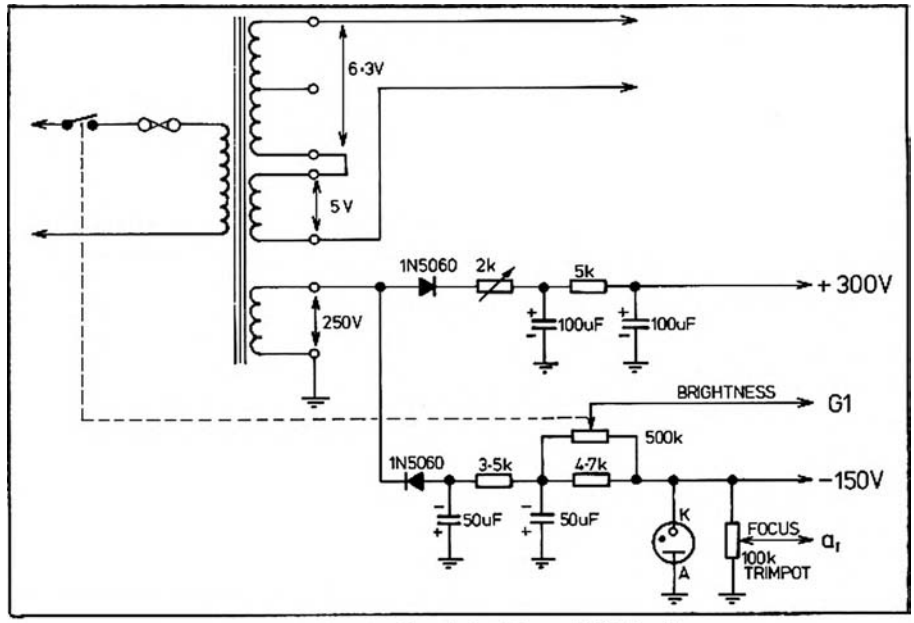

FIG. 5: Power Supply Circuit for Phase Shift Oscilloscope.

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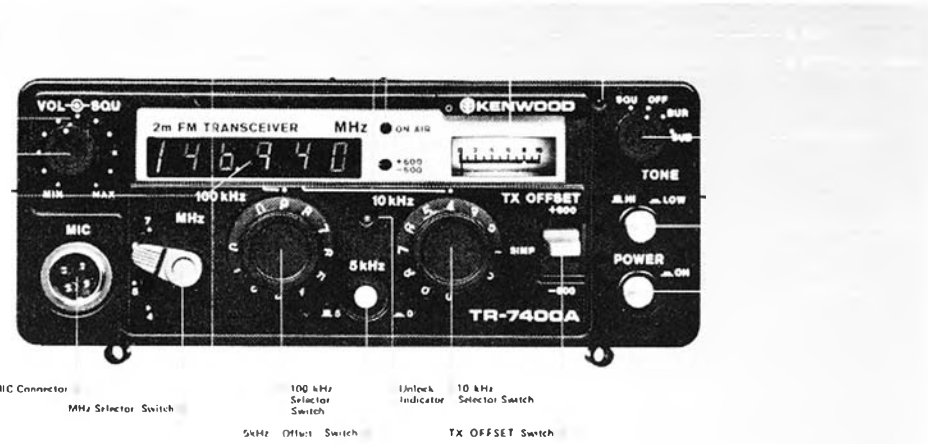

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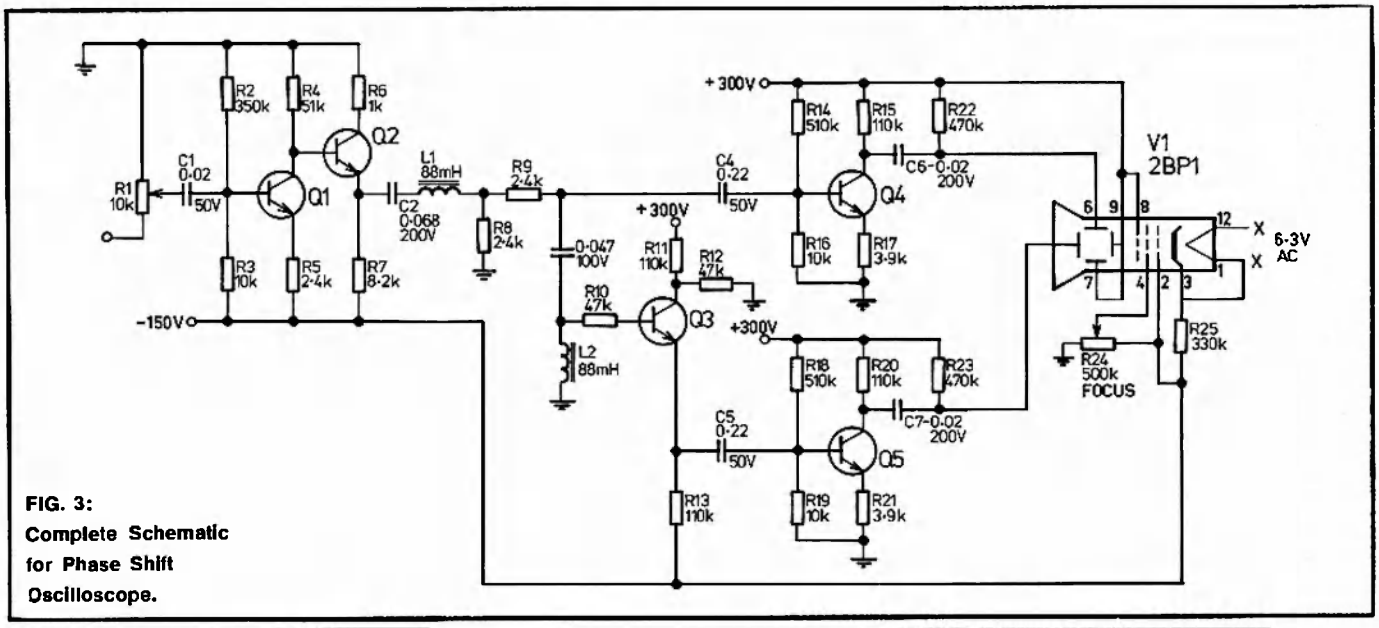

FIG. 3: Complete Schematic for Phase Shift Oscilloscope.

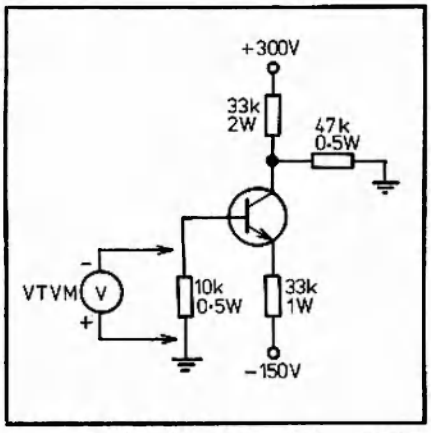

FIG. 4: Testing Circuit for choice of High Gain Transistors.

Measured Voltage	Approx. hFE
—1.5V	30
—1.0V	45
—0.5V	90

If you look at Fig. 1, the resonance circuit is resonant near the centre frequency for the frequency range concerned (2550 Hz). For a circuit with high Q-value the phase angle will range from about 180° to 0° over a small frequency range which gives straight lines on the CRT. In the region of resonance, there will appear an ellipse since the signals are about 90° out of phase, but the width of the ellipse is very small, since the amplitude of the series voltage (ET) approaches zero when the phase angle nears 90°. In this way there will appear a straight line on the CRT for all frequencies concerned, and this line will rotate on the screen when the frequency is varied. Typical traces on the phase-shift oscilloscope when receiving RTTY signals are shown in Fig. 2.

CIRCUIT DESCRIPTION

The schematic diagram is shown in Fig. 3.

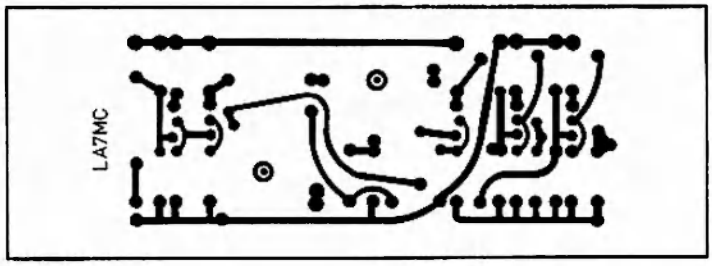

FIG 6: Printed Circuit Board Layout.

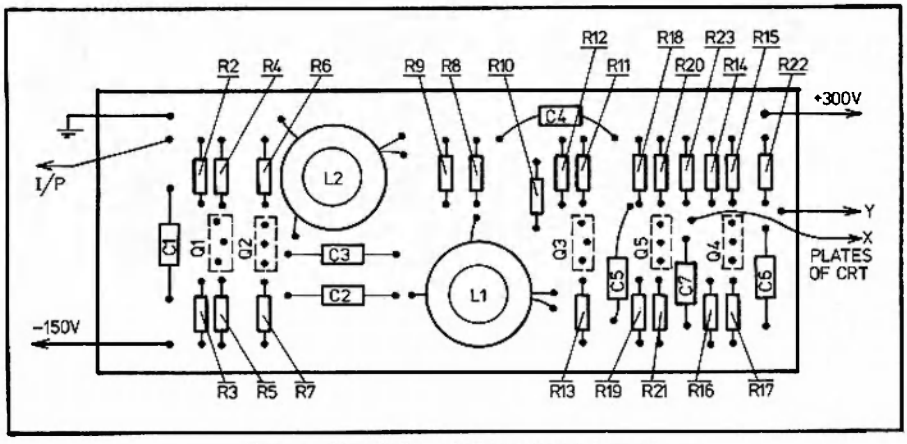

FIG. 7: Circuit Board Component Layout.
NOTE — Transistors mounted on copper side.

Input stage Q1 gives an amplification of about 20 times (about the ratio R4/R5). R2 and R3 are bias resistances for the base. Q2 is an isolating emitter follower which reduces the collector load for Q1 and supplies the current which is required for the LC phase shift network. The series compensation network (C2, L1, R8) you can omit, but it does give two advantages. C2-L1 is in resonance at about 2 kHz and this gives an increased impedance over the 2-3 kHz range which compensates for the increased voltage across the phase shift coil (L2) with increased frequency, thus maintaining the same voltage at the oscilloscope between 2125 Hz and 2975 Hz. Another advantage with C2-L1 is that signals which are well over or under the 2-3 kHz range have no effect on the CRT and thereby the oscilloscope picture is limited to the desired frequency range.

R9, C3 and L2 form the phase shift network as described in Fig. 1. C3-L2 is resonant at 2550 Hz. Q3 works as an isolating emitter follower to give a high impedance across L2 and maintain a high

Q value for the network. Q4 and Q5 are amplifier stages with an amplification of about 20 times (the proportion between collector loading and emitter resistance). Resistances R14-R16 and R18-R19 provide bias for the transistors.

THE PRACTICAL CONSTRUCTION

I had no suitable new power transformer so I used an old transformer from an outdated radio. This had only a high voltage winding of 250 volt, so I had to construct the supply in a slightly different way than in the initial design. The scheme is shown in Fig. 5 and all details should be clear. I found it necessary to put in a brightness control combined with on-off switch.

In relation to CRT's, I looked first for a large screen D9 16-2. This worked well and gave a very accurate reading of the shift. But the tube was nearly a half metre long and I therefore tried a German surplus tube LB-1 of more suitable size — 6 cm diameter. The case became smaller such that it matched the ST-6 and AK-1 better and I screwed the boxes together in one unit.

The printed circuit is shown in Fig. 6 and component placings in Fig. 7. I had slight difficulties with instability when I used the 10k ohms potentiometer in the input shown in the original circuit in Fig. 3. I changed the potentiometer for one of 100k ohm and with a 22k ohm resistance in series with the sliding contact. The circuit then became completely stable and I had no difficulties after this. Otherwise the circuit seemed completely non-critical and required no tuning or adjusting.

In respect of its operation, I find it a great help for tuning of RTTY, but I also find that the tuning meter in ST-6 is needed also, especially when tuning 170 Hz signals.

(Reference: "Transistorised Phase-Shift RTTY Scope", RTTY Journal 1/1972.) ■

(To be concluded)

LETTERS TO THE EDITOR

The Editor,
Dear Sir,

In September I will be travelling from Cairns to Cape York. It is proposed to set up a portable station at the tip of the Cape. It will be a Slow Scan Television DX expedition. Bands to be worked are 80 through 10 metres. A special QSL card will be printed for the occasion. The exact dates and times will be announced on the Sunday morning broadcasts in all States

Stan Mudford VK3BHZ.

The Editor,
Dear Sir,

Reference: Letter published by Mr. Rodney Champness VK3UG.

Dear Rodney,

Your articles have not gone unnoticed by the VK5 Division, but my colleagues chose to ignore your unwarranted and unjustified criticism.

In 1842 Samuel Morse, an American, invented the Morse Code. The early method to receive it was on a paper tape which was driven by a hand-wound spring motor. It was difficult for many to receive by buzzer or a sounder early in its history. The invention was one up on the smoke signals; wireless was not invented then.

We later found a use fo rthis very useful invention for wireless communication. It found uses in both World Wars, shipping and other forms of communication. Authorities realised that the standard set down by old Sam Morse was not applicabla to its use when sent by hand and received by ear in relation to rigid formation of characters and spacing, so it was used in a form that most amateurs and ship operators adopted according to their needs. The characters were sent faster so as they could be received by sound, not by the Dot and Dash principle. So in the year 1959 AD, not so long ago, this was realised, so to paragraph RR ARR, the amendment clearly states in the ITC 1959 "The spacing between words should be increased from 5 to 7 dots". This means there is no change in the words per minute to be sent in a given time but each symbol has to be sent fractionally faster to allow for the increased spacing between words. (Taken from the RSGB CW Book.)

I could not refrain, Rodney, from replying to your unjust and unwarranted criticisms. I suggest you update your knowledge accordingly.

Jack Trembath VK5JT,
Co-Ordinator VK5 Div. CW Broadcast.
H. Roberts VK5MY.
C. Castle VK5KL.
Ian Campbell VK5LI.

The Editor,
Dear Sir,

For quite a number of years the January issue of AR had a centre page, the front of which gave the conditions and rules for both the DX Centuary Club Award and the VHF Centuary Award, and the inner double pages gave the Australian DXCC countries list.

Why this has been discontinued is quite a mystery to myself and to many other DX chasers to whom I have spoken. With so little in AR for the DX man, surely the printing of this list of current country identification could be once again furnished.

Whilst the British RSGB and the American Radio Relay League, whose subscriptions compare very favourably against those of the WIA, provide a free QLS bureau, the members of the WIA are called on for each QSL card submitted to the various State bureaux for so many cents.

For the keen contest man and the DX chaser, who would in many cases send over 100 QSL's per month, the fee charged almost amounts to another subscription.

Perhaps other readers would give their views on this.

C. Whalley VK6KK. ■

PUBLICATIONS COMMITTEE SCORE IN NATIONAL FIELD DAY CONTEST — 1977

(Operating portable at Wallan, Vic using call sign of VK3OM

It works. Ron VK3OM proceeds to notch up a respectable score with his National Transceiver.

Bruce VK3UV with helical whip and FT101 amongst the big signals on 14 MHz.

YAESU

bail

ADVANCED AMATEUR COMMUNICATION EQUIPMENT FROM A WORLD LEADER —

Yaesu

FT-101E TRANSCEIVER: 160-10 Mx, SSB, AM, CW, PA two x 6JS6C, 260W PEP input SSB. Built-in Dual AC/DC power supply. BUILT-IN RF SPEECH PROCESSOR. Solid state except for Tx. PA and driver. IF noise blanker, FET Rx RF amplifier, clarifier, built-in speaker. Export Mod. 240V AC, 12V DC, incl. 160 & 11m. **$839.**

M-101 MOBILE MOUNT for FT-101E. **$33.50.**

FT-301S 160-10mx, fully solid state Tcvr suitable for Novice use. 25W PEP max. **$658.**

FT-301 160-10mx. Fully solid state Tcvr, built in RF Speech Processor, 200W PEP Input. **$879**

FT-301D DELUXE DIGITAL Tcvr. Similar to FT-301, **$1089**

FT-301S · FT-301 · FT-301D include rejection tuning on Rx.

· **FP-301 MATCHING POWER SUPPLY.** 20 Amp 12V suit all 301 Tranceivers. **$169.**

· **FP-301D DELUXE POWER SUPPLY.** With built in 24 hr or 12 Hour Clock and auto — CW ident Keyer provision. **$262.**

Programmed IC for FP-301D ident. $19.50

YO-301 MATCHING MONITORSCOPE for FT-301 Series. **$345.**

FT-200 TRANSCEIVER: 80-10 Mx, PA two x 6JS6C, 260W peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator. Can be modified for novice use. Power supply and transceiver. **$588.**

FT-75B TRANSCEIVER: SSB and CW. VXO, noise blanker, squelch. Very small size, transistorised, valve PA, a superb little rig. 80W PEP. Microphone and five crystals included. **$357.**

· **FP-75B AC POWER SUPPLY:** 230V for FT-75B/BS. Built-in speaker, power cable and plug. **$85.**

· **DC-75B DC POWER SUPPLY:** 12V for FT-75B/BS. Includes built-in speaker, mobile mount, power cable and plug. **$89.**

FL-101 TRANSMITTER: Solid state 160-10m, PA two 6JS6C, all facilities. Companion unit to FR-101. **$656.**

FL-101 SPEECH PROCESSOR: For installation in FL-101. **$79.**

FRG-7 WADLEY LOOP RECEIVER: All solid state, 0.5-29.9 MHz in thirty 1MHz bands. Electronic band selection. **$328.**

FR-101D RECEIVER: All solid state, 23 bands incl. all amateur bands 160-10m plus 6 and 2m, FM, CW, etc., el **$839.**

FR-101D DIGITAL: Has all the options of the FR-101D as well as DIGITAL READOUT. **$995.**

FL-110 SOLID STATE LINEAR AMPLIFIER. Companion unit to FT-301S. 10-15W drive, 200W PEP Input, 160-10mx. **$235.**

FL-2100B LINEAR AMPLIFIER: 80-10Mx, uses 2x572B triodes in G.G., twin fan cooled, styled to match FT-101E. **$528.**

FT-620B SIX METRE SSB AM, CW, TRANSCEIVER: 10W solid state, AC and DC operation. **$577.**

FT-221R TWO METRE TRANSCEIVER: Features all mode operation — SSB/FM/CW/AM — with repeater offset capability. 144-148 MHz coverage using advanced phase-locked loop circuitry. AC and DC operation. **$629.**

M-620/221/301 MOBILE MOUNT for FT-620B, 221R & 301, **$33.**

QTR-24 24 HOUR WORLD CLOCK: At a glance the time anywhere in the world can be read. **$33.**

· **FP-2 AC POWER SUPPLY** suitable for use with FT-223, etc. 240V AC in, 12V DC 2A out, built-in speaker and charger. **$85.**

FTV-650B SIX METRE TRANSVERTER: Converts 28 MHz. SSB to VHF, and includes receiving converter. 50W PEP. Primarily designed for coupling with Yaesu transmitters and transceivers. **$249.**

FTV-250 TWO METRE TRANSVERTER: Similar FTV-650B. 10W-15W output, but all solid state and built-in AC PS. **$249.**

FT-223 TWO METRE TRANSCEIVER: 10W, 23 Channels, plus one priority channel. Inc. 40, 50 & 51, plus one rptr. (Other rptrs. available at $10.00 per ch.). **$229.**

YC-500E 500MHz FREQ. COUNTER: Accurate to .02ppm. **$574.**

YC-500S 500MHz FREQ. COUNTER: Accurate to 1ppm. **$446.**

YC-500J 500MHz FREQ. COUNTER: Accurate to 10ppm. **$319.**

YO-100 MONITORSCOPE: Matches the FT-101E, but can be used with other Yaesu equipment. (IF kits 455 kHz and 9 MHz optional extra). **$257.** (IF Kits **$10.00 each**).

YP-150 DUMMY LOAD/POWER METER: For use over the frequency range 1.8-200 MHz. Three power ranges, 0-6W, 0-30W, 0-150W with built-in cooling fan. **$98.**

FF-50DX 3-SECTION LOW PASS FILTER for TVI reduction. **$35.00.**

F-101 FAN. $36.

SP-101 MATCHING EXTERNAL SPEAKER for FT-101, FR-101, FRG-7. **$49.** **SP-120, for 301/221. $49.**

OPTIONAL CRYSTAL FILTERS. (Inc. CW & AM filters for FT-101). **$59.**

MATCHING VFOs: FV-101B, FV-200, each. **$139**, FV-301 **$149.**

YC-601 DIGITAL READOUT ADAPTOR for FT-101E, inc. built-in AC PS. **$230.**

YC-221 DIG. READOUT ADAPTOR for FT-221R . . . .

YD-844 DESK MICROPHONE: Yaesu De Luxe PTT Dynamic type with stand, spring and lock PTT switches. PTT also actuated when lifted from deck. **$49.**

RS SERIES HF GUTTER MOUNT MOBILE ANTENNAS: RS Base and Mast (doubles as ¼ wave on 2m). **$22.50.** Coil and Tip Rods: RSL-3.5, **$20.00.** RSL-7, **$19.00.** RSL-14, **$18.00.** RSL-21, **$16.50.** RSL-27/28, **$16.00.**

· Power Supply Price applies only with purchase of matching transceiver.

As the sole authorised Yaesu agent and factory representative for Australia, we provide presales checking of sets, after-sales services, spares availability and 90-day warranty.

Quote type and serial number of set when ordering spares. All prices include sales tax. Freight is extra. Prices and specifications subject to change without notice. Allow 50c per $100 for insurance.

LARGE RANGE OF ACCESSOR

YAESU

SAHI ANTENN

HIDAKA

Cush Craft

STANDARD VHF and UHF TRANSCEIVERS

SR-C146A. 2m hand held 5 chan. 2W transceiver, inc. carrying case and 3 chns.	$248.00
SR-C432A, 70cm hand held 6 chan. 2W transceiver, inc. carrying case and 1 chn (435 MHz)	$285.00
SR-C430 70cm 12 chan. 10 watt mobile transceiver inc. 1 ch (435 MHz)	$342.00

STANDARD ACCESSORIES

CMP08 Hand mic. for SR-C146A and SR-C432	$25.00
CAT08 Rubber antenna (helical) for SR-C146A	$10.00
Heavy Duty Carrying Case for hand held units	$16.50
AC Adapter and charger for hand held units	$45.00
Mobile Adapter for hand held units	$14.50
AC Charger only	$11.00
Ni-CAD Penlight Cells, type AA	$1.90

MONITOR RECEIVERS

SC101, Automatic scanning receiver, 4 VHF chns., 4 UHF chns., Xtals extra.	$169.00
MR-2, Mini Monitor. 12 ch. pocket receiver VHF.	$137.84
MS-2, Mini Scanning Receiver 4 Ch. inc.	$186.35

MARINE NOVICE/11 METRE TRANSCEIVERS

GTX-3325, SSB/AM 23 Ch. Inc. N.B.	$269.00
CB-555 AM 23 Ch. Transceiver Inc. N.B.	$138.00
CBR-9000 6 Ch. In-dash mount. B.C. 2 FM.	$184.00
606CB 23 Ch. AM/BC/FM MPx/Cassette stereo In-dash mount transceiver	$368.00
GTX-3336 AM 23 Ch. Transceiver	$89.00

ANTENNAS AND ANTENNA ACCESSORIES

HF MONOBANDERS

204BA, 4 element 20m. Beam	$254.00
203BA, 3 element 20m. Beam	$214.00
VS-20CL 3 elem. W.S. 20m beam, **inc. Balun**	$196.00

HF DUO BAND

VS-22 3 element 15-11/10m, **inc. Balun**	$148.00

HF TRIBAND BEAMS

TH6DXX, 6-element trap Beam	$316.00
TH3Mk3, 3-element trap Beam	$268.00
TH3Jr, 3-element trap Beam	$193.00
HY-QUAD 2 element Quad Beam	$292.00
VS-33 (Equiv. TH3Mk3), **inc. Balun**	$227.00

NOVICE BEAMS

CB-3 3-element 11m	$69.50
CB-5 5-element 11m	$87.00
Long John 5-element (wide spaced) 11m	$122.00
Eliminator II, 2-element Quad. Sw'ble polarisation, 11m	$114.00
Big Gun II, 4-element Quad. Sw'ble polarisation, 11m	$229.00
SDB-6 Stacked 6-el Beam (3 + 3)	$163.00

HF VERTICALS

VS41/80KR 10m thru 80m, inc. 11m	$102.00
VS-RG Radial Kit for VS-41/80 KR	$29.00
18AVT, 10m thru 80m trap Vertical	$130.00
12AVQ, 10m thru 20m trap Vertical	$64.00
18V 10m thru 80m base loaded Vertical	$49.00
18HT 10m thru 80m Tower	$346.00
GPGP ¼ wave, 1m G.P.	$29.00
CR-1 ½ wave Ringo, 11m 3.75 dB	$54.00
HOPE-10GP. 10/11 metre helical groundplane	$81.00
Million V1 11 metre ½ wave 3.75dB	$49.00
VS-10 GH ⅝ wave 10/11 G.P.	$65.00

HF MOBILE WHIPS AND FITTINGS

AQUA CAT 108" Marine, 11m (no ground plane req'd.)	$88.00
AS27MCE 102" S.S. Whip	$14.00
HOPE-10R 10/11 metre adjustable gutter mounted helical inc. cable and connector	$48.00
HOPE-10B 10/11 metre adjustable helical equipped with ball mount and spring	$44.00
THUNDERSTICK 108" fibreglass whip	$25.00
SUPER STICK similar to Thunder Stick, but double section	$26.00
GUTTER CLIP for whip tops	$2.90
HOPE-15R 15 metre adjustable gutter mounted helical incl. co-ax and connector	$49.00
HOPE-IORE 10/11 metre whip top only (as used in Hope-10R)	$29.00
HOPE-15RE 15 metre whip top only (as used in HOPE-15R)	$32.00
CIT-1H 10/11 metre base loaded, boot or rooftop mount, incl. co-ax and plug	$25.00
CIT-2H 10/11 metre centre loaded gutter mounted whip, incl. co-ax and plug	$25.00
AS-303 HF Mobile antenna set, centre loaded, incl. heavy duty ball mount and spring	$136.00
AS-NK matching SS. Bumper Mount for AS-303	$18.00
DUCK 27 MHz Replacement Ant For 11m. Walkie Talkies (12" Flex Helical)	$9.00

FITTINGS: (Suit all makes with ⅜" x 24 thread).

BPR, bumper mount	$20.00
BDYF, heavy duty adjustable body mount	$22.00
HWM-1, fixed body mount	$18.00
SPG, heavy duty spring	$14.00
SPGM, light duty miniature spring	$8.00
VS-BM Ball Mount & Medium Duty Spring	$19.00
VS-BPM Bumper Mount	$18.00
VS-LBM Ballmount & H.D. Spring	$22.50

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ES FROM BAIL ELECTRONICS

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SCALAR

ANTENNAS HI-MOUND

K SR hy-gain

MARK MOBILE

Helical:

HW-80-8 80m, 8ft.	$54.00	HW-15, 15m, 4ft.	$22.50
HW-80, 80m, 6ft.	$32.00	HW-11, 11m, 4ft.	$22.50
HW-40, 40m, 6ft.	$29.50	HW-11, 11m, 6ft.	$23.50
Hw-20, 20m, 6ft.	$24.50	HW-10, 10m, 4ft.	$22.50

VHF ANTENNAS

23, 3-element 2m Beam	$22.50
28, 8-element 2m Beam	$48.00
215B 15-element 2m super-beam	$88.00
VS-2GH 2m ⅝ wave ground-plane	$32.00
4B 4-element 6m beam	$61.00
6B 6-element 6m beam	$100.00
VS-6GH 6 metre ⅝ wave G.P.	$35.00
ARX-2 three half wave 6dB gamma loop matched vertical	$49.00
ARX-450, 435-450 MHz three half wave 6dB Ringo	$45.00
AR-6, 6m ½ wave Ringo 3.75 dB	$45.00
A144-7, 7-element 2m Beam	$32.00
A144-11, 11-element 2m Beam	$45.00
A144-20T, 20-element 2m "Twist" Beam	$91.00
A50-3, 3-element 6m Beam	$47.00
A50-5, 5-element 6m Beam	$73.00
A430-11, 11-element 430 MHz Beam	$32.00
GDX-1 80-500 MHz Discone	$78.00

VHF MOBILE ANTENNAS

270 Double stacked ⅝-wave fibreglass whip for 2m	$56.00
271 Mount for 270	$8.00
AS-2HR, ⅝-wave SS 2m gutter mount, inc. co-ax	$45.00
AS-2P40 as above, but fibreglass whip	$47.00
AS-2HRF ⅝-wave cowl mount type	$54.00
AS-6RD 6m centre loaded SS whip with gutter mount	$24.00
VS-07MG 70cm Mag Mount ¼ wave	$17.00
AS-2DW 2 metre ¼ wave gutter mounted whip incl. co-ax and connector	$29.00
HOPE-2R 2 metre gutter mounted helical, only 22 cms long, incl. co-ax 2 connector	$40.00
S-TOWN 2 metre flexible gutter mounted helical	$19.50
HU-2HR 2 metre Hidaka ⅝ wave gutter mount incl. co-ax and connector	$44.00

SCALAR MOBILE WHIPS

M-22T ¼ wave 2m whip top	$6.50
M-25 ⅝ wave 2m whip top	$16.50
M27-R60T 5ft. 11m. C.L. whip top	$21.05
M-40T 4.5 dB Gain, 435 MHz	$19.80
M.B. Standard base	$4.70
M.B. UHF base	$5.80
MAGBASE inc. 12ft. of RG-58/AU	$41.75

ANTENNA ACCESSORIES

LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs.	$56.00
LA-2, smaller size co-ax arrestor	$11.00
BN-86, broad-band ferrite Balun, 2 kW for Beams and Doublets	$30.00
HN31 Dummy Load Cantenna Kit 1 kW oil cooled (oil not included)	$39.00
FF-50DX Low Pass Filter, 3 Section, 1 kW	$35.00
LP-7 TVI Filter low power	$11.00
KW Electronics L.P. Filter, 5 Section, 1 kW	$59.90
Porcelain Egg insulators	30 cents
WIDE RANGE of Co-axial cable and connectors in stock. K-20 70 ohm Twin feeder	36 cents per yd.
Multi-band dipole traps centre insulator, 80-10m bands per pair complete with insulator	$35.00
Co-axial cable switches, 5 position, Model 590G	$37.00
CX-3, 3 position co-ax switch	$11.00
TWS-120, 2 position co-ax slide switch	$14.00
TWS-150, 5 position co-ax slide switch	$25.00
TWS-220, 2 position double pole slide switch	$25.00
RS-107 Transceiver tester	$66.00
RS-501 Ant. Impedance bridge Inc. 1 osc.	$68.00
Extra Osc. for RS-501	$14.00

SWR AND POWER METERS

† **SWFS-2, single meter type,** combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2¼". 3-150 MHz, UHF connectors — $22.00

† **SWR-2, dual meters,** 50 ohms. Simultaneous reading of forward and reflected power, 5" x 2" x 2¼". 3-150 MHz, UHF connectors — $31.00

SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kW in three ranges. A very elegant instrument. 7⅝" x 2¾" x 3¾" — $68.00

FS-600A Peak Reading Wattmeter SWR meter 20, 200, 500 and 1000 watts 230 VAC operation. 3.5-30 MHz, very accurate — $73.00

FS-301 Wattmeter/SWR meter 20, 200 and 1000 watts 3.5-30 MHz — $49.00

† Type numbers may vary

ANTENNA COUPLERS

HC-75 Tokyo Hy-power labs. Trans-match 75w PEP — $54.00

HC-500 Tokyo Hy-power labs. Trans-match 500w PEP — $112.00

HC-500A Tokyo Hy-power labs. inc. 160mx 500w PEP — $119.00

HC-2500 Tokyo Hy-power pep trans. Trans-match 2.5 kw PEP — $246.00

ROTATORS

Emotator:

102LBX Similar to CD-44	$138.00
501CXX Similar to Ham II	$207.00
1102MXX Heavy duty	$299.00
1211 Mast clamp for 102LBX	$14.50
1213 Mast clamp for 501CXX	$22.00
300 Mast Stay bearing for above	$25.00
301 Tower top bearing	$25.00

VCTF-7, 7 core cable (for 1100 series)	$1.00 yd.
VCTF-6, 6 core, for 102 & 501	90 cents per yd.
1103MXX Extra Heavy Duty	$335.00
1215 Mast clamp for 1102/3	$26.00
Flexible coupler	$TBA

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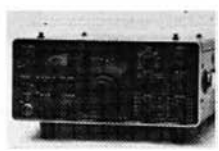

YAESU AMATEUR EQUIPMENT

Now an addition to YAESU'S range of measuring instruments . . .

QTR-24

24 hour World Clock

QTR-24

Yaesu has now made an addition to their already well known range of measuring instruments. It is the QTR-24 a 24 hour World Clock. With a glance the time in any principal city or time zone can be simultaneously co-ordinated with local time on a 24 Hour basis. The QTR-24 is powered by a 1.5V dry cell, which has a normal life of approximately one year. No amateur or SWL station could be complete without one.

Also shown in the photograph is the YO-100 monitorscope, FT-101E transceiver, YC-601 digital readout adapter and YP-150 dummy load/power meter.

OTHER ACCESSORIES

EKM-1A Audio Morse CP Osc with speaker, one transistor, and tone control, requires one UM3 cell, in metal case 3⅝" x 2½" x 1⅛" **$14.00**

TC-701 Morse Practice Osc. with built-in key and spkr. Inc. battery and auxiliary earpiece. Copy of morse code on case. Two can be wired together to form a practice communication set **$20.00**

MC-701 Mic. Compressor, battery operated. Available with 4 pin mic. connector **$56.00**

Model 703 Digital Alarm Clock, 230V AC (Copal) **$26.50**

Servicing facilities for all types of Amateur and Novice equipment. We check all sets before sale and provide a 90 day warranty.

All prices incl. S.T. Postage and freight extra. Add Ins., 50c per $100. Prices and specifications subject to change without notice. Availability depends on stock position at time of ordering.

MORSE KEYS

EK-127 Electronic Keyer **$97.00**

EK-150S Single Paddle Electronic Keyer **$106.00**

EK-150D Double paddle electronic keyer **$106.00**

MK-1024 Programmable Keyer, 1024 bit memory **$203.00**

HI-MOUND

HK-710 De luxe heavy duty morse key. Heavy base. A really beautifully constructed and finished unit. Fitted with a dust cover, standard knob and knob plate. Ball bearing shaft **$38.00**

HK-808 Similar HK-710 but with full miniature ball race bearings and more precise adjustments **$68.00**

HK-707, Similar to above but with dust cover and standard knob. On standard base **$19.00**

MK-701 Side Swiper key to actuate an Electronic keyer **$38.00**

BK-100 (BUG) Semi-automatic bug key, fully adjustable **$45.00**

VALVES, 572B **$48.00,** 6KD6 **$9.50,** 6JS6 **$8.50,** 6JM6 **$8.00,** S2001 (6146B) **$11.50,** 12GB7 **$6.50,** 7360 **$9.55,** 6GK6 **$5.25**

JAS7677

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FRED BAIL VK3YS
JIM BAIL VK3ABA

60 Shannon St., Box Hill North, Vic., 3129.
Ph. 89 2213

Radio amateur equipment from B.E.S. also sold by —

W.A.	Radio Communication Services H. R. PRIDE, 26 Lockhart St., Como, 6152	Ph. 60 4379
	WILLIS TRADING CO., 429 Murray Street Perth 6000	Ph. 21 7609
S.A.	FARMERS RADIO PTY. LTD., 20 Stanley St., Plympton, 5038	Ph. 293 2155
TAS.	G. T. ELECTRONICS, 131 Westbury Rd., South Launceston, 7200	Ph. 44 4773
	PRINS RADIO, 123 Argyle Street, Hobart 7000	Ph. 34 6912
N.S.W.	Aviation Tooling, STEPHEN KUHL, 104 Robey St., Mascot, 2020	Ph. 667 1650 AH 371 5445
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147	Ph. 624 2691
	DIGITRONICS, 186 Parry St., Newcastle West, 2302	Ph. 69 2040
QLD.	H. C. BARLOW, 92 Charles St., Aitkenvale, Townsville, 4814	Ph. 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion, 4010	Ph. 57 6830
A.C.T.	QUICKTRONIC, Jim Bland, Shop 11, Altree Crt., Phillip, 2606	Ph. 81 2824 82 2864

AR SPECIAL —

1977 FEDERAL CONVENTION REPORT

The 1977 Federal Convention was well up to standard in the quantity and quality of work and results. As the Federal President commented in his opening address, it was as well attended as any previous Convention, if not better in fact; fifteen in Divisional delegations and all six members of the Executive.

It is strange that Executive members can influence but have no part in Institute policy making. This is the prerogative of the Federal Council mainly through the medium of the Federal Convention. Now that the Investigator's Report has been considered and implemented to a presently acceptable extent the time has arrived when a number of Constitutional changes will emerge for discussion both at Federal and State levels.

There were three principal general areas for discussion at the Convention. These were "CB", the general field of specialised VHF/HUF operations and a number of inter-related miscellaneous items in the Novice licensing area. This Report should be accepted as dealing only very briefly ith the subject matter of note.

BAND PLANS

The Federal Council confirmed the following band plans:—

6 METRE BAND

MHz	
52.000-52.010	EME operation only, any mode
52.010-52.100	DX operation only; subdivided according to mode as follows:
52.010-52.050	CW operation only
52.050-52.100	narrow band modes only (e.g. CW, SSB, DSB, AM, FSK)
52.100-52.300	all narrow band modes, DX and local tunable operation
52.300-52.400	beacons only; secondary beacon segment
52.400-52.500	beacons only; primary beacon segment
52.500-53.100	simplex net operation, primarily FM
53.100-54.000	general operation; DX, local, and experimental operation, all modes; "private" nets; future linear translators and repeaters

Calling frequencies are as follows:

52.025	CW
52.050	Meteor Scatter — any narrow band mode
52.075	RTTY (FSK)
52.100	Primary SSB/AM
52.200	Secondary SSB/AM
52.300	SSTV (F4)

2 METRE BAND

MHz	
144.000-144.010	EME operation only, any mode
144.010-144.100	DX operation only; subdivided according to mode as follows:
144.010-144.050	CW operation only
144.050-144.100	narrow band modes only (e.g. CW, SSB, DSB, AM, FSK)
144.100-144.400	all narrow band modes, DX and local tunable operation
144.400-144.500	beacons only; primary beacon segment
144.500-144.600	beacons only; secondary beacon segment
144.600-145.700	general operation; DX, local, and experimental operation, all modes; "private" nets; future linear translators and repeaters
145.7 -146.0	satellite and space communication
146.0 -148.0	FM net operation; simplex and repeater

Calling frequencies are as follows:

144.025	CW calling frequency
144.050	meteor scatter calling frequency, any narrow band mode
144.075	RTTY (FSK) calling frequency
144.100	primary SSB/AM calling frequency
144.200	secondary SSB/AM calling frequency
144.300	SSTV calling frequency (F4)

70 CENTIMETRE BAND

The full 70cm band plan as amended is as follows:

MHz	
420-432	ATV Primary Channel DSB or VSB (ATV-1) Video at 426.25 MHz Sound at 431.75 MHz
432-432.01	EME only — any mode
432.01-432.05	DX only — CW portion (with CW calling frequency at 432.025 MHz)
432.05	Meteor Scatter calling frequency
432.05-432.1	DX only — all narrow band modes (including CW) (with RTTY calling frequency at 432.075 MHz and SSB/AM primary calling frequency at 432.1 MHz)
432.1-432.4	Tunable operations both DX and local, all modes (with SSB/AM secondary calling frequency at 432.2 MHz and SSTV calling frequency at 432.3 MHz)
432.4-432.6	Beacons only
432.6-433	Tunable operation — any mode. **NOTE:** Calling frequencies should be used solely for monitoring, calling or establishing contacts. Calling frequencies should not be used for net operations.
433-435	FM Repeater Inputs
435-438	Internationally reserved satellite allocation
438-440	FM Repeater Outputs
440-441	FM Simplex
441-443	Experimental
443-450	ATV Secondary channel VSB only (ATV — 2) Video at 444.25 MHz Sound at 449.75 MHz

10 METRE BAND

An approach is to be made to Central Office for Novice Licensees to be allocated the segment 28.1 to 28.6 MHz (instead of the previous policy of seeking 28.1 to 28.3 MHz). The Executive were also instructed to investigate world-wide 10m band beacon plans. The IARU Region 1 band plan allocates 28.2 to 28.25 MHz as the beacon segment. The existing 10m beacons are located at present between 28.15 and 28.2 MHz.

STANDARDS

Federal Council adopted 7 kHz as the recommended maximum deviation for FM (F3) transmissions in the VHF/UHF amateur bands in respect of repeater and simplex frequencies therein. The Executive are to examine standards for ASCII and other data transmissions.

2m REPEATER CHANNELS

The Executive was instructed to investigate the extension of the national FM simplex and repeater band plan to the 147 to 148 MHz segment as a matter of urgency. When general agreement has been reached on the precise channelling, etc., to be adopted a submission will be made to Central Office.

GENERAL TECHNICAL

Central Office is to be approached for Novice Licensees to use VFO controlled transmitters in place of the existing crystal (and VXO) control. VFO includes frequency synthesisers. Another motion duplicated an older motion seeking the extension of the 6m amateur band on a non-interference basis down to 50 MHz. Executive is to seek approval for FM TV (F5) transmissions in the 23cm band and upwards on a general or individual basis.

ARNOLD REPORT

Although the Investigator's Report was not adopted an explanatory statement was prepared and issued. This appeared in last month's AR.

PUBLICATIONS

Once again Amateur Radio — the joint possession of all Divisions and members — came up for debate. A proposal that AR address labels should also carry the callsign or SWL number of the member was passed. The proposal that monthly lists of new and amended callsigns should appear in AR was lost for several reasons. It was agreed that Executive should look into the publication of an "Amateur Radio Year Book" for sale to the general public. Various problems with AR were discussed — such as alleged delays in the mail, incorrect insertions and the inclusion of State news of general reader interest. Work on the 1977 Call Book was discussed and a proposal that only postal addresses should be published was lost.

GENERAL

It was agreed to approach the Department for the institution of longer term lower cost licences. Proposals for the use of CW by limited licences under certain general conditions were not passed mainly because of the complexities involved. Another old established policy was revived; this relates to approaching the Department for various morse code speed endorsements on certificates. Three proposals to amend the RD contest rules failed. It was agreed that the standard procedure adopted in recent years should be followed, namely that all proposals for amending contest (and awards) rules are to be sent to the Federal Contest (or Awards) Manager who will consult with Executive whenever needed. If the Executive thereafter believes that any particular point or points rates sufficient importance only then will the matter be brought before the Federal Council. Badges, stickers and the like were discussed. The Executive are to continue work on these. The problem of modernising the existing badge (which is also used on certificates and awards) lies in the unavailability of someone suitably qualified to prepare the necessary art-work but it is hoped publicity will result in a volunteer coming forward to help. It was apparent from the discussions that the optional use of an "international-diamond" style logo requires further investigation. A discussion was held about Institute broadcasts. A review was ordered relating to Amateur advisory committees. A proposal to seek a general extension of the 576 MHz band was dropped in favour of specific applications being made. The same applied to 70cm "in-band" ATV repeaters. Details are to be sought of frequencies in use in shared bands in an effort to discover a way to reduce mutual interference — this applies mainly on UHF and higher bands. The establishment of a Ron Wilkinson microwave award is to be investigated by the Executive.

ORGANISATIONAL

In future, student members are to be billed at the appropriate full normal subscription rate and can pay the concessional rate only on production of a properly completed certificate. The Executive are to revise the EDP green form and membership proposal form. A proposal to standardise pensioner concession criteria was not adopted mainly because it came up during general business and had not been adequately researched. A proposal that interest should be charged on overdue Divisional accounts with Executive was rejected as unfraternal.

EXECUTIVE AND EXECUTIVE COMMITTEES

The work of the AARTG (relating to RTTY) was agreed to be taken over by the VK2 Division as it has been relinquished by VK6. The VK2 Division also agreed to provide a sub-committee of the VHF/UHF Advisory Committee to work on wideband (ATV) and related matters. No other changes were sought in Committee affairs. The Executive appointments for 1977-78 were voted upon and are unchanged except that Mr. Roper re-enters as an Executive member in place of Surg. Rear Admiral S. J. Lloyd expecting an interstate transfer during the year.

DISCUSSIONS

In-depth discussions took place on "CB", Novice licensing, Novice examinations, Project Australis, the work of YRS, investigations about a land site in Canberra and feasibility study for its development, IARU and WARC 79 details. June WIANEWS in AR reported some of these in detail. Finally,

mention is necessary about financial matters. A budget for 1978 was approved subject to review by August 31. It was also agreed that the Federal element of the 1978 subscriptions (presently $15) should be reviewed by the same date. The budget, when related to inflationary and other trends, indicated that a small increase could be adequately supported without recourse to the policy that subscriptions be indexed against the CPI. This will be carefully considered by the Finance sub-committee. Much discussion went on about the ITU fund which is used in defraying the costs of WIA representation in ITU conferences, especially WARC 79. Evidence presently available suggests a figure of $20,000 would be needed for WARC 79 and after much discussion it was agreed that each Division should be levied at $2.00 per Divisional member payable by 31.3.1978. How each Division is to raise its share of the levy rests with the Individual Division. On this basis the largest Division would be required to find about $2400 and the smallest about $190. A firm commitment was given by the adoption of a suitable motion. Reports have already appeared in AR on the other discussions.

Finally, the Federal Councillors and Divisional delegations at this Convention were:

VK1—VK1QJ assisted by VK1TH
VK2—VK2ZTM assisted by VK2ZBX and VK2ZDD
VK3—VK3ZCK assisted by VK3ACA and VK3JQ
VK4—VK4NP assisted by VK4TE
VK5—VK5QX assisted by VK5PI
VK6—VK6NE (with assistance from VK3ASC)
VK7—VK7PF assisted by VK7ZBY.

EXECUTIVE REPORT
WIRELESS INSTITUTE OF AUSTRALIA

For the year ended 31st December, 1976, the Institute incurred a net surplus of $8,728.00.

The Executive have taken reasonable steps, before the Statement of Income and Expenditure and Balance Sheet were made out, to ascertain that action had been taken in relation to the writing off of bad debts and making of provision for doubtful debts and to cause all known bad debts to be written off and adequate provision to be made for doubtful debts.

At the date of this report, the Executive are not aware of any circumstances which would render the amount written off for bad debts, or the amount of the provision for doubtful debts, inadequate to any substantial extent.

At the date of this report, the Executive are not aware of any circumstances which would render the values attributed to current assets in the accounts misleading.

At the date of this report no charges exist on the assets of the Institute which has arisen since the end of the financial year and does not secure the liabilities of any other person.

There does not exist any contingent liability which has arisen since the end of the financial year.

No contingent liability or any other liability has become enforceable within the period of twelve months after the end of the financial year which in the opinion of the Executive will or may affect the ability of the Institute to meet its obligations when they fall due.

Since the end of the previous financial year the Executive have not received or become entitled to receive a benefit by reason of a contract made by the Institute or a related corporation with the Executive or with firms of which they are members or with companies in which they have substantial financial interests.

The results of the Institute's operations during the financial year were in the opinion of the Executive not substantially affected by any item, transaction or event of a material and unusual nature. There has not arisen in the interval between the end of the financial year and the date of the report, any item, transaction or event of a material and unusual nature likely, in the opinion of the Executive to affect substantially the results of the Institute's operations for the next succeeding financial year.

Members of the Executive
(Sgd.) D. A. WARDLAW
(Sgd.) P. A. WOLFENDEN

BALANCE SHEET AS AT 31st DECEMBER, 1976

	1976	1975
Members' Funds:		
Accumulated Fund	$14,795	$6,067
Reserve Fund	627	627
Special Funds—ITU	8,653	7,766
IARU	3,985	3,050
	$28,060	$17,510
Represented by:		
Current Assets:		
Cash at Bank—General Account	$9,597	$1,951
Short Term Deposit	11,038	5,750
ITU Deposit	8,000	8,000
Other Deposits	2,200	—
Sundry Debtors—Less Provision for Bad Debts)	13,204 (2,000)	14,840 (2,000)
Stock on Hand—at Cost	4,060	3,532
	46,099	32,073
Non-Current Assets:		
Furniture and Fittings—at Cost Less Provision for Depreciation	1,572	1,289
	47,671	33,362
Deduct:		
Current Liabilities:		
Sundry Creditors	$1,053	1,052
Subscriptions In Advance	12,645	12,166
Provision for Superannuation	2,250	1,250
Provision for Project Oscar	600	—
Provision for Holiday and Long Service Leave	2,763	—
Deposits—Magpubs	300	300
Darwin Donations	—	1,084
	19,611	15,852
	$28,060	$17,510

STATEMENT OF INCOME AND EXPENDITURE FOR YEAR ENDED 30th JUNE, 1976

	1976	1975
Income:		
Members Subscriptions	$60,005	$40,465
Surplus—Publications	2,599	2,594
Interest Received	976	300
Levies Received	—	16,500
	63,580	59,859
Expenditure:		
Amateur Radio Deficit (Note 1)	$12,929	15,498
Audit Fees	210	150
Bank Charges	738	316
Convention Expenses	2,096	1,876
Committee Expenses	204	259
Depreciation	393	322
EDP Expenses	1,400	2,114
General Expenses	654	298
Insurance	691	594
Legal Expenses	—	29
Membership Recruiting	1,404	—
Provision for Bad Debts	—	1,800
Postage and Freight	1,814	2,026
Project Australis	997	1,180
Rent and Rates	2,084	1,787
Repairs and Maintenance	357	283
Superannuation	1,000	750
Stationery and Printing	2,838	1,149
Salaries and Secretarial	22,201	15,371
Telephone	617	459
Travelling Expenses	2,225	146
	54,852	46,407
Net Surplus	8,728	13,452
Accumulated Fund Brought Forward	6,067	(7,385)
Accumulated Fund	$14,795	$6,067

NOTES TO AND FORMING PART OF THE ACCOUNTS

Note 1
AMATEUR RADIO

		1976	1975
Income:			
Advertising		$21,707	$18,452
Subscriptions		2,105	890
Sundry Income		1,348	1,243
		25,160	20,585
Expenditure:			
Awards	$90		65
Bad Debts	—		172
Honorariums	3,340		2,725
Postage	6,062		5,428
Publishing and Printing costs	24,475		24,471
Salaries	3,105		2,305
Travelling and Sundries	1,019		917
		38,091	36,083
Deficit for year		$12,931	$15,498

EXECUTIVE STATEMENT

In our opinion

(a) The Statement of Income and Expenditure is drawn up so as to give a true and fair view of the surplus of the Institute for the financial year ended 31st December, 1976.

(b) The Balance Sheet is drawn up so as to give a true and fair view of the state of affairs of the Institute as at the end of the financial year.

Members of the Executive
(Sgd.) D. A. WARDLAW
(Sgd.) P. A. WOLFENDEN

STATEMENT OF PRINCIPAL ACCOUNTING OFFICER

To the best of my knowledge and belief the accounts for the year ended 31st December, 1976, give a true and fair view of the matters contained in Section 162 of the Companies Act 1961, and required to be dealt with in the accounts as presented.

Principal Accounting Officer
(Sgd.) K. V. ROGET

AUDITOR'S REPORT TO THE MEMBERS OF THE WIRELESS INSTITUTE OF AUSTRALIA

1. In our opinion the attached accounts give a true and fair view of the state of the Institute's affairs at 31st December, 1976 and of its surplus for the year ended on that date.

2. As required by the Companies Act 1961, we report as follows:

In our opinion

(a) The attached accounts are properly drawn
  (1) So as to give a true and fair view of the matters required by Section 162 to be dealt with in the accounts; and
  (2) In accordance with provisions of that Act.

(b) The accounting records and other records, and the registers, required by the Act to be kept by the Company have been properly kept in accordance with the provisions of that Act.

Hebard & Gunning, Chartered Accountants

Melbourne
15th March, 1977

(Sgd.) P. W. HEBARD
Partner

FEDERAL PRESIDENT'S ANNUAL REPORT

1. In presenting this Annual Report of the Executive for the past year I would like to emphasise that, by means of WIANEWS printed in AR and the "Federal tapes" broadcast over official WIA stations, a continuous report of Federal and International matters has been put before you all throughout the year.

2. Consequently this report will only make special reference to particular items of importance.

3. The Executive consisted of myself as President and Chairman; I was also Chairman of Committee 2 of the Australian Preparatory Group (APG) for WARC 79; **Keith Roget VK3YQ** — Honorary Treasurer and Chairman of the Finance Sub-Committee. We are fortunate to have Keith in this position with his wide experience in WIA financial matters and office management. **Peter Wolfenden VK3PA** —

Executive Vice-President — continues to hold office as Chairman of the VHF/UHF Advisory Committee and is able to provide the Executive with expert guidance when matters in this area are discussed. Peter is also a member of APG Committee 2. **Jim Lloyd VK3CDR** has had lengthy experience in WIA affairs particularly in relation to WICEN. **Ken Seddon VK3ACS** — Ken is also Chairman of the Federal Repeater Sub-Committee and in this area keeps the Executive well informed. **Graeme Scott VK3ZR** — Graeme is our Education Co-ordinator and has had quite a lot to do this year.

4. I am very happy at the diligent and co-operative way the Executive has operated over the last twelve months.

5. Also a regular attender at Executive meetings was the Chairman of Project Australis, David Hull VK3ZDH who provided a great deal of assistance and information in his specialised area. David is also a member of APG Committee 2.

6. The Editor of AR attends as many Executive meetings as is possible. This is essential as AR is a very important aspect of our activities.

7. During the year we also made use of the specialised knowledge of many individuals who attended meetings of the Executive to provide us with very helpful information.

8. Of course, attending all meetings of Executive is our Secretary/Manager Peter Dodd. Peter has continued to prove himself a valuable asset to the A. The office is running smoothly and economically keeping the Council and members well informed as to what is transpiring.

9. **Attendances.** The following is a statement of attendances at Executive meetings since the last Convention:—

Total number of meetings: 14

Name		Attended
	Dr. D. A. Wardlaw	14
	Mr. P. A. Wolfenden	13
	Surg.R/Adm. S. J. Lloyd	9
	Mr. K. V. Roget	13
	Mr. K. C. Seddon	13
	Mr. G. F. Scott	8
	Mr. D. J. B. Hull	5
	Mr. B. Bathols	8
	Mr. W. E. J. Roper	5

10. Other Federal officers were:
Intruder Watch Co-ordinator: Alf. Chandler VK3LC
Historical Officer: Max Hull VK3ZS
Federal Contest Manager: Kev. Phillips VK3AUQ
Federal QSL Manager: Ray Jones VK3RJ
Federal Awards Manager: Brian Austin VK5CA
Chairman AARTG: Don Graham VK6HK
Federal WICEN Co-ordinator: Rex Roseblade VK1OJ
They all deserve our thanks for jobs well done.

DEPARTMENT OF POSTS & TELECOMMUNICATIONS

11. Throughout the year we have had regular meetings with the Department of Posts and Telecommunications Radio Frequency Management Division.

12. These personal meetings have made it much easier to conduct our business with the "RFMD".

13. I am continuing as Chairman of Committee 2 APG (Australian Preparatory Group) WARC 79.

14. Numerous matters of concern to all amateurs have been taken up with the P&T Department. The results of these negotiations have been well documented through the columns of WIANEWS.

INTERSTATE VISITS TO THE MEMBERSHIP

15. During August I had the opportunity of visiting the Queensland Division making sure I had a chance to meet as many of the members of the Division as possible.

16. My first stop was Brisbane where I attended a Divisional Council meeting. On the next evening there was a well attended general meeting of the Division. At this meeting I was able to bring the members up to date on many matters of Federal importance, answering questions and obtaining the views of the membership on a wide range of subjects.

17. My next stop was Rockhampton where I attended the Central Queensland Convention. This gave me further opportunities to speak to many country members from surrounding districts.

18. From Rockhampton I flew to Mackay where I had lunch with a number of members for further discussions and then flew on to Townsville where, at a meeting of the Townsville Amateur Radio Club, I was able to have wide ranging discussions with the members on a variety of subjects.

19. This trip, which took me more than 2500 km from Melbourne, enabled me to gain first hand insight into the needs of our members in the more distant centres of Australia and also to give them in return first hand information as to what was happening on the Federal front.

20. On passing through Sydney on my way to Queensland I promised the President of the NSW Division that I would pay them a visit in the near future. The ideal time turned out to be the weekend of the Gosford Convention.

21. On Friday, 16th February, I attended a general meeting of the VK2 Division and then all day Saturday was spent at the Wireless Institute Centre to meet the Council and specialised groups. This allowed extensive discussions of Federal matters to be conducted as well as divisional policies to be explained.

22. On Sunday I was driven to Gosford for the Convention where the record attendance of almost 700 gave me the ideal opportunity to meet many members from all over the State.

23. On the last weekend in March I visited Adelaide for the opening of the South Australian Divisional H.Q. at Thebarton. This visit gave me the opportunity to discuss Federal matters with the Divisional Council. This well attended opening ceremoney enabled me to meet many of the members.

24. This Division must be congratulated on the fine job they have done in preparing their H.Q.

25. Another visit of importance was to Canberra where the Honorary Treasurer, Keith Roget VK3YQ and myself were invited to investigate at first hand the site for a possible future national H.Q. for the WIA and discuss the feasibility plans as prepared to that date.

POSSIBLE H.Q. BUILDING IN CANBERRA

26. The NCDC is presently making lease sites available for use as the H.Q. of National organisations. All of these sites are in one area set aside for this specific purpose.

27. On hearing about this the ACT Division made the appropriate inquiries as to the conditions of occupancy that would be required. A site is available and a financial feasibility study was based on the use of this site. Certain conditions were set down for the design and use of the building. In order to allow the various organisations to recoup some of their expenses in building their H.Q. in Canberra, 50% may be leased to tenants while the remaining 50% is to be used by the organisation for its own purposes.

28. The sums of money involved are large and it is generally felt that a project of this nature must not be a burden on the running costs of the Institute and that if we are to proceed more information is needed.

29. Of course it must be borne in mind that at this stage there is no intent of moving the H.Q. of the WIA to Canberra as the H.Q. of the P&T Department is still remaining in Melbourne.

30. Thus the proposal must be looked at entirely as a business one. With this in mind, therefore, I commend members to give it their careful consideration.

RECRUITING

31. As Noel Eaton VE3CJ, the President of IARU has said, the best way the majority of amateurs can help in the preparation for WARC 79 is to belong to their National Society.

32. The WIA, with this in mind, has launched a recruiting drive with advertisements in EA, and ETI. We also printed pamphlets one of which was aimed at the non-amateur explaining amateur radio and the other aimed at non-member amateurs. Of course the main brunt of recruiting must fall on the Divisions. It is pleasing to see so many novices joining.

NOVICE LICENCES

33. At the last Convention it was decided that Novices were to be full members and to this end the Divisions are busy having their Constitutions altered.

34. The P&T Department has announced that Novices will be granted a 200 kHz segment on the 28 MHz band, a condition the WIA has been seeking ever since the introduction of the licence.

EDUCATION

35. The following postal motion dated 13/8/76 was passed.

"That having regard to practical considerations and the necessity for the re-organisation of WIA educational arrangements it is resolved that Motion 72.201 be rescinded and that no other similar constitutions be recognised but that the Institute agrees to render every possible help and assistance for the training of youth heretofore with the object of preparing them for the Amateur examination, including the continuing provision of Certificate forms publications and the like."

The NSW Division suggested that all Divisions should report at the next Convention how things were proceeding without a Federal YRCS Co-ordinator.

36. The WIA Federal Education Co-ordinator has met with the RFMD Examiner and had useful discussions. Sample examination questions were provided.

37. In collaboration with experts from several Divisions a novice examination syllabus has been produced.

38. Interstate co-operation has also occurred in the running of trial novice examinations. These examinations give the potential novices the means to determine whether they have reached the required standard. It will be interesting to see if the percentage of passes increases.

WARC 79

39. It was not until the 1976 Administrative Council meeting of the ITU that an agenda for WARC GENERAL 1979 was produced.

40. It has now become apparent that a significant number of countries are not satisfied with this agenda. Many say there is insufficient time and want it extended; others say it may be best split into two separate sessions.

41. The Australian Administration feels that providing the facilities can be made available the conference could be completed in ten weeks. It would, however, be a very intensive conference. This uncertainty creates problems for amateur representatives both national and IARU.

42. During the year, by courtesy of the IARU, a considerable amount of material has been made available to Societies.

43. Michael Owen VK3KI, was invited by Noel Eaton VE3CJ, President of IARU to attend the International Working Group in Geneva which produced the IARU model brief for use by member socities.

44. The WIA consolidated a vast amount of material into a background information paper.

45. APG Committee 2 (the Amateur and Amateur Satellite Services Committee) was charged with the identification of areas of band change and band retention and the production of a scenario to the year 2000.

46. This material was presented to the 4th APG meeting as was the material from all other users. There are areas of overlap and at this stage only very preliminary discussions have taken place.

47. During the next six months a great deal more will be heard on these matters.

REPEATERS

48. Repeater co-ordination is still being carried out from Melbourne with a member of Executive as Chairman.

49. There have been two main areas of concern to the Committee. Firstly, the repeater licence conditions that have been proposed by the P&T Dept. — to date the matter has not been finalised. Secondly is the need for additional channels over and above those provided for in the current band plan — the problem is particularly acute in NSW.

50. The point has been repeatedly made that the WIA has formulated a band plan for repeaters not only on 2 metres but also on 70 cm. When the P&T Dept. is approached by any groups wishing to set up a repeater the WIA should be informed in order that all repeaters will conform with orderly band planning.

THE MAGAZINE

51. Over the past year it was pleasing to see that the Publications Committee has been able to maintain the high standard of AR.

52. We are fortunate in having a printer whose efficiency has enabled the printing costs to be contained at a very reasonable level.

53. Again the advertising revenue has helped to keep the cost to members down, although distribution costs (post and mailing service) have risen.

54. In December Bill Roper VK3ARZ found it necessary to resign as Editor and Bruce Bathols has taken over. Bill has always been a tower of strength to the WIA particularly during his 4½ years as Editor, a job he took when the magazine became Federal.

CALL BOOK

55. Agreement has been reached with the P&T Dept. as to the conditions of a contract for the production of the Call Book for the next 10 years.

56. It will be produced from a computer printout. Of course the accuracy will only be as accurate as the material supplied as far as non-members are concerned.

MAGPUBS

57. Magpubs continues to provide members with a service. Technical publications are available at very advantageous prices. This service is in no way subsidised by the membership dues and in fact supplies a small profit when all expenses are brought into consideration.

THE ARNOLD REPORT

58. At this stage it would appear that the Investigator's report by Bob Arnold has made little if any impact. The feedback from members so far as can be gauged here has been negligible.

59. The financial problems of the Executive during 1974/75 probably had much to do with the reorganisational concept. Has this now fallen through by reason of the magnificent response by Divisions to the Federal levy mutually agreed and paid in 1975?

60. Since the Federal Council supports the Executive very strongly it must be assumed that no overriding considerations, other than financial, are operating to cause a reorganisation to occur for purely Federal reasons. The general climate surrounding Federal activities appears to have undergone considerable changes in the light of public relations activities brought into being during the past year or so.

WICEN

61. Our Federal WICEN Co-ordinator, Brig. Rex Roseblade, attended a Communications Seminar at the Civil Defence School at Mt. Macedon during the year.

62. HF WICEN net primary channels have been agreed on.

63. It was also felt that there is a need for greater flexibility when emergencies arise and third party traffic is required to be handled. The matter has been raised with the P&T Dept.

PROJECT AUSTRALIS

64. David Hull represented the WIA at the Oscar 6, 7 and 8 Operations meeting held in Washington D.C. during May 1976. A report of this meeting was published in AR in August 1976.

65. David has been in attendance at many Executive meetings and keeps the Executive well informed on Amateur Satellite Service matters.

INTRUDER WATCH

66. Alf Chandler VK3LC, continues his dedicated work as Intruder Watch Co-ordinator, editing a regular column in AR.

67. This is a very important facet in our preparations for WARC as it indicates that we are well aware of the alienation of our frequencies.

JARL 50th ANNIVERSARY

68. The Japan Amateur Radio League celebrated its 50th Anniversary from the 23rd to the 26th September, 1976.

69. Michael Owen VK3KI, the Immediate Past President was able to represent the WIA as he was visiting Tokyo on his way back from the IARU Working Group in Geneva.

70. An opal rock shaped like a map of Australia was presented to the JARL by the WIA.

NZART 50th ANNIVERSARY

71. The WIA was invited to send a representative to the NZART Golden Jubilee Conference during the year.

72. Keith Roget, the Federal Treasurer, was able to represent the WIA and convey our congratulations to our sister Society across the Tasman.

DARWIN FUND

73. After consultation the Darwin Club stated it had unanimously agreed that monies collected in the Darwin Appeal fund should go to the club and not to individual members. Accordingly, a cheque for the full amount collected, $1084.38, was sent to the President of the Darwin Club with the request that the money should be used to acquire tangible assets for the club.

UHF WORLD RECORD

74. Our congratulations go to VK6WG in Albany and VK5QR in Enfield, a suburb of Adelaide, who on the 25th January 1977, broke the world distance record for 1296 MHz.

"CB"

75. During this year the pressure on the Government to introduce a CB type service has reached an extremely high level, particularly with the unrestricted importation of cheap 27 MHz transceivers.

76. It is now obvious that a majority of those who wish for the introduction of a "CB" service into Australia will only be satisfied with one in which 27 MHz frequencies will be available.

77. This covers an allocated amateur band and it is clear that both amateurs and "CB" cannot share the same frequency.

78. It is also clear that "CB" as advocated by the majority could in no way be made to fit into the ITU definition of the Amateur Service.

79. Letters to the Minister have pointed out that the 27 MHz band is an important one for the Novice Amateur operator. It has also been pointed out that Australian amateurs have already been disadvantaged as far as the Region 3 allocations are concerned in that we do not have the full extent of the 3.5 MHz band and, furthermore, we have been deprived of the lower half of the 50-54 MHz Region 3 allocation. We must, however, admit that some small compensation was given in the past by extending the 7 MHz band by a mere 50 kHz.

SUPERANNUATION FUND

80. The Treasurer will report on the progress made in the setting up of a Superannuation Fund for WIA staff.

MEMBERSHIP STATISTICS

81. These are compiled, with adjustments, from the EQP data at mid-December 1976 input and P&T Department data as at 31.12.76 as supplied by telephone.

TABLE 3. WIA member clubs and groups

	Licensed	No licence	Total
VK1	2	—	2
VK2	11	4	15
VK3	17	2	19
VK4	13	1	14
VK5	5	1	6
VK6	7	2	9
VK7	—	—	—
	55	10	65

TABLE 4. Students, Pensioners and other concessionary grades:

	Students		Pensioners		Life	"Family"
	Lic.	N L.	Lic.	N.L.	Memb.	Memb.
VK1	1	—	—	—	1	—
VK2	19	19	64	9	10	1
VK3	60	64	44	10	6	12
VK4	3	—	31	7	3	5
VK5	1	9	19	8	5	6
VK6	5	5	11	3	5	—
VK7	—	8	4	2	5	1
Federal	—	—	—	—	11	—
	89	105	173	39	46	25
	194		212		46*	25
						477

NL = Not Licensed.

*2 are without call signs — i.e. 10% of membership

A. Membership Grade

F	2485	
A	773	
C	638	
T	222	
S	194	
H	1	Error — should be E.
L	46	
B	52	Direct subs. ($10.80)
D	95	Direct through agency ($7.20)
E	85	NZART ($7.20)
G	284	
J	87	Free copies—reciprocal & IARU etc
	4962	

TABLE 1 (Previous year in brackets) **Totals:**

	Total Licensees		WIA licensed members		% members to total licensees		Other WIA members		Total WIA members	
VK1	144	(126)	79	(83)	55	(66)	31	(35)	110	(118)
VK2/9N	2383	(2233)	978	(957)	41	(43)	267	(232)	1245	(1189)
VK3	2219	(2144)	1087	(1074)	49	(50)	324	(345)	1411	(1419)
VK4	851	(815)	503	(457)	59	(56)	154	(155)	657	(612)
VK5/8	907	(835)	499	(473)	55	(57)	180	(191)	679	(664)*
VK6/9X	581	(521)	288	(278)	50	(53)	80	(69)	368	(347)
VK7	246	(239)	154	(160)	63	(67)	67	(84)	221	(224)
VK0	5	(6)	—		—		—		—	
	7336	(6919)	3588	(3482)	49	(50)	1103	(1091)	4691	(4573)

*Includes 16 "Junior Associates" (3 with call signs)

TABLE 2. P&T Dept. Licensees distribution:

	Full Call	Limited	Novice	Total
VK1	114	27	3	144
VK2	1653	663	65	2381
VK3	1378	788	53	2219
VK4	553	285	13	851
VK5	546	269	28	843
VK6	414	139	25	578
VK7	164	80	2	246
VK8	40	16	8	64
VK9*	—	—	—	5
VK0	—	—	—	5
	4962	2287	197	7336

*2 on Norfolk Is., 3 on Christmas Is.

B. Destination outside Australia

New Zealand	99	Thailand	2
Papua New Guinea	21	Sri Lanka	3
USA	41	Pakistan	2
UK	14	New Hebrides	2
Japan	10	India	2
Malaysia	5	Canada	3
Switzerland	5	W. Germany	3
Indonesia	3	Mexico	2
Philippines	4	Christmas Is.	2
Singapore	3	Hong Kong	4

and one each to:

Denmark, Sweden, Norway, Finland, USSR, Turkey, Netherlands, Libya, Botswana, S. Africa, Burma, Rhodesia, W. Samoa, Nauru, S. Korea, Ocean Is.

(Sgd.) DAVID WARDLAW
President

VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

News has finally filtered through that the 3D3AA beacon in Fiji is not operating, so has been removed from listing. An additional beacon in New South Wales is VK2RHR, which is located at the QTH of Barry Goodman, VK2ZAG at High Range near Mittagong, operating on a frequency of 144.120 MHz, running 10 watts into five vertically stacked ½ wave collinears, and identifies every three minutes on MCW. The purpose of the beacon is to evaluate High Range as a possible permanent repeater or beacon site. Reports covering a period of one week are required and may be forwarded to Barry at P.O. Box 318, Mittagong, NSW 2575. The above information came from Jeff Pages VK2BYY the VK2 VHF and TV Group Secretary. The information should have been included last month, but was missed, sorry Jeff.

6 METRES

Geoff VK3AMK with some news, saying he had a 14 MHz QSO on 30/4 with 3D2AZ in Fiji and mentioned 6 metres to him. He replied there was no current activity on 6 metres there, the last brief contact he knew of was with ZL1QI over two years ago! 3D2AZ said he heard the VK2 beacon but after trying to raise VKs on HF could not find anyone interested in 6 metres! He will still try if anyone is interested. Their 6 metre allocation is 50 to 54 MHz, but operation is unpopular due to a number of local people watching Australian and New Zealand Ch. 0 and Ch. 1 TV, as there is no local service. Geoff asks, how do you get anywhere with that sort of set-up?

Geoff says "The way 6 metres has been over recent years, and especially the last few months, anyone in a location such as 3D2 who has not been working DX has not been trying! Recently I have spoken to ZL3QK and ZL4MB on HF and both complained what a poor season it had been. Again, I can't really understand this at all. Last 23/10 I put my 6 element yagi at 18 feet and pointed to Tokyo, two hours later the band opened into JA with 5 x 9 signals and did the same again on 4/11. During the summer I left the antenna in the same position, mounted vertically, and worked VK1 to 8, YJ8, P29 and ZL using 50 watts. The vertical is fantastic in reducing noise from Ch. 0 and I spent most of the time listening, it was such a change to be able to hear backscatter that normally would have been lost in Ch. 0 noise. As far as I can tell the vertical made no difference to any DX signals, and the lack of QRM from Ch. 0 put me way in front of other seasons even without the facility of being able to turn the beam. The only problem seems to be weak signals from beyond about 30 miles with stations with horizontal polarization. This I had expected anyway.

"During the autumn I have religiously monitored 50 to 52.1 daily from 0315 to 0445 Z but not a trace of JAs. When the VK5s and western VK3s were hearing and working JAs around Easter there was nothing here. Previous JA openings to here have been extremely selective, one side of Melbourne enjoying S9 signals while inaudible across town."

Thanks, Geoff, for another one of your newsy letters — your comments are interesting with regard to vertical polarization and Ch. 0. Equally interesting is your support for my argument of long standing that were more people to watch 6 metres and transmit as well as listen there would be many more contacts made, and I still maintain the equinoxial periods will be the times when transequatorial or transoceanic DX will be to the fore. I have some more letters to follow now which lend further support for my previous many proddings for you all to operate then.

Albert VK2ZFB has penned some comments to one of my recent opening comments in this column re "lack of activity following the usual finish of the Ross Hull Contest". He supports the view that the six metre band in particular rarely ever closes down, it's only the operators. To support this view he reports that on 8/4 he came across three VK5s having a ragchew, which he promptly broke up. On 11/4 he worked three VK4s, on 17/4 heard John VK2BHO working some JAs on CW and phone, so called and worked JH6XYR at 0640 Z, his first JA in 16½ years. On 26/4 it was ZL3AAN at 0720 Z. Albert asks how long it will be before some fellows wake up to the possibilities of such contacts at periods other than the usual Es summer period. I heartily concur with you Albert . . . 5LP.

Ross VK4RO has sent a letter to me and a tape and details from both follow. Firstly I think congratulations are in order for his contact with KH6GRU in Hawaii on six metres on 17/4 when reports of 5 x 9 were exchanged both ways, and this is most likely to be the first such KH6 to VK contact since the 1957/58 period. Clive VK4ZCE who was only using a dipole antenna also had a contact with KH6GRU, and Mario VK4MS was heard calling CQ in Hawaii also.

The tape originally came from Bert KH6GRU who stated during the contact with Ross VK4RO that his signals were available for an hour before he had to QRT. Signals were 5 x 9 most of the time, with some slow fading. Bert advised first hearing strong signals from VK stations on 10 metres, so he programmed the beacon station KH6EQI (15 miles away) on, and this is what Ross first heard, on 50.104. The contact between the two stations was on 52.1 MHz, and quite a lot conducted via CW because Bert was having some trouble with his 6 metre linear.

Bert mentioned he had been heard on 8/4 in Guam, on 9/4 in Guam and Japan, and 10/4 Guam. Ross VK4RO had been heard in Guam by KG6GRH during the contact with KH6GRU. On 23/4 he worked 4 or 5 stations between 1800 and 1930Z in the San Diego area of California on Es for an early start to what could be an excellent Es season. He listens for Ch. 0 in Australia on 51.750 and Ch. 1 in New Zealand on 50.750, but so far nothing heard. Bert first came to Hawaii in 1968/9 and worked South America regularly around 2300 to 0100 Z during the autumn. He will be looking for Ross and any other VKs during September/October this year.

The KH6EQI beacon is on 24 hours a day and uses Heathkit SB110 equipment running 80 watts output to a 5 element beam. The antenna is programmed to three different directions during the day, from 1800 to 0400 to USA on a bearing of 50 degrees, 0400 to 0645 to Guam and 0645 to 1800 to ZK1 or F08 about south. KH6GRU runs FRDX400/FLDX400 to Collins 62S1 for six and two metres, with home brew linear running 500 watts. The only time he has previously been heard in Australia was during 1969/70 and that was probably by VK8KK, but no contact made.

In his letter Ross VK4RO gives details of most of the northern VK4 openings during March and April, all reported JA openings were the afternoon type, no fast QSB (flutter) like evening type. Most stations heard were SSB or CW, very few AM from the north now. Whilst it might seem we are hammering six metre equinoxial activity at the moment, (well, that's deliberate, because I want more of you guys who are home and have the equipment and opportunities to tune around to do so) the more contacts we can muster like the Hawaiian contact, then the more likely we are to get the big guns from the USA to take an interest in our portion of the 50 to 54 MHz segment. So if the following outline of VK4 activity does not start to whet your appetite, then I am sure nothing will.

19/3: First JA opening, 0540, short, with QSB.

20/3: JAs 0600, long opening to S9.

25/3: JAs 0550, short, QSB.

27/3: KH6EQI 0240 to 0340, peaking S9+.
JA, 0330, short, QSB. P29GR 0345 5 x 3.
VK1, VK2, 0900, weak.

30/3: KH6EQI, 0300, 539.

9/4: JA 0440 long, to S9. JA 0630, short, to S9.

10/4: JA 0530 short, QSB.

11/4: VK1, 2 and 5 0330 to 0600, QSB.
JA 0900 short, QSB. JA 1020 long, QSB, moderate strength.

15/4: JA 0900 short, QSB.

16/4: VK2 and 3 0030, short, QSB.
KH6EQI 0410 519 to 319, short.
P29 0440 QSB. JA 0630 long, QSB. VK8VF 0852 539.

17/4: KH6EQI 0530 599.
KH6GRU 0630 5 x 9. Contact with VK4RO.
VK2 0622 5 x 9. Ch. 5A 0630 weak.
P29 0650 QSB. KH6EQI 0652 519 (back in again) JA 0940 weak.

18/4: KH6EQI 0300 599. VK4RO reported heard in KG6 at 0300. 529.

20/4: JA 0830 — 1000 long, S9+.

21/4: JA 0745 — 0900 long, S9.

22/4: VK 0235 5 x 3.

23/4: JA 0730 weak.

24/4: VK8 0400 5 x 9.

26/4: P29 0720 5 x 9. JA 0830 short, 5 x 3.

30/4: JA 0900 short, 5 x 3.

No more openings after this date. Stations working JAs were Ross VK4RO, Clive VK4ZCE, George VK4GS, Joe VK4JH and Mario VK4MS.

That's it, chaps; that list shows the measure of activity in the good areas to the north of our big country, but it would be a safe bet to say some of the above would also have been audible much further south. In fact, I did copy a tape brought to me by David VK5KK from a VK3 who had been amongst the DX too, but my copy did not turn out very well so cannot at this stage pass on the information it contained. Too late for a recopy for this issue.

However, as a result of this and previous jottings on the same subject it looks as though we will all need to be more on the ball in future so we can participate in some of the goodies offering!

Being rather tied up at night at the moment I cannot offer you anything in the way of news on the two metre scene, but will try and show some improvement in that direction for the next issue.

MOONBOUNCE REPORT

"The first EME contact between VK2AMW and a station on the African continent took place on 23/4/77 when we were able to contact ZE5JJ on our first attempt since his new 32 foot diameter dish has been operational. His signals were a max. of 7 dB over noise, making copy quite easy while his dish was 'on the moon'. His remote readout of dish pointing is still giving trouble so he has a second operator continuously steering it. Fortunately he had clear skies. It was heavily overcast and raining part of the time at our end, needing total reliance on calculated position of the moon and on remote readout.

"This was the first known UHF contact between Australia and Africa. It also means that VK2AMW has now had confirmed contacts with stations on all continents outside Australia on 70 cm. This took approx. 7½ years of EME work.

"Tests were also carried out on 30/4 with K4VOW, who was heard but his signals were not strong enough for a contact to be made, also with W0YZS and W7GBI, neither of whom were heard. Our echoes were quite good, at 9 dB max. over noise, on this occasion.

"It was good to have Club members present on both of the above dates, in addition to the operators, VK2ALU and VK2ZEN.

"Information has now been received from Austin Youmans of NRL on the dipole excited waveguide or Clavin type feed. This confirms that the present feed on our dish could be suitable for modification. It should give better illumination efficiency, hence a little higher dish gain than our existing system. VK3ALU". From The Propagator.

From Graham VK6ZCJ comes a letter outlining activity in Darwin recently, and he reports considerable activity on six metres, with JA openings on March 13, 25 and 31, April 1, 2, 10, 18, 19, 20, 26, 27, May 1 and 2. It is interesting to note that a number of the openings have been later in the day than those noted by Ross VK4RO. Graham lists some as late as 1100 to 1336 Z, being the evening type openings. Also signals were heard on the 50 MHz end of the band on April 21, 23 and May 5 and 13.

Graham reports the most reliable indicator of band openings as being the Russian/Chinese TV video on 49.750. The 49.305 FM is also OK but not so good in the evenings. No JA amateur beacons have been heard. So far this year he has worked JA1, 2, 3, 4, 5, 6 and 9 and JR6 in just over 100 contacts.

In talking to the JAs Graham has received word they have been hearing the KH6EQI beacon regularly but no contacts made (source JA1LZK). From comments received all States in VK except VK6 have been worked by JA this year, particularly good on 9, 10 and 11th April. P29GR was worked in Japan on 23/4, while KG6 Guam is a regular contact there.

On 17/5 Graham reported a brief opening to JA 0857 to 0920. Many signals on the 50 MHz end working KG6, but only two in our part of the band, signals were over S9. JA1TTS reported he worked KL7HAM (Alaska) on 15/5/77.

Graham further reports the VL5SA beacon on 48.45 MHz is back on the air, but no further details of equipment or location. There is some talk in the Darwin Radio Club that the 2 metre beacon will be on the air shortly. VK8VV has agreed to get it going . . . That's good news for everyone, even down south of the continent. Thanks for the letter Graham, we feel rather envious of the six metre activity up there.

I compliment the Gold Coast Radio Club for their new improved monthly newsletter, and hope it will be instrumental in increasing interest in the Club's activities.

A letter arrived today from Bill Tynan W3YO, Contributing Editor for "The World Above 50 MHz" in QST, who commented on my query of the 70 cm Best DX in QST in January 1977, and advises that all the distances shown above the record standing are for EME contacts. However, Bill made the point that there appears to have not been any claims made for the 432 MHz contact between Les VK3ZBJ and Wally VK6WG in February 1975. If this has not been done, how about you gents having the matter finalised so some VK standings can be given mention in the overseas magazines. We now also have the 23 cm record set recently between Reg VK5OR and Wally VK6WG on 25/2/77, so I am sure VK amateurs would like to see the records set straight. How about it, chaps, on with the job!

Bill W3YO also asks to be informed of any worthwhile accomplishments in this part of the globe for inclusion in QST World Above 50 MHz, so I will try and remember to do this on your behalf. Perhaps we should start with the VK4RO to KH6GRU contact.

That will have to do for this time, concluding with the thought for the month: "Sentimentality is no indication of a warm heart. Nothing weeps more copiously than a chunk of ice".

The Voice in the Hills. ■

IARU NEWS

WARC 79

Writing in Radio Communication, February 1977, about the Region 1 VHF Manager's meeting in Amsterdam, a report indicated that with regard to WARC 79 the position was somewhat depressing as many of the IARU societies did not seem to be in effective touch with their national administrations.

News from IARU headquarters reports that 23 member societies have received indications of favourable response to the amateur position from their governments and 11 out of the 30 societies reporting expected to have amateurs appointed to the governments' WARC delegations in 1979. The French Society REF reported that French amateurs can now use A1 emission on 1826 kHz solely for international contests with a maximum power of 10W. They have also won the privilege of building and installing 2 metre repeaters (16 kHz bandwidth, 200W erp, 144-146 MHz, R1 access) after many long and arduous attempts.

Europe's CEPT (the organisation through which Europe co-ordinates its telecommunications policies) is thought unlikely to support a 220-225 MHz allocation and a hard struggle is expected for 50-54 MHz between the amateur and mobile services if TV moves away from this segment. VERON (Netherlands) cannot expect to receive more than 10 kHz in the 160m band.

In South Africa the portion 1930-1970 kHz might be supported for amateur use but not on an exclusive basis. The indications are that it is going to be "extremely difficult" to allocate a portion of the 80m band exclusively to amateurs due to sharing with fixed, mobile, defence and private services. On 40m the segment 7000-7150 kHz for exclusive amateur use might be possible but the proposals for 10.1-10.6 and 18.1-18.6 MHz were rejected due to several services using the segments for long-distance communications but the proposal for 24.0-24.5 MHz seemed more favourable. The use of 220-225 MHz is out but 2300-2310 and 3400-3410 MHz as amateur satellite bands were considered to be acceptable by the South African PMG.

Indications from Sweden show problems about the 3.5 and 7 MHz proposals, although the administration reacted favourably towards the 14, 21 and 28 MHz proposals.

In Switzerland the authorities appear to be against 10 and 18 MHz bands as well as 50 and 220 MHz, but some support was detected for the proposed 24 MHz band. Many difficulties appear in relation to the retention of the 70 cm band for amateurs, reports USKA, except for the satellite amateurs, reports VSKA, except for the satellite window.

The Canadian first draft for WARC 79 touches on several points of significant interest to amateurs. The three new bands at 10, 18 and 24 MHz are provided for but the 80m allocation is reduced to 3.5-3.8 MHz exclusive and for 40m, 6.9-7.1 MHz exclusive.

April 1977 QST contains an article by David Sumner K1ZZ on the ARRL response to the FCC WARC 79 frequency proposals (already referred to in AR vide FCC Docket 20271). Several of the tabloids with the article appear very apt.

"If one service is to expand, another must surrender spectrum space. Fixed service needs will be far less after 1985 than they are today. Better techniques could improve the utilization of existing broadcasting bands," says FCC. "There is a critical need for new amateur allocations at 10, 18 and 24 MHz. The sharing arrangements with the fixed service is a realistic solution to the problem of expanding one service without seriously impairing another. A shift in the 15m band is unnecessary and undesirable. Sharing between amateur and CB at 220 MHz is wholly impractical for a number of reasons. The solution for CB lies at 900 MHz where sufficient spectrum space is available for future expansion."

Other comments in this article include such items as "The radio spectrum is a finite resource: There are just so many usable kilohertz to go around, and there are more possible uses for radio than can possibly be accommodated. In addition, the representatives of every radio service argue that they need, at minimum, the spectrum that is now allocated to them, and usually that they need a lot more for present and future requirements. If one service is to expand, it follows that some other service is going to have to surrender spectrum space. Since the last general WARC in 1959, the most heavily used circuits in the fixed service have shifted at an ever increasing rate to undersea cable, landline, microwave links and satellites. All of these alternative methods of communication provide higher quality and greater capacity than is possible below 30 MHz. For example, a single geostationary satellite now has a bandwidth of 500 MHz, more than 18 times the width of the entire HF spectrum. The developing nations, according to the FCC, will have a large and continuing need for fixed service allocations.

The amateur service is expanding world-wide at a rapid rate; projections show that a total of six million amateur stations by the year 2000 is quite likely.

Above 30 MHz the major battle that is shaping up . . . pits the UHF TV broadcasting interests against the land mobile community."

These various extracts hopefully illustrate a few of the massive problems arising for WARC 79 amateur radio consideration. There are at least 10 times more still unmentioned.

Thanks go to David Rankin, the Secretary of the R3 Association, for the update on IARU members and other societies in his letter to the editor in last month's AR. It is most pleasing to note the increased membership. ■

INTRUDER WATCH

Alf Chandler, VK3LC

Reference the pulse transmissions that have been bugging us for the past year or so, as I said in the March 1977 issue of AR I thought that would be the last time I would have to mention the subject. However, that signal is still annoying most amateurs and covers an entire band when being transmitted. Although the Russian Administration has been told in no uncertain terms how the signal interferes with the amateur as well as other services they still persist in their experiments, and many amateurs in Australia have reached the level of frustration where they have given up hope that anything can be done about it.

However, I ask all observers to continue to report the pulse whenever it is heard, giving date, time, frequency range, strength, and if possible bearing because update complaints are still being forwarded to the Administration concerned.

Now, I am going to quote what is being said in other parts of the world. In England I quote from "Wireless World" — "It is now common knowledge that a large portion of the HF band of the radio frequency spectrum has been suffering from interference caused by a very powerful transmitter, or transmitters, located somewhere in Russia or the Ukraine. The interference became so bad that most of the communication services have complained through their respective organizations and the Home Office and to the Frequency Registration Board of the ITU. A Home Office representative recently informed us that they have made a complaint direct to the Russian authorities and have been told that they are conducting tests and are taking steps to reduce the interference. We can only speculate, and perhaps the best way to do this is to study the information at hand and then compare it with systems which we know are within the realms of our present technology, or could be feasible. Reports indicate that the transmitter is located in the area of Gomel, an industrial town in Byelo-Russia, and this has been confirmed by NATO direction finders. Monitoring engineers agree that the actual powers involved are in the tens of megawatts, probably 20 to 40 mW.

Amateurs and broadcasters have not been the only ones affected by the interference; almost every service has been troubled. Although the signals are very difficult to observe, even on a high speed oscilloscope, there are as many as four sources all transmitting the same, or nearly the same, information, perhaps from different locations. What is interesting is that the signals are no longer remaining for periods of hours in one frequency band but are moving up and down the HF spectrum in about 100 kHz steps, remaining at the chosen frequency for 30 seconds to 10 minutes. The use of pulse signals suggests over the horizon bar, and a complicated system would be necessary to compensate for propagation variations, and this may

Involve the use of more than one source. It is understandable that the Russians should wish to keep HF communications in addition to satellite communications using microwaves because, in the event of war, the satellite is very vulnerable. Over the horizon radar is not new, the USAF and the Defence Advanced Research Projects Agency have been actively interested for about 15 years and distances of at least 1850 km are possible. It is interesting to note that the frequencies chosen are normally between three and 30 MHz. The system would almost certainly use backscatter radar which depends upon energy reflected from the target reaching the receiver antenna array via ionospheric reflections. Radar of this kind is often ineffective within a certain skip distance from the transmitter. This may explain why an American radio amateur visiting a Soviet amateur organization as a representative of ARRL was told that their amateurs were unaware of any high power transmissions from their country."

The article goes on to describe how this type of radar could even tell the size and shape of enemy aircraft and or battleships.

From ARRL Intruder Watch Memo of May 1977 I also quote — "Many of our members are wondering why and how such blatantly illegal operations such as the Po pulse can continue for such a long period of time. We realize that the matter is now in the hands of the State Department, but it gives our members little satisfaction to be told that the State Department is working on the problem, when the concrete result can be seen. The only acceptable resolution is no interference at all. There is no such thing as a "little" harmful interference on frequencies allocated to the exclusive use of amateurs, and the Soviet Union has agreed to abide by these allocations. The one unquestionable fact is that the interference is still there, in clear violation of the ITU regulations." They also ask that reports be still continued, and ask for suggestions as to what alternate courses of action could be taken should further FCC and State Department action continue to prove ineffective.

All reports that originate in Australia are processed by our Administration as well as sent to the ARRL and the PCGB. Keep them coming. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

A recent meeting of the VK3 ATV repeater group drafted a submission to the Licensing and Regulatory Branch for an ATV repeater to be located on Mt. Dandenong. The input frequency of this repeater will be on 444.25 MHz and the output frequency on 579.25 MHz. Consideration is being given to vertical polarisation for the downlink.

Les Jenkins VK3ZBJ together with members of the Frankston and Mornington Peninsula Amateur Radio Club (F.A.M.P.A.R.C.) held a marathon 10 hours of TV transmission on Friday, 13th, and Saturday, 14th May, displaying all aspects of amateur radio to an Expo held at Frankston Technical College. Transmissions were in colour and black and white and created a great deal of public interest.

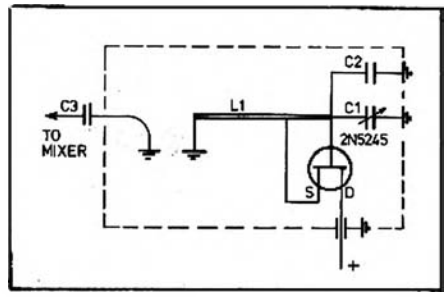
On Sunday, 15th May, we were pleased to welcome John Ingham VK5KG to Ron Harrison's ATV segment of the VK3BWI broadcast. John provided a video tape showing aspects of ATV activity in VK5.

To the date of writing these notes we have had no correspondence from other States with the exception of VK5. We hear rumours of activity in VK2, but have not yet made contact with any active operators.

MODIFICATIONS TO THE VK3ZIM ATV CONVERTER

The following modifications have been developed by members of the VK3 ATV group.

1. Use 1K ¼W resistors for the collectors of the two RF stages **inside the shielded box** and decouple to supply rail by 1000 pF feed through capacitors.
2. A third RF stage using a BRF91 in identical configuration yields increased gain with slight degradation in noise figure.
3. An improved FET local oscillator courtesy of VK3ZBJ/Mr. Hartley) provides a pure injection which reduces herringbone interference and commercial breakthrough. A typical Les Jenkins effort, simple with a bare minimum of components, but works very well. The output power from this loop should be **loosely** coupled to the circuit is fairly high so the hairpin oscillator (as long as it is in the same compartment you are in business!). A little experimentation is needed for optmium results but the dimensions are non-critical.



L1 = approx. 1".
18-20 gauge wire, source tapped at approx. 30%.
C1 = 2-8 pF existing trimmer.
C2 = 4.7-6.8 pF.
C1 = 2-8 pf existing trimmer.
C3 = existing coupling capacitor.

C1 can be replaced with a suitable "eddystone" variable with some plates removed for reduced capacitance.

Les has also developed a new wideband converter for ATV. Mk. 1 prototype is already in operation and its performance seems to be very good. It is particularly impervious to out of band signals in the VHF region (2 metres, commercial television, etc.). We hope to describe this converter in a subsequent issue of AR.

Please forward any contributions for this column to P. J. Cossins VK3BFG, 14 Coleman Rd., Wantirna South, Vic., 3152. Tel. (03) 231 2778. ■

LARA

Ladies Amateur Radio Association

As we move into July, the most important event in the amateur calendar approaches. I refer, of course, to LARA's birthday, and this year is the second such occasion to occur this century. In other words, LARA was founded two years ago in VK3 and has been going ever since. The membership has grown to around 100 subscribers spread across Australia from Perth to Tasmania. Some ZL YL's (members of WARO) are also on our waiting list. Prominent activities within LARA are the regular Monday night skeds, production of the newsletter (note quite so regularly), and of course divisional activities, VK3 being the most active. Last but not, of course, least are these columns in AR which perhaps enables us to reach a wider audience of interested YL's.

Joining in other clubs' activities, I have been pleasantly surprised to find out how well-known LARA has become. This makes up for all those Sunday mornings spent putting a LARA segment on the divisional broadcast and other such efforts. Perhaps with encouragement, those YL's who know about us could be persuaded to join in our activities or just subscribe to the newsletter which provides a YL view of the amateur world.

It has been said of LARA that we are more of a social club than a technically-oriented club. This is probably true, but although LARA's technical side is directed towards teaching newcomers and giving encouragement to those YL's sitting for exams, there is no reason why members cannot send technical items to the newsletter (or AR—Ed.) or suggest speakers for meetings. In fact the harassed editor of the newsletter could probably pounce on such things with tears of joy! As more members of LARA become qualified and licensed operators we will, no doubt, have more of a technical orientation, but at the same time there is no pressure on our new members to study an unfamiliar subject from scratch if they don't want to. Interest is more valued than know-how.

At this point it seems appropriate to extend, on behalf of LARA, our warmest congratulations to Mavis Russell who has recently gained her AOCP, and to Vicky Edmonds who has her AOLCP. Further results of exams are being awaited (impatiently).

On the social side, congratulations to VK3 member Nita Kraus whose engagement was announced recently.

And last, finally but not at all least, Happy Birthday to US!

33 LARA. ■

QSP

25th ANNIVERSARY SOUTH-WEST ZONE CONVENTION
Saturday 1st and Sunday 2nd October 1977.
Venue: Griffith —— Ex-servicemen's Oval Pavilion.

Trade Displays, VHF and HF Hunts, HF Homestead Mobile Contest, Children's Events, Tour Pioneer Park Museum, Slow Scan TV Demo, Mobile Fox, Surplus Market, Winery Tours, Ladies' Events, RTTY Demos, Vicom Static Display.

Anniversary Dinner — Saturday night.

Visit the Griffith Show before departure on Monday.

Accommodation will be scarce. BOOK EARLY. The Secretary, P.O. Box 854, Griffith, 2680.

WILL IT HAPPEN HERE?
In mid November, 2 FCC agents, 6 US marshalls and ten police officers raided a CB-ers home in Houston, Texas.

They confiscated 20 linear amplifiers ranging in power from 250 watts to a 6000 watt home-built unit using television transmitter tubes. The engineer in charge of the raid added that a group of neighbours applauded the confiscation as TV reception in the area had been disrupted.

From 73, February 1977

BONES
Someone said that the membership of every organisation is made up of four kinds of bones. There are WISH BONES who spend their time wishing someone else would do all the work. There are JAW BONES who do all the talking but very little else. Next are the KNUCKLE BONES who knock everything that everybody else tries to do. Finally there are the BACK BONES who get under the load and do all the work.

WHAT KIND ARE YOU?

From W.A. Bulletin May 1977. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN March 1977
Frequency Measuring Contests; Yet Another Electronic Keyer; Metric Standards for Copper Winding Wires; Crystal Filter; Faulty Electrical Apparatus Can Kill.

CQ March 1977
DXosis Okinawa Style; Electromagnetics Made Interesting or Cores Need Not Bore; Front Panel Adjustment for Slug Tuned Coils; A 150 Watt Switch-Mode Regulator; Build a Three-Purpose Antenna; Amateur Radio Operation from Apartments and Motels; The Multi-Band Trap Antennae—Part 2; No Harry, AM is not Dead.

CQ May 1977
VK9XX DXpedition to Christmas Island; The Multi-Band Trap Antenna—Part 4; Filament Voltage: Why it is What it is; I Am Curious, Infrared; The Slik Purse In-Line Wattmeter.

HAM RADIO January 1977
Single Sideband FM; Direct Conversion Receiver; Ground Plane Antenna; Matching Techniques for Solid State RF Power Amplifiers; Five Band SSB Transmitter; Automatic Up/Down Repeater-Mode Circuit; Simple Diode Tester; Q Measurements; Solar Power Source; Computing VSWR Indicator; Microprocessors: the Vectored Interrupt.

HAM RADIO February 1977
RX Noise Bridge Improvements; Portable CMOS Counter; Interstage 50 ohm Terminations; Fixed Frequency Receiver for WWV; ATV Callsign Generator; Custom Capacitors for Homebrew Projects; Isolating Parallel Currents in RF Amplifiers; Silver Plating Made Easy; Bandspreading Techniques for Resonant Circuits; Portable Keyer Paddle; Troubleshooting Logic Circuits; Microcomputer Interfacing; LC Circuit Calculations; IC Tone Generator.

QST February 1977
TVI Sleuths at Work; Codzila 1; A Time-Delayed Tone Decoder; Inexpensive Traps for Wire Antennas; Understanding Linear IC's; Radio Propagation and Solar Activity; Cycle 21—Four Divergent Views; TR-4C Outboard Receiver Modification; A Control System for Your Station: Simple and Economical; RTTY Distribution and Control Box; Solid State BC-221 Frequency Meter; Build This Solid State PA for 440 MHz.

QST March 1977
Hamcationing—DX Style; The CB Slider; The Equalizer; Understanding Linear IC's; Using the Heath SB-650 Frequency Display with the Yaesu FT-101; A 1296 MHz Signal Source; 50 Years Ago; Charge It. Your Nicad. That Is; Evolution of a Quad Array; A Phase-Locked 2 Metre FM Transmitter; A Second Look at Linear Tuning; Deregulation—Another Round; Getting to Know OSCAR—From the Group Up; Regulations Revisited; Centennial Catastrophe; Building for the Future.

RADIO COMMUNICATION February 1977
A 70 MHz Transistorized Transmit/Receive Converter; Improving the Selectivity of a Rebuilt HRO; RTTY—What is It?; A Low Power 80 MHz Transmitter; Some Experiments with High-Frequency Ladder Crystal Filters.

RADIO COMMUNICATION March 1977
A Third Method SSB Generator; Modifying 120/180-Line SSTV Equipment to Transmit and Receive 240/256 Line Video; Monitoring for Auroral Propagation; The Yaesu FRG7 Receiver; RTTY — Beginners' Terminal Unit.

RADIO COMMUNICATION April 1977
The G3PLX Mk. 2 RTTY Video Display Unit; Simple Alignment for Drake 4C Receiver; Amateur Television; The "Disappearing Inductance" — A New Trick and Some Better Beams.

RADIO ZS January 1977
Shoot for the Horizon; South African VHF Beacon Stations; Unknown Transistors.

RADIO ZS February 1977
A Homebrew Two Element Cubical Quad.

SHORTWAVE MAGAZINE December 1976
Digital Switching Indicator; Aerial Selector Switch; Terminal Unit for RTTY; Shack LV Power Unit.

SHORTWAVE MAGAZINE February 1977
The Other Man's Station; RAE Q & A; Thirty-first Annual MCC. ■

REPEATERS

Ken Jewell, VK3AKK
Peter Mill, VK3ZPP

FEDERAL
At the recent Federal Convention it was agreed that the recommended deviation for FM simplex nets and repeater channels will be ± 7 kHz peak.

The need for more repeater channels was referred back to th FRC as a matter of urgency.

The corrections to the repeater directory that have been received will be included when it is reprinted in the Call Book.

NEW SOUTH WALES
After consultation with the VK3 Repeater Committee, Griffith was allocated channel 5. It is hoped that base stations in the area between the Griffith and Macedon repeater areas will be responsible and not interfere with one system while operating into the other system, band openings being the exception.

VICTORIA
Bendigo has fitted audible identification. They have also been experimenting with a proportional tail, which depends on input signal strength. (The stronger the signal, the shorter the tail.—Ed.) Until the duplexer is tuned and fitted there will be an unbalance and the repeater will appear deaf in some directions. This is due to the TX aerial being on the top of the tower and the receiver aerial on the north side of the tower approximately 100 feet below.

Swan Hill have fitted a solid state repeater but are having trouble with over-heating.

East Gippland's repeater has been operating unattended for over five months using solar cells. They are having desensitizing problems but hope to fix it with a couple of filters.

SOUTH AUSTRALIA
Mt. Gambier now has a licence to test. The Rx-Tx are finished and the control and ident are nearing completion. David VK5ZOO reports that it is not another "Weetie Packet Special", hence the delays.

TASMANIA
Ulverstone is having difficulties with cavities. The repeater is finished but has been delayed by a 22 kV line falling across the 230V line. They will be using half wave dipoles.

The information in this column might appear lopsided from State to State, but we can only print what is supplied. We cannot make it up. ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

July
9/10	IARU Radiosport Championship
9/10	RAST SEANET WW DX CW Contest
16/17	Colombian Contest
16/17	10-10 Net QSO Party
23/24	County Hunters CW Contest
30/31	Venezuelan CW Contest

August
13/14	*REMEMBRANCE DAY CONTEST
13/14	European CW Contest
20/21	RAST SEANET WW DX Phone Contest
20/21	SARTG RTTY Contest
27/28	All Asian CW Contest

September
10/11	European Phone Contest
17/18	Scandinavian CW Contest
24/25	Scandinavian Phone Contest

October
1/2	*VK/ZL/Oceania Phone Contest
8/9	*VK/ZL/Oceania Contest
15/16	Manitoba QSO Party
29/30	CQ WW DX Phone Contest

COLOMBIAN CONTEST
Starts 0001 GMT Saturday July 16 and ends 2359 GMT Sunday July 17. The contest commemorates the 167th Anniversary of Colombia's Independence. All bands 3.5 to 28 MHz, phone and CW, may be used. Classes are (a) single operator single band, (b) single operator all band, and (c) multi operator single transmitter. Exchange RS(T) and a 3 figure serial number starting at 001. QSOs with HKs are worth 5 points, North America 3, other countries 2, and with same country 1 point. The multiplier is the sum of DX countries worked on each band. Final score is the sum of QSO points from all bands multiplied by the sum of different countries worked on each band.

Use separate log sheets for each band, indicate the country only the first time it is worked, and include a summary sheet showing scoring and signed declaration. Send logs by September 30 to LCRA Concurso Independcia, Apartado Postal 584, Bogota, Colombia.

SARTG RTTY CONTEST
Three periods GMT 0000-0800 and 1600-2400 Saturday, August 20, 0800-1600 Sunday August 21. Use all bands 3.5 to 28 MHz. The same station may be worked on each band for QSO and multiplier credit. Classes are single and multi operator single transmitter, and SWLs. Exchange QSO No. and signal report. QSOs with own country count 5 points, with other countries on the same continent and other continents 15 points. The US, Canada and Australia call areas count as separate countries for scoring. Each DXCC country, W/K, VE/VO and VK call area count as multipliers. Final score is the sum of QSO points times the multiplier from each band. SWLs use same scoring but based on stations and messages copied. Certificates will be awarded to the highest scoring stations in each country, US, Canadian and Australian call area.

Use a separate sheet for each band and include a summary sheet showing scoring and other essential information, and your name and address in block letters. Send logs to SARTG Contest Manager, C. J. Jansen, OZ2CJ, Maisnersgade 5, 8900 Randers, Denmark. Logs must be received by October 10.

REMEMBRANCE DAY CONTEST - 1977 - RULES

REMEMBRANCE DAY CONTEST 1977
A perpetual trophy is awarded annually for competition between Divisions of the Wireless Institute of Australia. It is inscribed with the names of those who made the supreme sacrifice and so perpetuates their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and, in addition, the winning Division will receive a suitably inscribed certificate.

OBJECTS
Amateurs in each VK call area, will endeavour to contact other amateurs:—

1. In other VK call areas, P29 and ZL on all bands 1.8 through 30 MHz.
2. In any VK call area (including their own), P29 and ZL on authorised bands above 52 MHz and as is indicated in rule 5.

CONTEST DATE
0800 hours GMT on Saturday August 13 1977 to 0759 hours GMT on Sunday August 15, 1977.

All Amateur stations are requested to observe 15 minutes silence before the commencement of the contest on Saturday afternoon. An appropriate

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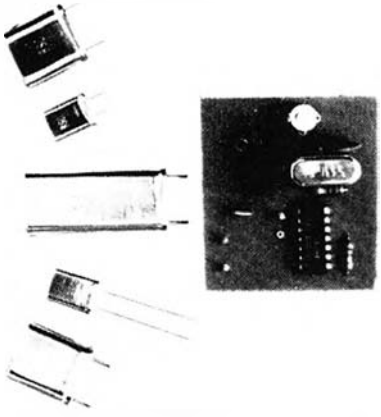

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Take the hard work out of Coil Winding, use — "WILLIS" AIR-WOUND INDUCTANCES

No.	Dia Inch	Turns per L'gth Inch	Inch	B & W Equiv	Price
1.08	½	8	3	No. 3002	99c
1.16	½	16	3	No. 3003	99c
2.08	⅝	8	3	No. 3006	$1.16
2.16	⅝	16	3	No. 3007	$1.16
3.08	¾	8	3	No. 3010	$1.40
3.16	¾	16	3	No. 3011	$1.40
4.08	1	8	3	No. 3014	$1.56
4.16	1	16	3	No. 3015	$1.56
5.08	1¼	8	4	No. 3018	$1.75
5.16	1¼	16	4	No. 3019	$1.75
8.10	2	10	4	No. 3907	$2.52

Special Antenna All-Band Tuner Inductance
(equivalent to B. & W. No. 3907, 7 inch)

7" length, 2" dia., 10 TPI **Price $4.36**
Reference: A.R.R.L. Handbook, 1961

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INTRODUCING NEW LINEAR AMPLIFIERS!

80W, 144-148 MHz, FM, SSB LINEAR AMPLIFIER 2M10-80L

HF-3-100L2 Amplifiier (new model)

Frequency Range	3-30 MHz
Input Power	10W Nom., 5-20W PEP range
Output Power	100W Nom., ±½ dB across band, 200-250W PEP output
Input Impedance	50 ohm nom., adjustable to match exciter range under 2:1 across band
Output Impedance	50 ohm nom., up to 3:1 VSWR acceptable with little degradation
Current Drain	16 A nom., 20 A supply recommended at 13.6V DC
Power Supply	13.6V DC recommended for best results, 11-14V DC acceptable positive or negative ground
Pre-amp	18 dB nom. gain across entire HF band, 15 dB typ. at 50 MHz, 3-4 dB NF
Size	19.1 x 16.5 x 8.9 cm. Weight 1½ kg

2M10-80L Amplifier

- All solid state — microstripline design.
- Broadband — requires no tuning across band.
- Variable T-R delay for SSB/CW operation.
- Full VSWR & reverse voltage protection.
- Under 1 dB insertion loss in receive or bypass mode.
- Harmonics levels typically —40 dB or better.
- Measures only 7.1x10.2x16.5cm, wt. 1kg.

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TIME CLOCK — BATTERY OPERATED — $28

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broadcast will be relayed from all Divisional stations during this period.

RULES

1. There shall be 4 sections to the Contest:
   (a) Transmitting Phone
   (b) Transmitting CW
   (c) Transmitting Open
   (d) Receiving Open.

2. All Australian amateurs (VK callsigns) may enter the contest whether their stations are fixed, portable or mobile. Members and non-members of the Wireless Institute of Australia are eligible for awards.

3. Amateurs may use these modes:
   (a) Phone
   (b) CW
   (c) RTTY
   (d) TV (fast and slow scan).

However, only one entry may be submitted for sections (a) to (c) in rule 1. An open log is one where points are claimed for more than one mode. AM, SSB and FM are grouped as one mode, i.e. Phone.

4. Cross mode operation is permitted but both stations may only claim points as for a phone/phone contact. Cross band operation is not permitted via a satellite repeater.

5. **Scoring:**
(a) On the 3.5, 7 and 14 MHz bands a station in another call area may be contacted once on each band using each mode. That is you may work the same station on each of these bands on Phone, CW, SSTV and RTTY.
(b) On the 1.8, 21, 27 and 28 MHz bands, a station in another call area may be contacted twice on each band using each mode provided that not less than 12 hours has elapsed since the previous contact on that band using that mode.
(c) Between 1600 hours GMT and 2100 hours GMT on Saturday, intra call area contacts may be made on the 1.8, 7, 21, 27 and 28 MHz bands once for each mode on each band.
(d) Between 0300 hours GMT and 0759 hours GMT on Sunday, intra call area contacts may be made on 1.8, 21, 27 and 28 MHz bands, once for each mode on each band.
(e) On the bands 52 MHz and above, the same station in any call area may be worked using any of the modes listed in rule 3 at intervals of not less than 2 hours since the previous same band/mode contact. However, the same station may be contacted repeatedly via satellite not more than once by each mode on each orbit.
(f) All CW/CW, SSTV/SSTV and RTTY/RTTY contacts count double. Note rule 3 re cross mode contacts.

6. Multi-operator stations are not permitted, although log keepers are allowed. Only the licensed operator is allowed to make a contact under his/her own callsigns. Should two or more licensed operators wish to operate any particular station, each will be considered as a contestant and must submit a log under his own callsign.

7. Club stations may be operated by more than one operator, but only one operator may operate at any one time, i.e. no multi-transmissions. All operators must sign the declaration.

8. Entrants must operate within the terms of their licences.

9. **Cyphers.** Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of 5 or 6 figures will be made up of the RS (telephony) or RST (CW) reports plus 3 figures that will be incremented by one for each successive contact. If any contestant reaches 999, he will start again with 001.

10. **Entries.** Must be set out as shown in the example, using one side of the paper only, and standard WIA log sheets if possible. Entries must be clearly marked "Remembrance Day Contest" on the envelope, and must reach the Federal Contest Manager, WIA, Box 67 East Melbourne 3002, in time for opening on Friday September 16, 1977. Early submission of logs will be appreciated.

11. **Terrestrial Repeaters.** Contacts via terrestrial repeaters are not permitted for scoring purposes. However, contacts may be arranged through the repeater and if successful on another frequency, that contact counts for scoring purposes.

12. **Portable Operation.** Log scores of operators located outside their own call area will be credited to that call area in which operation takes place, e.g., VK5XY/2. His score is added to the VK2 scores.

13. **All Logs** shall be set out as in the example shown, and in addition MUST carry a front sheet showing the following information:

Name
Address
Section
Callsign
Claimed Score
Number of contacts
Modes used
Declaration: "I hereby certify that I have operated in accordance with the rules and spirit of the contest".
Signed
Date

All contacts made during the contest must be shown in the log submitted. If an invalid contact is made, it must be shown, but no score claimed. Entrants in the "Open section must show the various mode contacts in numerical, i.e. chronological order.

14. The Federal Contest Manager has the right to disqualify any entrant who during the contest, has not observed the regulations or has consistently departed from the accepted code of operating ethics. The Federal Contest Manager also has the right to disallow any illegible, incomplete or incorrectly set out logs.

15. The ruling of the Federal Contest Manager of the WIA is final and no disputes will be entered into.

AWARDS

Certificates will be awarded to the top scoring stations in sections (a) to (c) of rule 1, in each call area, and will include the top scorer in each section of each call area operating exclusively on 52 MHz and above. Each VK, ZL and P29 call area will count as separate areas for awards. There will not be an outright winner. Further certificates may be issued at the discretion of the Federal Contest Manager.

The Division to which the Remembrance Day Trophy will be awarded shall be determined by the following formula:

Average of top 6 logs plus (1000 times total points score from all entrants from call area in sections a, b and c of rule 1 divided by the total call area licences).

VK0 scores are added to VK7 and VK8 to VK5. Scores by VK9 stations are added to the mainland call area geographically nearest. Scores claimed by ZL and P29 stations are not included in the scores of any VK call area.

Acceptable logs for all sections shall show at least 5 valid contacts. The trophy shall be forwarded to the winning Division in its container and will be held by that Division for the specified period.

RECEIVING SECTION (Section (d)

1. This section is open to all Short Wave Listeners in Australia, Papua New Guinea and New Zealand, but no active transmitting station may enter.

2. Contest times and loggings of stations on each band are as for transmitting.

3. All logs shall be set out as in the example. It is not permissible to log a station calling "CQ". The detail shown in the example must be recorded.

4. Note the times and conditions set out in rule 5.

5. Club stations may enter this section. All operators must sign the declaration.

AWARDS

Certificates will be awarded to the highest scorers in each call area. Further certificates may be awarded at the discretion of the Federal Contest Manager.

EXAMPLE OF TRANSMITTING LOG

Date/time GMT	Band	Mode	Callsign worked	RS(T) sent	RS(T) rec'd	Points

EXAMPLE OF RECEIVING LOG, VICTORIAN SWL

Date/time GMT 14 Aug 77	Band MHz	Mode	Callsign heard	RS(T) sent	Station called	Points
0612	7	P	VK5PS	58002	VK6RU	1
0615	7	CW	ZL2AZ	559004	VK4KI	4
0618	14	P	VK0ZZ	57006	VK6FI	6
0624	14	P	VK6FI	58004	VK0CB	3
1620	28	P	VK3WI	59077	VK3ZZ	1
15 Aug 77						
0750	1.8	CW	VK3YQ	599360	VK3XU	2
0754	52	P	VK3YXX	58137	VK3ZXX	1

SCORING TABLE FOR PHONE CONTACTS — ALL CW/CW, SSTV and RTTY CONTACTS COUNT DOUBLE

From	To 0	1	2	3	4	5	6	7	8	9	P29	ZL
VK0	—	6	6	6	6	6	6	6	6	6	6	6
VK1	6	—	2	3	3	4	5	4	6	5	5	3
VK2	6	2	—	1	1	2	3	2	4	4	4	2
VK3	6	3	1	—	2	1	3	2	4	4	4	2
VK4	6	3	1	2	—	3	5	4	3	3	3	3
VK5	6	4	2	1	3	—	3	2	3	5	5	4
VK6	6	5	3	3	5	3	—	4	5	5	5	5
VK7	6	4	2	2	4	2	4	—	4	6	5	3
VK8	6	6	4	4	3	3	5	4	—	3	4	5
VK9	6	5	4	4	3	5	5	6	3	—	6	5
P29	6	5	4	4	3	5	5	5	4	6	—	5
ZL	6	3	2	2	3	4	5	3	5	5	5	—

Read table from left to right to work out points for the various call areas.

ALL INTRA-CALL AREA CONTACTS ON 52 MHz AND ABOVE, OR AS INDICATED IN RULES 5(c), (d), and (e) are worth one point.

IONOSPHERIC PREDICTIONS

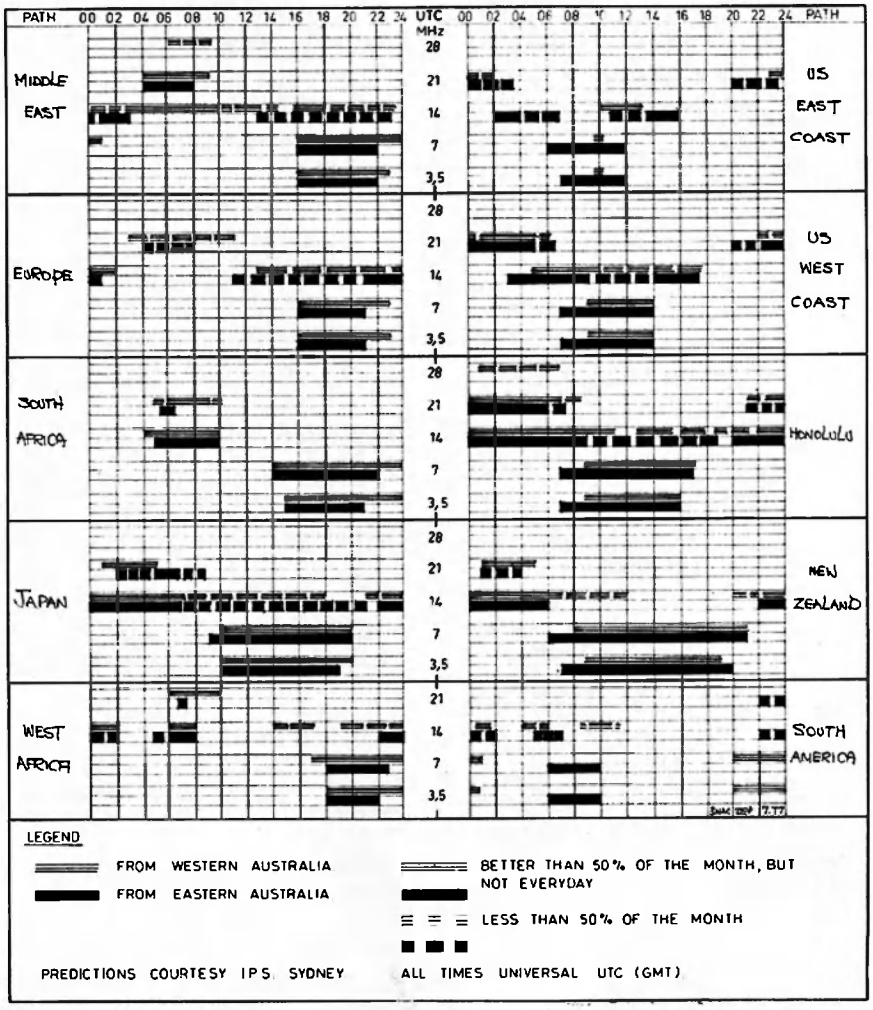
Len Poynter, VK3ZGP/NAC

For the statistically minded we have now gone through the sunspot— minima in July 1976 with a running smoothed number of 12.4. Generally, so far as solar activity was concerned, 1976 was the year of lowest activity with some very active periods and some very inactive periods.

The brighter side is that conditions are on the improve and it has brought to light some very interesting propositions as to how the new cycle will perform. Of course whilst you have experts you have diverse theories and of course in proportion — projections. In February 1977 QST an interesting article appeared challenging the projections of many experts in as much that cycle 21 could be equally as good as cycle 19 — remember that big one back in 1958? Let me qoute the final paragraph of the article. "Many other estimates of the upcoming solar activity have been that it will be much lower than the last cycle, which peaked in 1968. If this were to be true, the 6 metre band would be effectively unuseable for F-layer DX, and the 10 metre band would be marginal, at the best, a good part of the year. Our analysis indicates that the next cycle of solar activity MAY even soar above the 1957 level. If this happens the 6 metre band will be useful for F-layer distances for a record period in time. A more cautious estimate still places the level of activity for the new cycle well above the 1968 peak, as frequent openings would be expected."

A summary of some authoritive estimates for cycle 21. Gliessberg of the Astronomical Institute of West Germany. Cycle 21 to peak between 5/79 and 5/80 with a mean between 56 and 96. Cohen and Linz predict the next maximum at around 55. Smith G8KG predicts cycle 21 to equal at least cycle 20 and could even reach 150. Hill, of the Naval Electronics Laboratory Centre in San Diego, predicts cycle 21 to begin in late 1976 and at its maximum to reach at least 130 and possibly as high as 200 (refer to the previous quotation).

Naturally there are as many predictions as there are researchers in the field of solar activity. Summing up they range from a low 40 to a high 200. It is important to realise that solar research is still a new science. Important data pertaining to solar effect on HF communications are still awaiting discovery. It is stated that a common misunderstanding lies in the belief that sunspots are the CAUSES of changes in band conditions. There is something else that is responsible for these changes but as yet science has not discovered what that "something else" is. Awaiting that discovery, we still use the sunspot number tool for determining general band conditions on a long term basis.



It's going to make interesting study over the next four to five years just how the whole range of theories will result. But the new cycle is definitely on and conditions generally are improving so make DX while the sun shines.

Predictions of smoothed monthly sunspot numbers: July 18, August 19, September 20, October 21, at May 2 1977.

Sunspot data courtesy Dr. Waldmeier, Swiss Fed. Observatory, Zurich. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Craters SA, 5152

WAA AWARD (Brazil)
General

1. The award is available to licensed amateurs.
2. Contacts from November 1945 are valid.
3. Do not send OSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society, a Radio Club Officer or a notary public.
4. All contacts must be made from the same call area, or where no call area exists, from the same country. Also, if the licensee moves to another country and changes call sign then all contacts must be made within a radius of 150 miles (240 km) of the original location.
5. There is no fee for the award. It is suggested that 2 or 3 IRC be sent to help defray expenses.
6. The address for applications is:

Labre,
Post Box 2353,
ZC00 Rio de Janeiro GB,
Brazil.

Requirements:
Confirmed contacts are required with 45 of the countries in the countries list:
C, CE0—Easter Island.
CE0Z—Juan Fernandez.
CE0X—San Felix.
CM$CO, CX, FG7, FM7, FO8, FP8, FS7, FY7, HC, HH, HI, HK, HK0—San Andres and Providencia.
HK0—Malpelo.
HK0—Bajo Nuevo.
HP, HR, K$W, KC4—Navassa.
KG4, KL7, KP4—Swan.
KS4—Serrana Bank.
KV4, KZ5, LU, OX, PJ—N. Antilles.
PJ—Sint Marten.
OA, PY, PY0—F. de Noronha.
PY0—St. Peter and St. Paul's Rock.
PY0—Trinidade e Martin Vaz.
PY0—Abrolhos.
PZ, TG, TI, TI9, VE, VO, VP1, VP2A, VP2D, VP2E, VP2G, VP2K, VP2L, VP2M, VP2S, VP2V, VP7, VP8—Antarctica.
VP8—Falkland.
VP8—S. Georgia.
VP8—S. Orkney.
VP8—S. Sandwich.
VP8—S. Shetland.
VP9, XE, XF4, YN, YS, YV, YV0—Aves Is.
ZF1, ZP, 6Y, 8P, 8R, 9Y. ■

AROUND THE TRADE

R. H. Cunningham Pty. Ltd. have advised that they are the sole Australian agent for the Watkins Johnson Company of the USA.

One of the latest receivers available is the WJ8888 HF synthesised receiver covering 500 kHz-30 MHz with digital readout.

The receiver is designed for the reception of AM, FM, CW, SSB emissions. Up to 6 IF bandwidths may be selected via front panel push-button switches. The seven digit LED readout resolution of the display is 10 Hz over the entire tuning range. Front panel controls include main tuning, IF bandwidth select, gain mode, detection mode incl. ANL, select RF gain, ISB audio select, audio level, squelch and variable BFO control.

QSP

CJ PREFIX
To help celebrate the centennial year of Japanese-Canadians DOC has authorised the use of the prefix CJ in lieu of VE or VO by all Japanese-Canadian radio amateurs during 1977. QST March 1977.

QSP

VALVES

"It is predicted that the price of small tubes will soar as a result of reduced competition, and the high prices for these items are already being felt in the US . . . Like it or not, semi-conductors are here." An article in March 1977 QST about the downturn in valve manufacture which has resulted in the closure of several US tube plants.

USA REPEATER CONDITIONS

QST March 1977 details and comments on FCC docket 21033 which proposes further deregulation of amateur repeaters. Amongst the items are such things as 10 minute identification intervals instead of 5 minutes, allow repeaters on all amateur frequencies except 435-438 MHz and revise the rules which emphasise that a station occupying a frequency has first priority to the concept that all frequencies must be shared.

CANADIAN PROPOSED RESTRICTIONS

DOC proposed regulation amendments seek control over the sale and use of external RF power amplifiers and of emergency beacons for 121.5 and 243 MHz. One paragraph prohibits use of devices to boost the output of a CB station. Emergency beacons were intended for use by downed aircraft and sinking ships only, but having been purchased by hunters and others, there have been inadvertent operations and false alarms increasing enormously with corresponding increases in expenses to search and rescue units. April 1977 QST.

OSCAR 8

"In order to maintain the many ongoing amateur satellite programs, especially the Education Program that brings the excitement of live satellite communications into schools across the US and Canada, another OSCAR should be launched as soon as possible. ARRL has agreed to reimburse AMSAT for $50,000 of its development and construction costs for AMSAT-OSCAR D provided the spacecraft achieves the desired orbit and functions properly. Additionally, the League will take over licensing and operational management. With ARRL's backing the eighth amateur satellite should meet its November launch schedule, while allowing AMSAT volunteers to continue work on the revolutionary Phase III satellite." Extracts from a report in April 1977 QST.

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,

IS AN AMATEUR AN AMATEUR?

This letter is written after a considerable time spent recently in solitary confinement in a forestry fire watch tower. There will be no apologies made to anyone as I am a firm believer in speaking one's mind (and allowing others to speak theirs). Intermingled with my comments is a random sprinkling of veiled extracts from various reputable and not quite so amateur-oriented magazines.

I will not quote the very tired and never ending dictionary versions of the words "ham or amateur" as I am sure that everyone has had so much of this philosophy that it becomes almost laxative by nature. For those who insist on that extra reassurance, I refer you to the very excellent definition in the "Handbook for Operators of Radio Stations in the Amateur Service". Do you fill the definition?

FINANCIAL

To continue with my thoughts, I ask a seemingly more and more important question of my fellow amateurs. Who amongst you are at all interested in electronics (and has not married money) has a bank balance to speak of? If our commercial benefactors had their way, I am sure that they would have everyone out working eight days a week in order to finance a new "Super Gizmo Mk. 2" for some project or another.

DOGMATISM

My next observation is that of the skill demonstrated by some of being dogmatic to the extreme, until some action is required on that particular subject and suddenly there exists a void in place of the abundance of never ending verbage. To these people, I can do but one thing, and that is to offer the gambler's philosophy of "Put up or shut up". Surely you must realise that not only do you damage your own personal standing within our ranks but to the service in general.

The above comments are not intended to imply that a person is not entitled to a viewpoint, but before plying your fellow amateurs with it, be prepared to give your backing to your philosophy. No one in their right mind would suggest that thoughts and philosophies should be inflexible, however a large number of people in this regard are as reliable as stable prices in some of our supermarkets.

LICENCE JUSTIFICATION

Not many amateurs can honestly say that they have had even a mediocre sense of technical achievement recently, and I do not mean the thrill or otherwise of operating your store bought appliance. Further to that last point, if you, like a large majority (myself included) own or operate a commercially manufactured device, could you explain in detail just how it works stage by stage? I would not go so far as to say that you should be able to do all the repairs, as quite often this requires test equipment not available in quite a large number of shacks. Even so, is it not time you justified your technical existence?

ON AIR MANNERS

My next subject is that of "on air" manners. This not only applies to the communal frequencies, i.e. repeaters, but all bands that are available to us. Quiet often a comment is made by a person in the course of a conversation that is not directly in line with the thoughts of a listener. There exists in our friendly society, along with the castrated ducks, cats and other forms of on air jamming, the individual who insists on overriding a discussion to air his own point of view without being asked, and equally unfortunately, with a goodly dose of anonimity.

To those people, along with the radio snob who will not talk to another station in particular unless put in a situation where it is impossible to get out of, I will not offer humanitarian pity as you do not deserve it. Here I think that eventually even though you are causing discomfort to others, you will surely bring about your own downfall in the time to come.

Further on the subject of manners, quite often during discussions on air, someone will come up and call for a "break" between overs of the the stations concerned. How many times have you heard the stations concerned tell the breaker to go ahead just in case there is some urgent traffic, or is the breaker acknowledged and the conversation continued regardless? Don't fool yourself, it happens all the time.

COMMUNICATION

In the course of operating your station, have you ever asked yourself whether or not you are communicating or are you just talking at someone? So many times I have heard large lumps of syllabic garbage that has absolutely no relation or bearing on the conversation at hand. Now this brings me to the point of how often or how long has it been since you went out of your way to help or to try and understand the interests of your fellow amateurs? There are so many and varied interests and fields to specialize in that one can become involved with, that it would be impossible to be conversant with them all. However, it is surprising how much you can learn once you listen and learn to communicate. It is surprising just how much that can be learned if one takes or makes the effort.

RADIO RATBAGS

My next victim in this crusade is the cause of amateur radio's equivalent of golfing's grass widow, and here I refer to the radio ratbag. This individual is usually completely devoid of life's responsibilities around him and anything that does not further his slave like attitude to his master just does not interest him. Perhaps this is extreme, but how many times have you asked your good lady (or other) to do something for you and it has been done straight away and without hesitation? How many times has your good lady, child or other, asked you to do some task and you have said "OK in a minute", which by the way will invariably turn into hours or in some cases not be done at all. On this particular point, I think that we are all guilty at some time or another but it is certainly a point worth watching. Just remember, amateur radio is a communicating disease not necessarily a communicable one.

PARASITES

This following section is dedicated to the radio parasite. It would appear that there is an ever growing number of these do-nothing self confessed fence sitters, who do nothing except sit at home, and offer nothing to the service that, like it or not, they are part of. The time has come for concerted effort to remove both the parasites and the paranoid types from the system. Firstly, in order to remove the parasites who do nothing for amateurs in general, perhaps we (all amateurs) should be required to prove to the relevant authority every two years that we are indeed technically competent and capable of justifying the piece of gear that adorns the wall of the shack. By this suggestion the implication is that if an individual cannot prove satisfactorily that he is competent in at leastt one of amature radio's facets, his licence to operate in the medium could be held in obeyance for a period of say twelve months while the person concerned has the opportunity to rectify the situation. If, however, this is not possible, then the licence could be suspended. This would have two effects:

1. Provide adequate incentive for amateurs to keep with it.

2. Ensure that only people genuinely interested in this self-educating medium remain.

To remove the paranoid from our ranks is for all intent and purposes impossible, however, it is by members carefully considering the various people that are voted to office and then allowing them to do their appointed tasks that these types will eventually have a minimal effect on our organsation. So next time you exercise your democratic rights to vote, vote for the person whom you honestly believe will do his best for the service in general, not just you.

CONCLUSION

If you have read this far, you deserve an explanation of why this letter was written and not just scrawled by a madman orator. While on the surface of things it would appear that I am attempting to defile, malign and otherwise belittle the amateur service, I truly believe that unless some of these things are brought forward in such a manner, complacency in some people will reign supreme. Furthermore, it was written to create comments (adverse or otherwise) and to hopefully instill a desire in as many people as possible within our ranks to at least think and ask themselves whether or not with all of their convictions they are being honest with themselves and above all else, do the scales of give and take come to rest unfalteringly on the give side? I hope for all our sakes they do.

Ian Foster VK3YJI, Watts Road, Nicholson, 3882, Victoria.

The Editor,

Dear Sir,

With regard to the John Moyle Memorial Field Day contest. We, the Wagga and District Radio Club, would like to express our disappointment regarding the overall activities and also the scoring system.

Under the club call sign VK2WG, we took the trouble to find a mountain which would give us suitable coverage for VHF. The site chosen was a mountain some 20 miles east of Tumut, and some 80 miles from our home town Wagga Wagga. This site was chosen after it had been proved in the mid-winter field days when stations in Sydney were worked on channel 40 FM with 8 watts into a five element beam. So believing the John Moyle contest to be the contest of the year, and most certainly the event of the year for our club, we made the effort to participate as a portable station.

During the 24-hour period which we operated the Dural beacon could be heard at all times but this did not mean that stations would answer our CQ on 144.1 MHz. If it wasn't for the Simplex FM channels and the VK1 boys our score would not have been anywhere near what it was.

The following was discussed by our club executive:

1. The scoring system as it is gives no incentive for any operator to even try. If one set up on the State border and worked stations just a few miles away, one can score far more than someone working 200 miles. We feel some change is needed in this area.

2. The mid-summer contest is too close to the John Moyle contest and these could be combined using the same set of log sheets. Alternatively have them further apart.

3. Publicity for the contest seems to be lacking and we feel more could be done in this area.

4. Apathy of amateurs. We cannot find the answer to this one, but perhaps the publicity angle might help.

It is the club's view that if there is no change, VK2WG/P will not be heard at all on the next John Moyle Field Day. This will not only be one less portable station on air but one less activity for this club to participate in, which we all look forward to. This is unfortunate as it is club activities like this which hold the club together.

I hope this letter does not create any ill feelings by the volunteers who do such good work checking logs, etc., but as one can appreciate it is not much fun not seeing some result for the effort which we put into the contest.

Hoping something can be done to improve the contest in the future.

Yours faithfully,

J. R. Brill, President,
Wagga and District Radio Club. ■

QSP

NEW ZEALAND

According to reports in Break-In, April 1977, there were 4,915 licensed amateurs at 31-12-1976. The NZART membership at the same date included 2,686 transmitting members, 394 non-transmitting and 231 overseas. The Society ended the year with a deficit of $4,319. The largest single item of expenditure was the net cost (after deducting advertising revenue, etc.) of Break-In at $19,526.

20 YEARS AGO

Ron Fisher, VK3OM

JULY 1957

With the exception of part three of Gordon Bowen's Modifying the AR7, all technical articles in the July 1957 issue of Amateur Radio were reprinted from American magazines. They did however reflect the thoughts of the time. The first, "Single Sideband: Is It Better than Amplitude Modulation?", written by W2CRR, argues that the real answer is DSB with suppressed carrier. The reasons he concludes are: 1. SSB has no power advantage. 2. SSB will not reduce interference. 3. SSB is much harder to generate. Well, what do you think?

If you have ever had thoughts about tracking pirates the next article could be worth a glance. "The Snoop-Loop", a portable DF loop designed for the ten metre band but adaptable to almost any frequency, was described by Claude Maer W0IC, and reprinted from QST.

"The Evils of Multiband Antenna Systems — And the Cure". Lew McCoy W1ICP shows how to build up simple band pass filters that will eliminate harmonic radiation. Again reprinted from QST.

On the Editorial page, Federal Executive philosophize on the subject of "Learning". Naturally in reference to Radio Amateurs and newcomers in particular.

The SWL section was now under the direction of a well known Victorian listener, Ian Hunt. Ian has since shifted to South Australia and now holds the call sign VK5QX. ■

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

KRACO Mobile 11 Mx (CB) Txcr — 23 Ch., SSB/AM, one month old, all accessories, perfect condx., $210.00. Hills Telomast 50', unused, with 150 Mx guy wire, 18 turnbuckles, thimbles, $55.00. Hy Gain 204BA 20 Mx Yagi, $140.00. Cushcraft A147-4 combination horiz/vert 2 Mx Yagi — 10 elem. each almost new, $50.00. B. Bathols VK3UV, 6 Ann Court Aspendale, 3195. Ph. (03) 90 6424 (evenings).

Omega-t noise bridge. Unused, $15. RPC 3C speech compressor, built in AC supply, works very well, $15. Sony TC66 cassette recorder, with all accessories, as new $30. Astatic D104 mike, $5. Low-pass filter, ARRL design, $5. Kyoritsu solid state GDO, 400 kHz to 220 MHz, $25. Heathkit HP23E AC power supply, suit SB or HW series transceivers, $25. VK3OM, QTHR. Ph. (03) 560 9215.

Power supply 12V 3 amp, commercial, Little Dick, $20.00. Ph. (058) 52 1636. VK3TG, QTHR.

Drake TR4-C Transceiver, complete with PSU, xtal-cal, noise blanker, in new first rate condition. National Panasonic cassette recorder, as new, Model RQ-222AS. Keith. Ph. (03) 570 7592.

Digital Freq. Meter with high freq. divider, Electronics Australia, $80. AM Transceiver, suit Novice, 80, 40, 20 and 10m, home made, $95. VK3YBR, QTHR. Ph. (03) 795 2792.

QQE06/40, QQE03/20, 829B valves and sockets; QQE02/5, 6146 valves, UM2 modulation transformer; Pye 9 MHz SSB filter with crystals. Star SR700A ham band valve Rx 80m to 10m and 10 to 10.6, 10.6 to 11.2 MHz, 600 kHz segments, 1 KC readout, AM FM SSB, provision for extra segments. Offers and further details: VK2BQJ, QTHR. Ph. (02) 642 0122 bus.

Some 5 Channel Friden Flexowriters. These units are built around an IBM Model "B" electric typewriter, they have a five channel paper tape reader, a five channel punch, keyboard and page printer and work on Baudot code. Operate off 110V 50 Hz, have external socket and plug for external communication, no circuit or information, ideal for RTTY experimenters, $50 each. VK3BJB, QTHR. Ph. (03) 560 2804.

Complete Sellout. KWM 2A Collins Transceiver W/AC matching P/S. Collins 32S 3A Transmitter with W/AC matching supply 75S 3C Receiver. TH6 DXX Tri-Band Super Beam 10-15 duo band beam. Down to earth prices for gear in mint condition. Ph. (03) 24 1232 or AH (03) 509 8637.

6LQ6 Tubes. 10 brand new at $5 each plus postage, 2 used 10 hours, $3 each. Eric Blerre VK2BEK. Ph. (02) 476 5096 after June 26th.

Type 3 Mk 2 Trans/Rec, 80-40-20m, 25W CW, 10W AM, xtal controlled 115-250V AC 6V DC, works well, $50. AWA MR6A low band FM T/R, unmod., single channel, good condition, $20. Don VK2ADY, QTHR. Ph. (067) 65 8664.

70 ft. Crank Tower, h. duty rotator and 2m long yagi, $200. HP524P counter with 100 MHz plug-in $85. Swan 500C incl. external 508 VFO, VOX unit and mobile PSU, $450. Shure 404C microphone, $25. Ian Foster VK3YJI. Ph. (051) 58 8311.

Complete Station. 18 months old, package deal only. TS520 transceiver, FL2500 linear, Hy Gain DB24B antenna, Ham II rotator, leader monitor CRO, Drake watt-meter W4, Heathkit dummy load, frequency meter, digital, electronic keyer, paddle key, $1000 the lot. Will not sell separately. VK4PO. Ph. (07) 399 8660.

Kyokuto Transceiver, 144 to 148 MHz, five months old, perfect condition, $275. Ph. (02) 759 3354.

Complete Station. Yaesu FRDX400/FLDX400/FLDX 2000. Excellent condition, handbooks, matching speaker, $750. VK3BAX, QTHR. Ph. (052) 95 949 or 97401 AH.

SB101, 10 to 80m Heathkit SSB transceiver, not working, external power supply, speaker box and transceiver cabinet etc. In very good condition. Transceiver needs work done to it, $150 the lot. Ph. Bert (03) 42 5312, AH (03) 758 4086.

1 Barlow Wadley Rx XCR1-30 mark, $175. 1 Drake SSR1, $250. Both under warranty. D. Deerman, 222 Barry St., Charleville, 4470.

One Philips type SVC 100L, manufactured for US Navy. Freq 1.9 MHz to 21 MHz continuous plug-in units, good for RTTY, all ceramic TNS high Q circuitry. Final 813 with 2 match, manual, large auto transformer, AC mains, 90 to 260A, $220. Also over 200 tubes. VK5LC, QTHR. Ph. (08) 71 6841.

70 ft ex DCA tower (self supporting), can be erected to any height to 70 ft; dismantled and with [illegible] $300. Hy-gain TH6DXX 6EL tri-band beam as new, fully manual, $200. VK2DD, QTHR. Ph. [illegible]46 6365.

[illegible]cts hybrid quad antenna, 6-10-15 and [illegible]ond, DX performance, $85; HRO-M RX, BS [illegible] to 30 MHz, C/W 697 P/S, $95; 40W CW T[illegible] to 30 MHz, self contained, $45; Weston model E772 analyzer test meter, 20,000 ohms/volt DC, $40; low voltage bench P/S, 6V to 15V, variable 50 mA output, S/C protected, $25; Woden UM1 modulation transformer, $12; transistors JAN2N657, $4; JAN2N1490, $12. Please add little extra for freight. VK2BFJ, 90 Wyong Rd., Killarney Vale, NSW, 2261. Ph. (043) 32 5758.

Galaxy HF 10-80m, 440 W input SSB transceiver, with Galaxy remote VFO, Galaxy speaker console, AC supply, mic, owner's manual, exc cond, very reliable transceiver, manufactured in USA, $475. Geoff Davey. Ph. (02) 389 6616 Bus., (02) 337 6379 A.H.

Atlas 210X, 80 to 10 NB, brand new, in carton, latest model, $550. Trio 9R59 RCVR, very good cond, gen cov, $120. Cliff VK2VK. Ph. (065) 52 2722.

SSTV Monitor, with waveform checking facility, assembled from local EMD club kit, brand new and professional appearance. For sale at half the price of the components, $125. VK3AOH, QTHR. Ph. (03) 49 6224.

DX160 communications Rx, in as new condition, $140 ONO. Ron VK1PM, 74 Brereton St., Garran, ACT. Ph. (062) 82 1154.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. L. A. KELSALL **VK2AKV**
Mr. THOMAS D. HOGAN **VK3HX**

FT101, ex VK-3AXU. Contact C. A. Cullinan, 7 Bunbury St., Newport, 3015. Ph. (03) 652 7245 Bus.

FT101 Mk 2 (same as FT101B), 10m to 160m, very good cond, complete with mic, English instruction manual, AC and DC power cords, original packing, $500. VK3SB, QTHR. Ph. (03) 550 3521.

Amateur radio and electronic text books, vertical antenna mast, morse key with oscillator and a large variety of radio components, $150. L. Walton, 26 Northam Rd., East Bentleigh, 3165. Ph. (03) 57 7766.

Complete station, FT101/E with CW filter, mic, etc., 14 AVQ antenna, must sell, going overseas, $620. VK2AYD, QTHR. Ph. (02) 452 1623.

Collins Inverter, solid state, 28V DC to 115V AC, 400 Hz at 100W, type 488A-2, C/W circuit, power plug suits 618T-3, $50, ONO. VK7KW, QTHR. Ph. (003) 44 2761.

FT401B plus matching speaker and Yaesu desk mic, and second cooling fan, good cond and incl all Yaesu documentation, $400. VK3ADL, 98 Nimmo St., Middle Park, 3206. Ph. (03) 699 9584.

Yaesu FT101B, exc cond, all accessories, $575; Gemtronics GTX3325 CB txcvr, SSB/AM, $150; IC502 6m SSB 3W PEP txcvr, $175; IC215 2m FM 3W txcvr, repts 2-8, Simplex 37, 40, 49, 50, 51, 65, $200; AWA MR6A car phone conv to 6m FM, 25W output, with 52.525 and 52.656 MHz, $80; TCA 6m AM txcvr, with 53.032, 53.100 and 52.900 MHz, $40; Hanimex RX, AM, CB, FM, AM, tunes to 160m, $19; Midland 13/698 CB 1W txcvr, brand new with chs. 11 and 14, $42; Panoramic adaptor, sig corps, BC1031A, 40; 2 transformers, 26-0-26V at 30 amps, and 10V at 5 amps, $25 for both. Contact L. Curling VK3NM, QTHR. Ph. (03) 88 3710 (after hours), (03) 329 7888 (business hours).

WANTED

Information or references on the subject of transistor aging. VK7EM, QTHR.

Crystals for Traeger Novice 3570, 4025, 3540, 3995 kHz or advice where is cheapest source. Rodney VK4NBC, 15 Alice St., Dalby, 4405. Ph. (074) 62 1294.

Small HF Transceiver for mobile use. Atlas, Swan or similar, S/S unit. Small triband HF yagi rotator. Don VK2ADY, QTHR. Ph. (067) 65 8664.

FT401/560/570 type transceiver. Particulars to VK3OM, QTHR or phone (03) 560 9215.

AR April, May, June, July 1958; October, November, December 1965; January, March, July, 1967. VK2BQJ, QTHR. Ph. (02) 642 0122 bus.

Commercial Digital Frequency Counter, also AM/FM signal generator, Marconi TF 995B/5 or similar. Please advise details and price to VK5ZTT, Box 261, Mt. Gambier, 5290.

HF Transceiver, second hand, good cond, up to $400. Preferably FT200, FT101, Swan, etc. Wanted for new YL Novice Licensee. Please contact Steve VK2BGL, QTHR. Ph. (047) 54 1096.

50 ft self-supporting, crank-up, tilt-over tower. Price and details to Mike VK1VW, 13 DeChair St., Deakin, ACT. Ph. (062) 81 1312.

I would be interested in hearing from anyone who has constructed, is constructing or is considering constructing any of the multimode transceivers as described in the Plessey publication "SL600 Series Transceiver Applications" and similar publications. G. Cross VK2ZZZ, 28 Havelock St., Mayfield, 2304.

Old-timer, inactive since 1947, making come-back and would appreciate any unwanted copies of AR, CQ, QST and the like. No matter how old. Will be thankfully received and all postal charges incurred will be refunded. Mac Cormack VK2ARK, 149 Albury St., Harden, 2587.

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TRIO KENWOOD model TS-820S AC only 160 to 10 M with digital readout. $980

TRIO KENWOOD model TS-820 AC only 160 to 10 M. $850

TRIO KENWOOD model MC-50 Microphone. $ 49

TRIO KENWOOD model TS - 700 - A FM-AM CW-SSB transceivers. Full 144-148 MHz coverage, 10-Watt output, VFO controlled, self-contained, AC-DC operation. $650

TRIO KENWOOD model TS-600-A FM-AM. SSB transceiver full 50-54 MHz coverage 10 Watt output variable from 1 Watt to full power. VFO controlled AC-DC operation. Styling as TS-700-A. P.O.A.

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All above HF transceivers will be modified for low cost to suit novice. Requirements 27 MHz conv. x-tals in stock now for Kenwood models

Universe 224 model 15 watts pep 23 channel AM SSB for as low as $215

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ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz $215

ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz. $215

FDK MULTY QUARTZ with 24 channels 10 sets of crystals supplied 10 Watts, new style. $265

YAESU MUSEN model FT-101-E AC-DC transceivers 10 to 160 M with speech processor $800

YAESU MUSEN model FT-301. $960

YAESU MUSEN model FT 301 - D $1140

YAESU MUSEN model FT - 301 - S $660

YAESU MUSEN model FL-2100-BLineal Ampl. $525

YAESU MUSEN model FP - 301 $165

YAESU MUSEN FR 6-7. Uses Wadley loop princ. $300

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YAESU MUSEN model YC-500-E-S-J P.O.A.

AUSTRALIA'S SOLE DIST. OF KLM PRODUCTS

KLM SOLID STATE POWER AMPLIFIERS

(MHz) 144-148	PA10— 80BL	80	OUTPUT (watts)
"	PA10—140BL	140	"
"	PA10—160BL	160	"
(MH "	PA 2— 70BL	70	"
400-470	PA10— 70CL	70	"
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	PA 2— 25BL	25	Watts P.O.A.

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14AVQ 10-40M. verticals, 19' tall, no guys	$ 65
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HY-QUAD 10-15-20 cubical quad Yagi 8' boom	$250
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HW-80, 6' long for 80 M.	$ 28
HW-40, 6' long for 40 M.	$ 25
HW-20, 6' long for 20 M.	$ 23
Swivel mounts & chrome-plated springs for all	$ 13

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A147-11 11 Element 2 M Yagi	$ 45
A147-20 combination horizontal vertical 2 M	$ 70
A144-20 combination Yagi with matching harness circular polarization	$ 75

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Model CDR Ham-11 for all hf beams except 40 M	$200
Model CDR AR-22 L junior rotator for small beams	$ 65
KEN model KR-400 for all medium size hf beams with internal disc brake	$110
KEN model KR-500 for vertical control of satellite tracking	$110

All models rotators come complete with 230-volt AC indicator-control units.

6-conductor cable for KR-400-500 65 cents per metre

COAX CABLE CONNECTORS

PL-259	$1.20
SO-239 Chassi Mount	$1.20
Male to male joiner	$1.20
Female to female joiner	$1.20
Angle connector	$1.70
T-connector	$2.00

COAX CABLE

RG - 8 - U foam filled per metre $1.20

SWR METER

Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality	$ 28
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SSR-1 Receivers	$270

CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals. Soon Avail.

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All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over $100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded.

Sideband Electronics Sales

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OPEN ON SATURDAYS TILL 12 NOON

TELEPHONE: 521 7573

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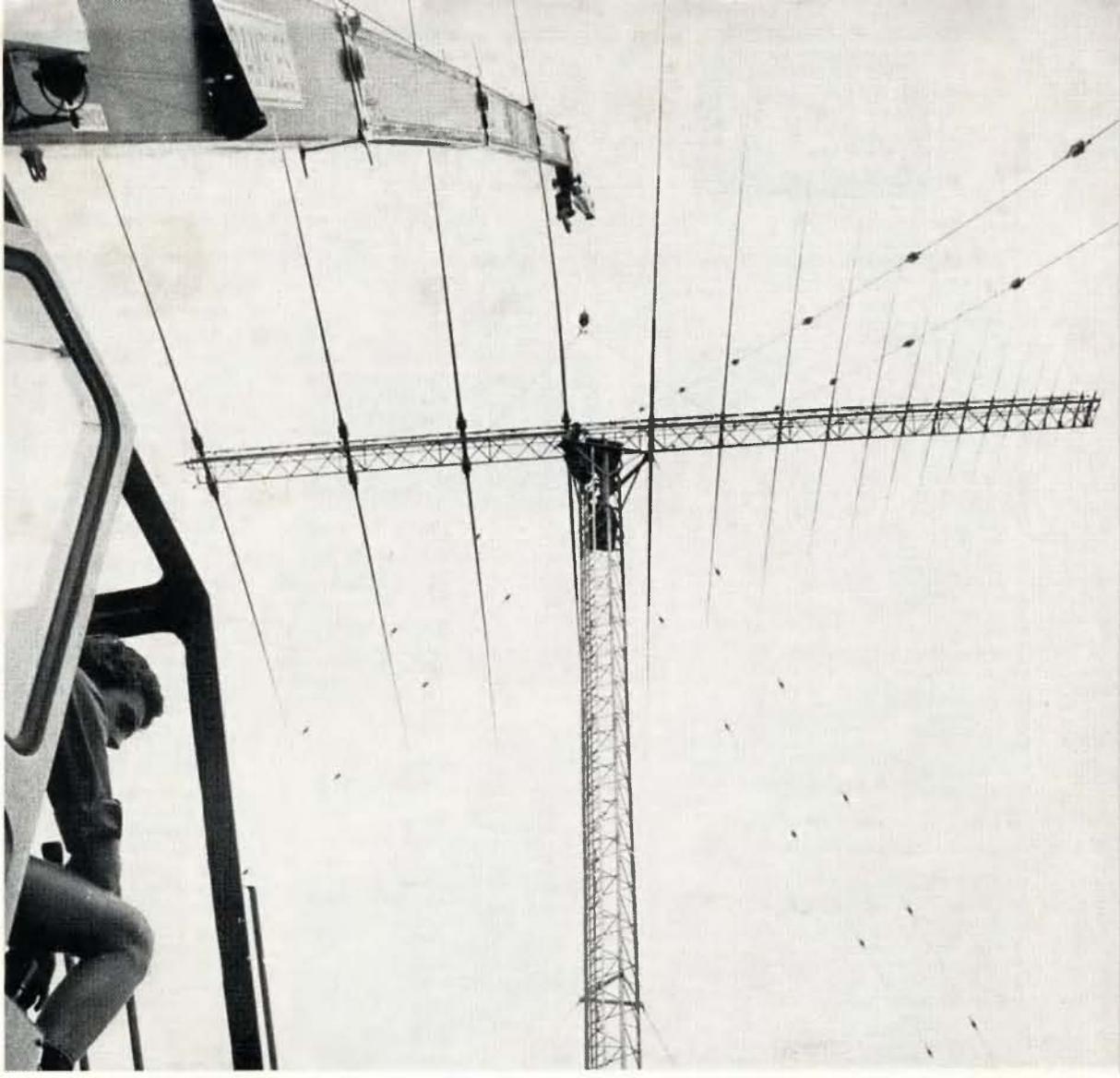
amateur radio



VOL. 45, No. 8 AUGUST 1977

CONTENTS

COVER PHOTO

Is this the antenna you have always wanted? If so, you will need a big back yard or very agreeable neighbours. The 19 element log periodic array is one of two erected recently at the Army's radio receiving station at the Greenbank camp, on Brisbane's southern outskirts. The elements are mounted on a 22m boom. The distance between tips of the longest elements is 24.3m. Two cranes were used to erect two 30.4m towers. The work was done by the antenna construction troop of the 127th Signal Squadron, based at Ivanhoe, Melbourne. If you want this antenna, the cost of the Australian designed unit complete is $36,000. And these are for receiving only.

Photo by Queensland Newspapers Pty. Ltd.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

MODEL OL64 D/P MULTIMETER. Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB. Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available, Model C $6.90.

$29.90 Postage $2.20

E.E.I. PORTABLE RADIO

AM/AIR VHF

SPECIFICATIONS:

Freq. Range: AM530-1600 kHz, AIR (VHF) 108-174 MHz. **Intermed. Freq.:** AM 465 kHz, FM 10.7 MHz. **Output:** 450 mW max. **Speaker:** 2½" permanent—magnetic dynamic type, 8 ohm. **Power Source:** DC — 6V (4 x UM3 Penlite) or equivalent. **Semiconductor:** 10 trans., 7 diode. **Dimensions:** 8½" (W) x 4½" (H) x 1-7/8" (D)

$18.90 — Postage $1.40

MODEL AS100 D/P MULTIMETER

This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.

SPECIFICATION: 1000,000 ohm/volt DC. 10,0000 ohm/volt AC. **DC Volts:** 0.3, 3, 12, 60, 120, 300, 600, 1,200. **AC Volts:** 6, 30, 120, 300, 600, 1,200. **DC Amps:** 12 uA, 6 mA, 60 mA, 300 mA, 12A. **Ohms:** 2k, 200k, 2m, 20m, 200m ohm. **Centre Scale:** 20 ohm, 2,000 ohm, 20,000 ohm, 200,000 ohm, 20m ohm. **Decibel** —20 to +57 db. **Dimensions:** 7-3/5 x 5-2/5 x 2-3/5 ins.

Carrying case for model I — $7.90.

Price: $52.50 — Postage $2.20.

MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL C.B. TRANSCEIVER

- **WITH CALL SYSTEM**
- **EXTERNAL AERIAL CONNECTION**

SPECIFICATIONS, NC-310

Transistors: 13.
Channel Number: 3, 27.24 OMHz Citz. Band.
Transmitter Frequency Tolerance: ± 0.005%.
RF Input Power: 1 Watt.
Tone Call Frequency: 2000 Hz.
Receiver type: Superheterodyne.
Receiver Sensitivity: 0.7 uV at 10 dB S/N.
Selectivity: 45 dB at ± 10 kHz.
IF Frequency: 455 kHz.
Audio Output: 500 mW to External Speaker Jack.
Power Supply: 8 UM-3 (penlite battery).
Current Drain: Transmitter: 120-220 mA.
Receiver: 20-130 mA.

Price: $105.00 — Postage $1.40

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THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER

The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

$328

SOLID STATE 19 TRANSISTOR MULTI-BAND RADIO — 9 RANGES

AM, SW, FM, VHF, AIR, PB
BATTERY-OPERATED
COLOUR CODED 9 BAND DIAL

1. AM 535 to 1600 kHz. 2. Marine 1-5 to 4 MHz. 3 & 4. Combined SW 4 to 12 MHz. 5. 30 to 50 MHz. 6. 88 to 108 MHz. 7, 8 & 9. Combined VHF Aircraft 145 MHz-174 MHz incorporating weather band.

Slider control, Dial light, Fine tuning control, Flip-up Time Zone map, Telescope antennas complete with batteries.

SPECIAL PRICE **$65** Post Pack $3.00

MULTI-BAND RADIO

SPECIFICATIONS:

Circuit: 16 Transistors, 15 Diodes, 1 Varistor and 2 Rectifiers.
Frequency Range: AM 535-1605 kHz, FM 88-108 MHz, TV1 56-108 MHz, TV2 174-217 MHz, AIR/PB2 110-174 MHz and WB 162.5 MHz.
Power Source: AC 240 Volts 60 Hz 4 Watts, DC 6 Volts.
Power Output: 350 mW (max.) 250 mW (undist.)
Dimension: 9⅜" x 3¾" x 8".
Weight: 4¼ lb. (approx.)
Supplied Accessories: Earphone, Batteries (4 size D).

$49.00 — Postage $2.50

HANIMEX AM/CB/FM SOLID STATE PORTABLE RADIO Model 2818

OWNER'S GUIDE — Operating Instructions.

SPECIFICATIONS:

Semiconductor Complement:
22 Solid State Devices (11 transistors, 11 diodes).

Frequency Range:
AM540-1600 kHz, CB channel 1-40, FM 88-108 MHz.

Intermediate Frequency:
AM/CB 455 kHz, FM 10.7 MHz.

Output Power:
300 mW Maximum, 10% Distortion 200 mW.

Speaker:
3" 8 ohm Dynamic.

Power Source:
Battery 6V "A-A" size.

Antenna:
AM Ferrite Bar Antenna, CB/FM Rod Ant.

Dimensions:
7" Height x 3.5" Width x 1⅞" Depth.

Weight:
1 lb. (without Battery).

$27.90 — Postage $1.50

E.E.I. SOLID STATE CAR RADIO

MW BAND
PUSH-BUTTON TUNING

SPECIFICATIONS:

Power Supply: 12 V DC
Receiving Frequency: MW 520KC (580M) — 1640KC (183M)
Intermediate Frequency: 455KC
Audio Output: 4.5W
Transistors: 8, diode 4
Speaker: 5" Permanent Dynamic 4 ohm
Sensitivity: Less than 20 uV at 20 N/S
Selectivity: More than 25 dB at ± 10 kHz detuning
A.G.C.: More than 45 dB at 1,000 kHz
IF Rejection: More than 40 dB at 600 kHz
IM Rejection: More than 50 dB at 1,400 kHz
Cabinet Dimension: 1-7/8" (H) x 6-1/5" (W) 4-1/8" (D)

$35.90 — Free Post

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a truly portable communications receiver, based on the WADLEY LOOP principle, the same principle as applied in the DELTAHET and RACAL receivers. A truly crystal-controlled highly sensitive multiple-heterodyne portable receiver of exceptional stability with continuous, uninterrupted coverage from 500 kHz to 31MHz.

All for **$310.00** F.O.R.

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amateur radio

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50-52 Islington Street, Collingwood, 3066
Tel.: 41-5054, 41-5055

QSP — 1977 CALL BOOK

The 1977 WIA Australian Radio Amateur Call Book is the first of a long series to utilise computer data.

This is the culmination of many years of investigation into the practicability of the scheme.

It was not until the readout from the computer could be produced in a form of sufficient quality to be acceptable for printing that the go-ahead could be given.

It was agreed with the P and T Department that our WIA membership lists could be used to produce the addresses.

In the case of non-members, the listings provided by the Department have been fed into the computer.

A number of apparent anomalies immediately showed up, and steps have been taken to eliminate them as far as possible.

However, we are confident that our own records are as accurate as the members themselves will let them be, because no one wants to miss AR.

We cannot be as confident with those of the non-members.

In conclusion, it must be emphasised that now the total amateur call sign listing is on the computer file, it will be much easier to maintain accuracy, given time to eliminate the quirks.

D. A. WARDLAW VK3ADW,
Federal President. ■

WIRELESS INSTITUTE OF AUSTRALIA

Federal President: Dr. D. A. Wardlaw VK3ADW

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Part-time: Col. C. W. Perry, Mrs. J. M. Seddon and Mr. T. Cook (AR advertising).

Executive Office: P.O. Box 150, Toorak, Vic., 3142. 2/517 Toorak Rd, Toorak, Ph. (03) 24 8652.

Divisional Information (all broadcasts are on Sundays unless otherwise stated):

ACT:
President — Mr. S. W. Grimsley VK1VK
Secretary — Mr. D. J. Farquharson VK1ZDF
Broadcasts— 3570 kHz & 146.5 MHz: 10.00Z.

NSW:
President — Mr. T. I. Mills VK2ZTM
Secretary — Mr. I. A. Mackenzie VK2ZIM
Broadcasts— 1825, 3595, 7146 kHz, 28.5, 52.1, 52.525, 144.1, Ch. 8 and other relay stations: 01.00Z. (Also Sunday evenings 09.30Z and Hunter Branch, Mondays 09.30Z on 3570 kHz and ch. 3 and 6).

VIC.:
President — Mr. A. D. Kerr, VK3JQ (Acting)
Secretary — Mr. J. A. Adcock VK3ACA
Broadcasts— 1825, 3600, 7135 kHz — also on 6m, 2m SSB and 2m Ch. 2 repeater: 00.30Z (Also on Radio 3CR Mondays 10.15 and 3HA).

QLD.:
President — Mr. D. T. Laurie VK4DT
Secretary — Mr. P. Brown VK4PJ
Broadcasts— 1825, 3580, 7146, 14342 kHz: 0.900 EST.

SA:
President — Mr. C. J. Hurst VK5HI
Secretary — Mr. C. M. Pearson VK5PE
Broadcasts— 1815, 3550, 7125, 14175 kHz, 146.5, 145.7, 146.8 (ch. 4), 431.965 6m and 2m (Ch. 8): 09.00 SAT.

WA:
President — Mr. R. Greenaway VK6DA
Secretary — Mr. N. R. Penfold VK6NE
Broadcasts— 3600, 7080, 14100, 14175 kHz, 52.656 and 2m (Ch. 2): 01.30Z.

TAS.:
President — Mr. R. K. Emmett VK7KK
Secretary — Mr. H. E. Hewens VK7HE
Broadcasts— 3570, 7130 kHz: 09.30 EST.

Postal information:
VK1 — P.O. Box 1173, Canberra, 2601
VK2 — 14 Atchison St., Crows Nest, 2065 (Ph. (02) 43 5795 Tues & Thurs (10.00-14.00h).
VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 41 3535 Sat 10.00-12.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001
VK5 — G.P.O. Box 1234, Adelaide, 5001 — HQ at West Thebarton Rd., Thebarton (Ph. (08) 254 7442).
VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (incl. with VK5), Darwin AR Club, P.O. Box 1418, Darwin, 5794.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.

WIANEWS

SPECIAL ANNOUNCEMENT

As this edition was going to press, the Postal and Telecommunications Department announced that Novice licensees had been allocated the frequencies of 28.1 to 28.6 MHz, effective from the 6th July, 1977.

It was further announced that all amateur radio operations within the existing 11 metre allocation (26.96 to 27.23 MHz) would cease as from 26th July, 1977. (See reproduced letter on page 6.)

The Institute, however, has been very active in seeking adequate compensation in relation to this band. The Institute has also been extremely active concerning other matters affecting, or likely to affect, radio amateurs by the introduction of CB. Those who are interested can rest assured that all the necessary homework has been done.

The Institute has never been an opponent of CB but it has stated on numerous occasions that proper controls are essential.

The general view is that a percentage of CB-ers will feel the need to expand their interests beyond the narrow confines of their service. The present Novice licence in amateur radio is seen as the logical step to cater for this expanded interest.

As a result, a great number of new Novice classes by WIA and other organisations have come into being, and in this field the very popular correspondence courses run by the Westlakes Radio Club, and others, show how the increasing need is being filled and, indeed, the extent of that need. The Novice examination statistics will reflect this expansion more and more. The number of enquiries about Novice licensing continues to grow and interest in the WIA sponsored trial Novice examination will increase correspondingly.

The introduction of the CB service on 1st July will affect the future of the Australian amateur service most severely unless the P and T Department can increase its staffing needs.

CB will affect radio amateurs in more ways than one. CB frequency allocations are published elsewhere in this issue.

CANBERRA LAND SITE

The Federal Treasurer prepared a financial statement about the Canberra land site proposals received from the very active and well-informed ACT Divisional Committee and circulated this to Divisions.

Replies received indicate that, owing to the magnitude of the initial sum to be found, and because of our comparatively small membership, the scheme has been considered premature at the present time. The detailed work is on file for future reference.

EXECUTIVE

Because of changed business commitments, Mr. W. E. J. Roper had to resign from the Executive. His place has been taken by Surgeon Rear Admiral S. J. Lloyd, whose transfer interstate in the near future has been re-scheduled.

PUBLICITY

Chris Long has been involved for some time with historical amateur recordings, general items of historical interest, production of amateur segments for commercial radio stations and Victorian Division broadcasts. He has now agreed to undertake similar work for the Executive and his active interest in general publicity for the WIA should prove extremely valuable when he has become accustomed to the broader issues involved. As the red background "800" recruiting folder stocks have now become exhausted a fresh edition is to be prepared for issue as early as possible.

INTERSTATE VISIT

The Federal President intends to pay an official visit to Western Australia towards the end of August. He is most anxious to meet as many VK6s as possible in Perth, Albany and other nearby centres during his short stay. He has also promised to attend the 25th SW Zone Convention in Griffith, NSW, during the first weekend in October and hopes to meet as many amateurs there as possible.

RETIREMENT

It is sad to record the retirement on health grounds of Mr. H. S. Young from the central office of the P and T Department. It is understood that Mr. D. Williamson is acting in the post. Throughout this decade, Horrie, as he is known to everyone, has been a tower of strength and advice for the amateur service under such conditions of change as have been seldom seen in amateur circles. Everybody will join together in wishing him a speedy recovery and a long and happy retirement. He will be giving the RD Contest opening address this year. ■

VICTORIAN NOVICE AMATEUR EXAMINATION — 1977

REPORT OF EXAMINER

The April 1977 Trial Novice Examination was the first held by the YRCS in Victoria. It has been a great success and will be repeated annually or bi-annually from now on; the next Trial Exam is scheduled for April 1978. There were 61 candidates. The pass rates in the examination were as follows:

Theory section, 46%; Regulation section, 48%; Telegraphy section, 19%.

Only 15 per cent of candidates passed in all sections. This low pass rate was largely caused by the high failure rate in Telegraphy Receiving.

Theory scores ranged between 28 and 96, with a mean value of 64.9. Facility values (percentage correct on each item) ranged between 15 per cent and 92 per cent. The weakest area was the section on AC circuits, especially reactance and resonance which are not well understood.

Regulations scores ranged between 20 and 97, with a mean value of 66.2. Facility values ranged between 30 per cent and 98 per cent, and the weakest area was the section on the "Q" code. This should be remedied, since the "Q" code questions are very heavily weighted.

The Telegraphy Sending pass rate was 77 per cent, but the Receiving pass rate was only 18 per cent. Lack of adequate practice in receiving morse is the largest weakness of Novice candidates.

The above is only a very incomplete version of the full examiner's report, which takes a detailed look at the problems of candidates and should be useful to all Novice Instructors. The full report will be published in the next issue of Zero Beat magazine, which will be available from YRCS headquarters in all States.

Every indication is that the Trial Exam greatly improved candidates' chances, so prospective Novices and Novice instructors in Victoria are strongly advised to make use of this service. ■

Happy faces show relief that CW exam just finished.

QSP

20th JAMBOREE-ON-THE-AIR 1977

The 20th Jamboree on the Air will be held over the week-end of 15th-16th October, 1977. Suggested starting time is 00.01 hours LOCAL time on Saturday 15th to terminate 48 hours later, i.e. 23.59 hours LOCAL time Sunday, 16th October, 1977. These are suggested times only; many stations find it more convenient to operate on the Friday evening and each station is completely free to select its own times and periods for operation. However, we suggest that there is a better chance of finding overseas stations if the suggested times are followed.

Local regulations must be strictly adhered to. It is suggested that you look for stations around the official World Scout Frequencies.

	Phone	CW
80 m		3.590 MHz
40 m	7.090 MHz	7.030 MHz
20 m	14.290 MHz	14.070 MHz
15 m	21.360 MHz	21.140 MHz
10 m	28.990 MHz	28.190 MHz

Listen before you call "CQ Jamboree" to ensure that the frequency is not already in use. Listen between overs to ascertain if overseas and other stations are endeavouring to contact you!

This year's participation certificate uses a symbol borrowed from New Zealand. This symbol was used in a "Come Alive" campaign some two or three years ago and is particularly appropriate for use in JOTA.

PLEASE NOTE: This year the World Bureau will operate under the call sign F0AA (Fox Zero Alpha Alpha) from the village of Ferney-Voltaire in France, just across the border from Geneva. With the support of the CERN and International Amateur Radio Clubs, and of the Verney-Voltaire Scouts, operation will be on all bands and modes for the full 48 hours of the event. It is also hoped to have an OSCAR satellite communication station in operation.

From Noel Lynch VK4ZNI

1977 CALL BOOK

The WIA 1977 Call Book should be available by the time you read this. Obtain your copy now from your Division. The cover price is $2.85, but postage and packing are extra — say 45 cents to be on the safe side. Bulk supplies are obtainable direct from the Executive office. Details about the call signs to be allocated to CB-ers became available too late for this issue but it is understood they will be issued in the following series — NA0001 up for NSW and ACT, PAA001 up for Tasmania, QAA001 up for Queensland, SAA001 up for South Australia and NT, VAA001 up for Victoria and WAA001 up for Western Australia. It is believed that the P and T Department will not be issuing lists of CB calls.

SATELLITES

A number of amateurs in this part of the world have expressed interest in a rumour that the USSR has launched, or is about to launch, an amateur satellite carrying a 2m to 10m band transponder. It is said that the transponder will be switched on from a date commemorating an advance in space technology — the possibility of a date in October has been mentioned. In the absence of any official news we must now wait and see.

WIA CORRESPONDENCE STOP PRESS

Commonwealth of Australia
POSTAL AND TELECOMMUNICATIONS DEPARTMENT
GPO BOX 5412CC, MELBOURNE, VIC., 3001

Reference: RB4/4/5
Telephone: 602 0151

Mr. P. B. Dodd — 6/7/77.
Secretary
Wireless Institute of Australia
PO Box 150
TOORAK, VIC., 3142.

Dear Sir,

Reference is made to your letter of 10 June 1977, requesting permission for novice amateur licensees to use the frequency band 28.100 MHz to 28.600 MHz.

I am pleased to advise that, effective forthwith novice amateur station licensees are authorised to use the frequency band 28.1 to 28.6 MHz for transmissions in accordance with conditions applicable to novice amateur stations in the 3.525 to 3.575 and 21.125 and 21.200 MHz bands.

I must also confirm telephoned advice to the President of the Institute, Dr. Wardlaw, that, because of the introduction of the Citizens Radio Service, the band 26.96 to 27.23 MHz will be withdrawn from the Amateur Service during the period that the Citizens Radio Service is authorised to operate in this band. As you know, the Government has already decided that from June 1982 CB radio will operate exclusively on the Ultra High Frequency (UHF) band.

I must also confirm that the withdrawal will become effective on 26 July 1977.

Individual licensees will be informed by mail of the abovementioned changes as soon as possible but I would be grateful if publicity could also be arranged through avenues available to the Institute.

Yours faithfully,

(Signed) J. WILKINSON for Secretary.

RADIO TELETYPE

Jostein Gjerde LA7MC

Reprinted and translated from consecutive issues of "Amator Radio" — published by the Norwegian Radio Relay League.

PART 8

AN AUTOMATIC T/R CIRCUIT FOR ALL TYPES OF RTTY CONVERTERS

If you enjoy operating VOX then you will want KOX for RTTY.

This is the final article in the series.

You will have noticed that we have not gone into further details in this series of RTTY converters ST-5 and ST-6. ST-5 has been described in SHARG news and this seems to be the best and most interesting of the converters now available. ST-6 is of course, very good, but it includes many automatic parts which you, for the present, have no use for, so long as you have not settled on a call frequency. If you have so settled, you could set the receiver on this frequency with the auto-start system on, so that the machine starts and writes when someone calls. You would then also be able to receive messages without being present, when the transmission took place.

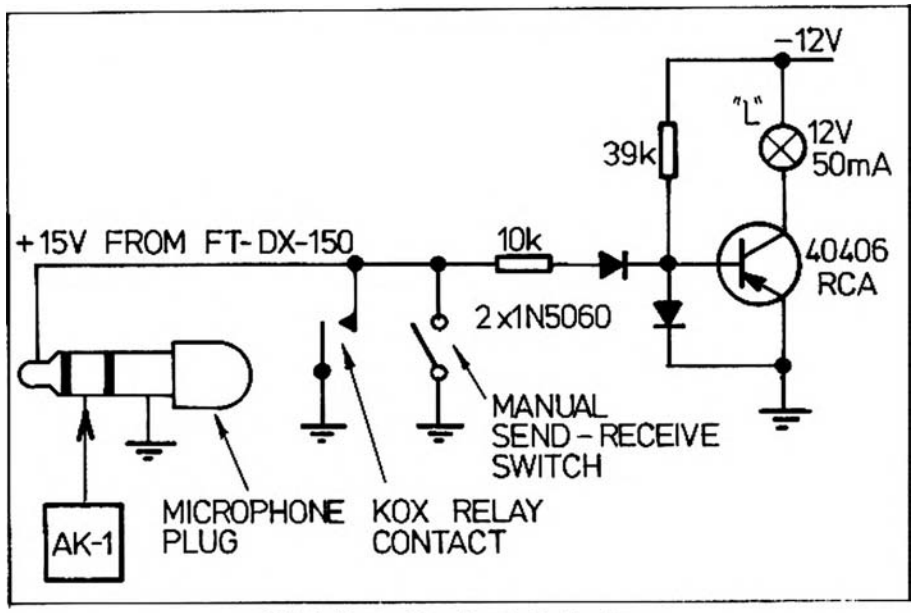


FIG. 2. Connection of an Indicating Lamp.

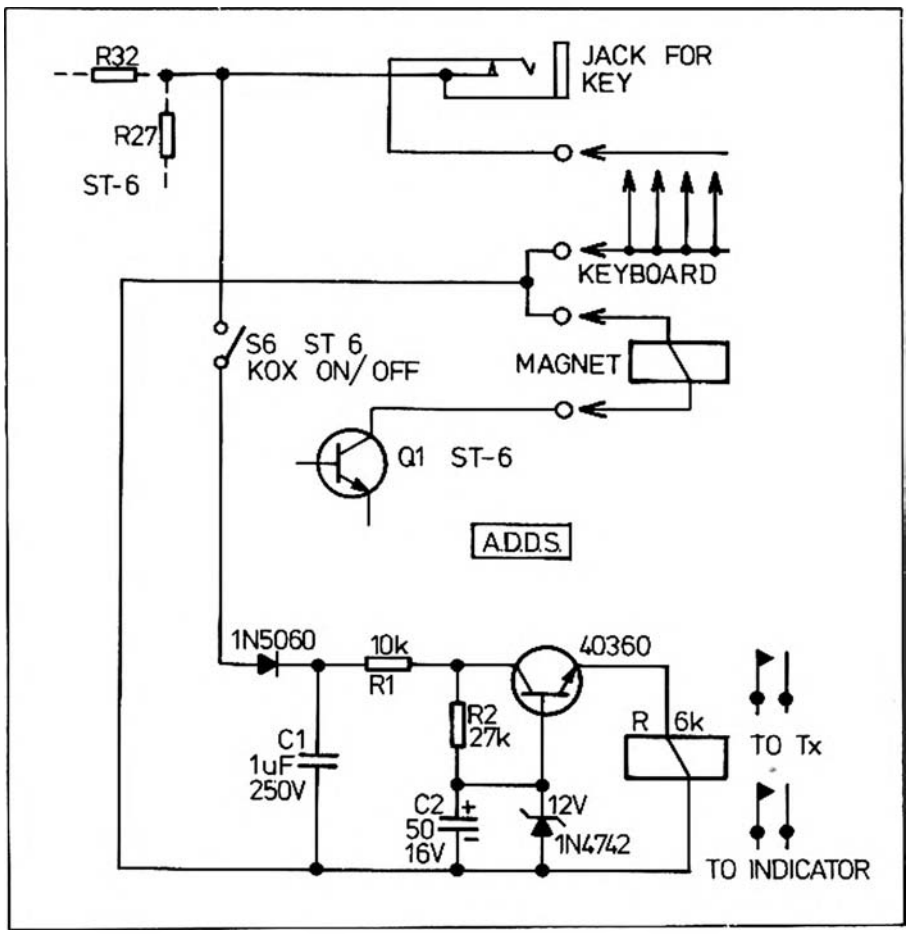


FIG. 1. KOX Operation Circuitry for use with ST-6 Converter.

(There are established nets on most HF bands and also on 2 metres.—Ed.)

KOX CIRCUIT

KOX, or key operated transmission, is a similar arrangement for RTTY as VOX is for SSB. That is to say, when you begin to transmit or type on your own keyboard, the transmitter will start by itself. There have been published many KOX circuits in magazines which explain the way you take a little of the keying voltage, amplify it and use it to drive the transmitter relay.

In respect of the popular converts ST-5 and ST-6 you run into difficulty with such a coupling. These converters use a so-called "floating loop". This will make it necessary that all voltages in the loop are keyed if you type yourself or receive signals through the receiver.

During reception the KOX should of course not operate. I have tested out a KOX coupling which is able to operate independently of which converter you use, and it is transistorised or valve operated.

Across the key contacts — keyboard or machine transmitter — there is a network which discharges itself slowly out through a relay (see Fig. 1). As soon as you begin to type the relay closes and "hangs" a little while after you stop typing. The "hang" time you can adjust by varying the size of C2. During reception both the keyboard and machine transmitter are short-circuited and there can, naturally, be no voltage across the network.

DRAKE® C-Line Amateur Equipment

$775

Drake R-4C

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. In addition to the ham bands, tunes any fifteen 500 kHz ranges between 1.5 and 30 MHz, 5.0 to 6.0 MHz not recommended. Can be used for MARS, WWV, CB, Marine and Shortwave broadcasts.

Superior selectivity: 2.4 kHz 8-pole filter provided in ssb positions. 8.0 kHz, 6 pole selectivity for a-m. Optional 8-pole filters of .25, .5, 1.5 and 6.0 kHz bandwidths available.

Tunable notch filter attenuates carriers within passband.

Smooth and precise passband tuning.

Transceive capability; may be used to transceive with the T-4X, T-4XB or T-4XC Transmitters. Illuminated dial shows which PTO is in use.

Usb, lsb, a-m and cw on all bands.

Agc with fast attack and two release times for ssb and a-m or fast release for break-in cw. Agc also may be switched off.

New high efficiency accessory noise blanker that operates in all modes.

Crystal lattice filter in first i-f prevents cross-modulation and desensitization due to strong adjacent channel signals.

Excellent overload and intermodulation characteristics.

25 kHz Calibrator permits working closer to band edges and segments.

Scratch resistant epoxy paint finish.

Drake MS-4

Drake MS-4 Matching Speaker for use with R-4, R-4A, R-4B and R-4C Receivers. (Has space to house AC-3 and AC-4 Power Supplies).

$685

Drake T-4XC

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. Four 500 kHz ranges in addition to the ham bands plus one fixed-frequency range can be switch-selected from the front panel.

Two 8-pole crystal lattice filters for sideband selection.

Transceives with the R-4, R-4A, R-4B, R-4C and SPR-4 Receivers. Switch on the T-4XC selects frequency control by receiver or transmitter PTO or independently. Illuminated dial shows which PTO is in use.

Usb, lsb, a-m and cw on all bands.

Controlled-carrier modulation for a-m is compatible with ssb linear amplifiers.

Automatic transmit-receive switching. Separate VOX time-delay adjustments for phone and cw. VOX gain is independent of microphone gain.

Choice of VOX or PTT. VOX can be disabled by front panel switch.

Adjustable pi network output.

Transmitting agc prevents flat-topping.

Meter reads relative output or plate current with switch on load control.

Built-in cw sidetone.

Spotting function for easy zero-beating.

Easily adaptable to RTTY, either fsk or afsk.

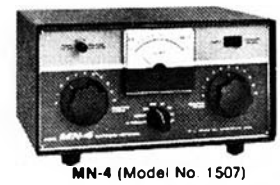
Compact size; rugged construction. Scratch resistant epoxy paint finish.

High Pass Filters for TV Sets

provide more than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.

Drake TV-300-HP
For 300 ohm twin lead **$13**

Drake TV-75-HP
For 75 ohm TV coaxial cable; TV type connectors installed **$17**



$165

MN-4 (Model No. 1507)

$310

MN-2000 (Model No. 1509)

Drake MN-4 & MN-2000 Matching Networks

• **Integral Wattmeter** reads forward power in watts and VSWR directly; can be calibrated to read reflected power • **Matches 50 ohm transmitter output** to coax antenna feedline with VSWR of at least 5:1 • **Covers ham bands** 80 thru 10 meters • **Switches in or out** with front panel switch • **Size:** 5½"H, 10¾"W, 8"D (14.0 x 27.3 x 20.3 cm). MN-2000, 14⅜"D (36.5 cm).
• **Continuous Duty Output:** MN-4, 200 watts; MN-2000, 1000 watts (2000 watts PEP) • **MN-2000 only:** Up to 3 antenna connectors selected by front panel switch.

TVI Filters

Low Pass Filters for Transmitters

have four pi sections for sharp cut off below channel 2, and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm. SO-239 connectors built in.

Drake TV-3300-LP

1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as TV front-end problems. **$3**

Drake TV-5200-LP

200 watts to 52 MHz. Ideal for six meters. For operation below six meters, use TV-3300-LP or TV-42-LP. **$32**

Drake TV-42-LP

is a four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input.

$19

Prices shown include Tax

Write, 'phone or call for technical information.

ELMEASCO Instruments Pty. Ltd.

P.O. Box 30, Concord, N.S.W. 2137.
Telephone: 736-2888.
Melbourne: P.O. Box 107, Mt. Waverley, Vic. 3149.
Telephone: 233-4044.
Adelaide: 42-6666; Brisbane: 392 2884.
Perth: 25-3144.

I prefer to have an indicator lamp which will light on the converter when the transmitter is in use. If I had used a manual switch with an extra contact set and a relay with extra contact set in the KOX, I could have used the extra contacts to pass current directly to an indicator lamp. I did not have this and therefore used the coupling shown in Fig. 2. When the transmitter is not keyed, there is a voltage of +15 volts at the key-point in my transceiver (Sommerkamp FT—DX—150). This voltage blocks the transistor and the lamp is unlit. There is a protective diode from the base of the transistor to earth to protect the transistor in case the keyed voltage is higher. Many transistors do not tolerate fairly high voltages in the blocking direction for the base/emitter diode.

When you have used KOX a while on RTTY you will see that it is an absolute necessity and will not manage without it.

Notes: This final article is marked "With this article finishes, **for the present,** this series on RTTY".

It could be that later numbers of the ARRL's "Amator Radio" may have continued the series. We hope you have enjoyed them.

RTTY operators may like to send a sketch of their favourite circuits or a photograph or two of their gear, K. ■

CITIZENS BAND FREQUENCY ALLOCATIONS

The Postal and Telecommunications Department Radio Frequency Management Division has issued booklet Ref. No. RB14 concerning the conditions covering the licensing and operation of the Citizens Radio Service.

Frequency allocations are as follows:—

HF CHANNELS

Maximum Transmitter Power Output — 4 watts (AM), 12 watts (PEP, SSB).

Ch. No.	Frequency MHz	Remarks
1	27.015	
2	27.025	
3	27.035	
4	27.045	
5	27.065	Suggested Emergency Calling.
6	27.085	General Calling.
7	27.095	
8	27.105	
9	27.115	
10	27.125	
11	27.135	
12	27.155	
13	27.165	
14	27.175	
15	27.185	
16	27.195	
17	27.205	
18	27.225	

The above allocation for the Citizens Radio Service is temporary only, and is effective from 1st July, 1977, to 30th June, 1982, when all CB operations within this band will be required to cease.

UHF CHANNELS

Transmitter output power — 5 watts Pm.

Ch. No.	Frequency MHz	Ch. No.	Frequency MHz
1	476.425	21	476.925
2	476.450	22	476.950
3	476.475	23	476.975
4	476.500	24	477.000
5	476.525	25	477.025
6	476.550	26	477.050
7	476.575	27	477.075
8	476.600	28	477.100
9	476.625	29	477.125
10	476.650	30	477.150
11	476.675	31	477.175
12	476.700	32	477.200
13	476.725	33	477.225
14	476.750	34	477.250
15	476.775	35	477.275
16	476.800	36	477.300
17	476.825	37	477.325
18	476.850	38	477.350
19	476.875	39	477.375
20	476.900	40	477.400

Remarks: Channels 1 to 10 and 36 to 40 may be used without restriction.

Channels 11 to 35 will be available to the Citizens Radio Service at a date to be announced.

Note: The UHF segment is not an amateur band and amateur operations within the above segment are not permitted.

Licensing details, etc., are available from the above booklet RB14, obtainable from the Radio Branches.

We stress that amateur operators are not permitted to work Citizen Band stations without first obtaining the appropriate CB licence (cost $20 per CB unit). Naturally the normal distress regulations apply. ■

THE MAN BEHIND THE MICROPHONE

Pictured here is Perc Anderson VK3PA, operating in his shack at Wallington, near Geelong. Perc has been active for almost 50 years on all bands from MF to VHF. Although officially retired, Perc leads an active life in the community.

Perc may be regularly heard as Net Controller of the ANZA net (3 p.m. EAST daily on 14.138 MHz), and as Pacific DX Net Controller on Fridays (0600 UTC on 14.265 MHz).

Although now mainly active on 20 metres with his FTDX570, FL2100B, TH6 combinations, Perc maintains a regular sked each week on 80 metres. A speech compressor is used to add punch to the signal and an SB610 monitor and YC-355D frequency counter ensure that not only is the signal clean but also right on frequency.

First licensed in August 1928, Perc was the first VK to use a class B modulator on the MF broadcast band. Many listeners will still recall his fine AM broadcast band signals during 1931-39. When he discusses these past days a certain nostalgia is apparent when valves such as the 201, 210 and 46s are mentioned.

The spacious shack is set in a very well kept garden which produces not only attractive blooms but also prize-winning vegetables. ■

QSP

MURPHY AGAIN!!

Some readers are probably aware that the captions under the photographs on page 16 of July AR were reversed.

We try, but you can't win them all.

—VK3UV.

ANTENNA MEASUREMENTS

This article explains in a simple manner what is involved in achieving accurate results in a field of measurement competitions which have quately understood. It is particularly relevant to the antenna gain masurement competitions which have become a popular feature of some VHF conventions and rallies. The original article was supplied by VK3ATN and is reprinted from "The Victorian VHF'er of February 1973.

Of all the measurements made in amateur radio communications systems, perhaps the most difficult and least understood is the measurement of antennas. For example, it is relatively easy to measure the frequency and CW power output of a transmitter, the response of a filter or the gain of an amplifier. These are all what might be called "bench" measurements because when performed properly all of the factors which influence the accuracy and success of the measurement are under your control. In making antenna measurements however, the "bench" is now your back yard. In other words, the environment surrounding the antenna can affect the results of the measurement. Control of the environment is not at all simple as it was for the "bench" measurement because now the "bench" may be rather spacious. The purpose of this report will be to describe antenna measurement techniques closely allied to those employed in an antenna measuring event or contest so that the measurements can be made successfully and with meaningful results. Hopefully, these techniques will provide a better understanding of the measurement problems resulting in a more accurate and less difficult task.

SOME BASIC IDEAS

An antenna is simply a transducer or coupler between a suitable feedline and the environment surrounding it. In addition to efficient transfer of power from feedline to environment, an antenna at VHF-UHF is most frequently required to concentrate the radiated power into a particular region of the environment. Because of the shorter physical wavelength at VHF-UHF as compared with HF, it is entirely practical and desirable to use antennas which concentrate almost all of their radiated power into a small region of the environment. This type of antenna is generally referred to as a *beam antenna.*

In order to be consistent in comparing different antennas it is necessary that the environment surrounding the antenna be standardized. This standard environment is referred to as *free space.* Ideally then, measurements ought to be made with the measured antenna so far removed from any environmental effects that it is literally in outer space, a very impractical situation. The purposes of the measurement techniques is therefore to simulate under practical conditions, a controlled nearly *free space* environment. At VHF-UHF and with practical size antennas, the environment can be controlled so that successful and accurate measurements can be made in a reasonable amount of space.

The electrical characteristics of an antenna which it is most desirable to obtain by direct measurement are:

1. Gain (relative to an isotropic source which by definition has a gain of unity).
2. Space radiation pattern.
3. Feed point impedance (mismatch) and,
4. Polarisation.

These characteristics will now be dealt with but in reverse order from that given above.

1. In general the polarization can be assumed from the geometry of the radiating elements. That is to say, if the antenna is made up of a number of linear elements (straight length of rod or wire which are resonant and connected to the feed point) the polarization of the electric field will be linear and polarized parallel with the elements. If the geometry of the elements is not consistently parallel with each other then the polarization cannot be easily assumed. This report will be directed to antennas whose polarization is essentially linear although the techniques can be extended to include all forms of elliptic polarization.

2. The feed point mismatch, although affected to some degree by the immediate environment of the antenna, does NOT affect the gain or radiation characteristics of an antena. That is to say, if the immediate environment of the antenna does not affect the feed point impedance, then any mismatch intrinsic to the antenna tuning reflects a portion of the incident power back to the source.

In a receiving antenna this reflected power is radiated back into the environment "free space", and can be lost entirely. In a transmitting antenna, the reflected power goes back to the final amplifier of your transmitter. In general an amplifier is *not* a good matched source to the feedline and if the feedline is very low-loss, the amplifier tuning may be altered to result in maximum power transfer to the antenna. This procedure is called conjugate matching in which the feedline is now part of a resonant system consistent of the mismatched antenna, feedline and amplifier tuning circuits. It is therefore possible to use a mismatched antenna to its full gain potential provided the mismatch is not so severe as to cause heating losses in the system especially the feedline and matching devices. Similarly, a mismatched receiving antenna may be conjugate matched into the receiver front end for maximum power transfer. In any case it should be clearly kept in mind that the feed point mismatch does *not* affect the radiation characteristics of an antenna. It can only affect the system efficiency.

Why do we include feed point mismatch as part of an antenna's characteristics? The reason is that for efficient system performance most antennas are resonant transducers and present a reasonable match over a relatively narrow frequency range. It is therefore desirable to design an antenna, whether it be a simple dipole or an array of yagis, so that the final single feed point impedance be essentially resistive and of a magnitude consistent with the feedline impedance which you plan to employ. Furthermore, in order to make accurate absolute gain measurement it is vital that the antenna under test accept all the power from a matched source generator; or, that the reflected power to the mismatch be measured and a suitable error correction in gain be included.

Perhaps the simplest approach to the feed point mismatch error is to provide a reactive tuner and SWR indicator as close to the feed point as possible (Fig 1). With the antenna radiating towards a "free space" environment, usually straight up into the sky with no obstructions in the main beam, the reactive tuner is adjusted for minimum VSWR, preferably less than 1.50:1. This will assure that the maximum correction error in gain will not exceed 4 per cent or 0.18 dB if the VSWR monitor is accurate at 1.50:1. The absolute gain will always measure lower for a mismatched antenna. An alternative method employs a calibrated directional coupler and power indicator so that the forward (incident) and reverse (reflected) power ratio can be measured directly. The coupler-indicator comprises an SWR monitor. In general the directional coupler and power indicator can give more accurate results.

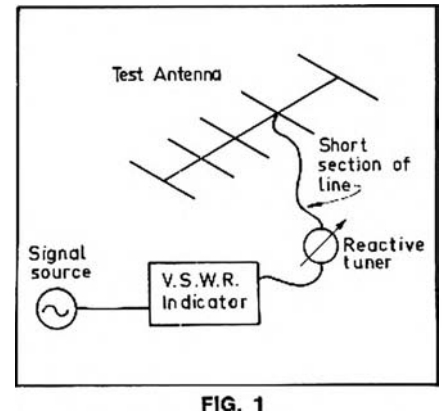


FIG. 1

It is essential that one of the above procedures be completed before gain

measurements are attempted. Not only will the proper correction or tuning be accomplished but an initially high SWR without the reactive tuner in the line will be an indicator that the antenna has not been adjusted for the nominal operating frequency. This is important with large colinear arrays or yagis whose intrinsic "Q" demands that the antenna be resonant at the desired operating frequency.

In concluding this section on impedance matching it should be pointed out that in an antenna measuring event or "contest" where many participants bring their antennas from far and wide to be evaluated and compared with other antennas, some compromises must necessarily be made. One of these may be that the test frequency be unchanged during the event which will naturally penalise those antennas which have been optimised for a specific frequency which is not the measurement frequency. The measurement committee will have to decide on the basis of additional complication and time consumption, whether each participant's antenna can be searched in frequency to determine its optimum performance frequency before any data is recorded.

Before leaving the subject of feed point impedance, mention should be made of the use of baluns in antennas. A balun is simply a device which permits a lossless transition between a balanced twinlead system, feedline or antenna and an unbalanced coax feedline or system. If the feed point of an antenna is symmetrical such as with a dipole and you desire to feed this antenna with an unbalanced feedline such as coax it is necessary to provide a balun between the line and the feed point. Without the balun current will be allowed to flow on the outside of the coax feedline. The current on the outside of the feedline will cause radiation and thus become part of the antenna radiating system. In almost every case this extra radiation from the feedline will be detrimental to the expected performance of the antenna.

ANTENNA TEST SITE (RANGE) SET-UP AND EVALUATION

Since an antenna is a reciprocal device, measurements of gain and radiation patterns can be made with the test antenna either as a transmitting or receiving antenna. In general and for practical reasons the test antenna is used in the receiving mode and the source or transmitting antenna is located at a specified fixing remote site and unattended. In other words the source antenna energised by a suitable transmitter is simply required to illuminate or flood the receiving site in a controlled and constant manner.

As mentioned earlier, antenna measurements ideally should be made under "free space" conditions. A further restriction is that the illumination from the source antenna be a plane wave over the effective aperture (capture area) of the test antenna. A plane wave by definition is one in which the magnitude and phase of the fields are uniform, and in the test antenna situation, *uniform over the effective area plane of the test antenna*. Since it is the nature of all radiation to expand in a spherical manner at great distance from the source, it would seem to be most desirable to locate the source antenna as far from the test site as possible. However, since for practical reasons the test site and source location will have to be near the Earth and not in outer space, the environment must include the effects of the ground surface and other obstacles in the vicinity of both antennas. These effects almost always dictate that the test range (spacing between source and test antennas) be as short as possible consistent with maintaining a "nearly error free" plane wave illuminating the test *aperture*.

A "nearly error free" plane wave can be specified as one in which the phase and amplitude from centre to edge of the illuminating field over the test aperture do not deviate by more than about 30 degrees and 1 decibel respectively. These conditions will result in a gain measurement error of no more than a few per cent less than the true gain. Based on the 30 degree error alone, it can be easily shown that the minimum range distance is approximately:—

$$Smin = 2D^2/\lambda$$

— where

D = the largest aperture dimension

and λ = the "free space" wavelength in the same length units as D.

The phase error over the aperture D for this condition is 1/16 wavelength.

Since aperture size and gain are related,

$$Gain = \frac{4\ Ae}{\lambda^2}$$ where

Ae is the effective area.

The dimension D may be obtained as follows for simple aperture configurations.

For a square aperture . . . .

$$D = G\frac{\lambda^2}{4}$$

which results in a minimum range distance of

$$Smin = \frac{G}{2}$$ (square aperture)

For a circular aperture . . . .

$$Smin = \frac{G}{2}$$ (circular aperture)

For apertures whose physical area is not well defined or is much larger in one dimension than in other directions, such as a long thin array for maximum directivity in one plane, it is advisable to use the maximum estimate of D from either the expected gain or physical aperture dimensions.

Up to this point in the range development only the conditions for minimum range length, Smin, have been established as though the ground surface were *not* present. This minimum S is therefore a necessary condition even under "free space" environment. The presence of the ground further complicates the range selection not in the determination of S but in the exact location of the source and test antennas above the Earth.

It is always advisable to select a range whose intervening terrain is essentially flat, clear of obstructions and of uniform surface conditions, i.e. all grass, pavement, etc. The extent of the range is determined by the illumination of the source antenna, usually a beam, whose gain is no greater than the highest gain antenna to be measured. For gain measurements the range extends essentially in the region of the beam of the test antenna. For radiation pattern measurements the range is considerably larger and consists of all that area illuminated by the source antenna, especially around and behind the test site. Ideally a site should be chosen where the test antenna location is near the centre of a large open area and the source antenna located near the edge and where most of the obstacles (trees, poles, fences, etc.) lie.

The primary effect of the range surface is that some of the energy from the source antenna will be reflected into the test antenna while the remaining energy will arrive on a direct line-of-sight path. This is illustrated in Fig 2:

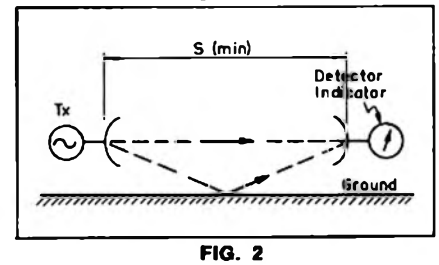


FIG. 2

The insistence on a flat uniform ground surface assures that there will be essentially a mirror reflection even though it may be slightly weakened (absorbed) by the surface material (ground). This mirroring of the source antenna is further illustrated in Fig 3 to show that the geometry may be readily analysed to determine the effects of ground reflection on the *amplitude variations* of the "nearly plane wave" arriving at the test aperture site.

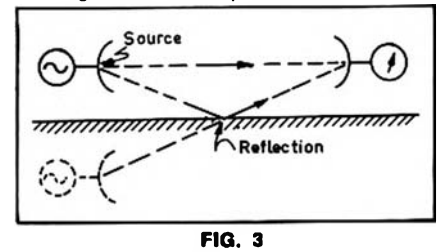


FIG. 3

In order to perform the analysis it is necessary to realise that reflected waves go through a 180 degree phase reversal upon reflection and that the resulting illuminating amplitude at a point in the test aperture is the vector sum of the electric fields arriving from the two directions, the direct path and the reflected path. If a perfect mirror reflection is

assured from the ground (it is nearly that for practical ground conditions at VHF-UHF) and the source antenna is an isotropic source, radiating equally in all directions, then a simple geometric analysis of the two path lengths will show that as the point where the fields sum is allowed to move in a vertical plane, the two field components (direct and reflected) will phase in and out. Since the field amplitudes are nearly equal, the resulting phase change due to the path length difference will produce an amplitude variation in the vertical test site direction similar to a standing wave as shown in Fig 4.

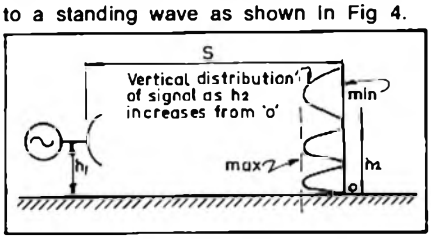


FIG. 4

The significance of this simple ground reflecting formula is that it permits the approximate location of the source antenna to be determined to achieve a "nearly plane wave" amplitude distribution in *vertical direction* over a particular test *aperture size*. It should be clear from examination of the height formula that as h is decreased, the vertical distribution pattern of the signal at the test site, h, expands. Also note that the signal level for h equal to zero is always zero on the ground regardless of the height h.

The object in using the height formula then is, given an effective antenna aperture to be tested from which a minimum S (range length) is determined and a suitable range site chosen, to find a value for h (source antenna height) such that the *first* maximum of vertical distribution at the test site, h, is at a practical distance above the ground and at the same time the signal amplitude over the aperture in the vertical direction does not vary more than about 1 dB. This last condition is not sacred but is closely related to the particular antenna under test. In practice then these formulas are only useful to initialise the range set-up. A final check of the vertical distribution at the test site MUST be made by direct measurement.

This measurement should be conducted with a small low gain but uni-directional probe antenna such as a corner reflector or 2 element yagi which is moved along a vertical line over the extended aperture site location. Care should be exercised to minimise the effects of local environment around the probe antenna and that the beam of the probe be directed at the source antenna at all times for maximum signal. A simple dipole is undesirable as a probe antenna because it is more susceptible to local environmental effects. The most practical way to instrument the vertical distribution measurement is to construct some kind of vertical track, preferably of wood, with a sliding carriage or platform which may be used to support and move the probe antenna. It is assumed of course that a stable source transmitter and calibrated receiver or detector are available so that variations of the order of ½ dB can be clearly distinguished.

Once these initial range measurements are completed successfully, the range is now ready to accommodate any aperture size less in vertical extent than the largest for which S min and the vertical field distribution were selected. The test antenna is placed with the centre of its aperture at the height of x h where maximum signal was found. The test antenna should be tilted so that its main beam is pointed in the direction of the source antenna. The final tilt is found by observing the receiver output for maximum signal. This last process must be done empirically since the apparent location of the source is somewhere between the actual source and its image, below the ground.

Before delving into the problems of measuring different types of antennas, a summary example of the procedure will now be given for a particular case. Assume that we wish to measure a 7 foot diameter parabolic reflector antenna at 1296 MHz.

Now a suitable site is selected based on the qualitative discussion given before. Next, locate the source height, h. The procedure is to choose a height h such that the first minimum above ground.

Place the source antenna at this height and probe the vertical distribution over the 7 ft. aperture location which will be about 10 feet off the ground. The measured profile of vertical signal level vs. height should be plotted and then empirically determine whether the 7 foot aperture can be fitted in this profile such that the 1 dB variation is not exceeded.

If the variation exceeds 1 dB over the 7 foot aperture, the source antenna should be lowered and h raised. Small changes in h, can quickly alter the distribution and test site.

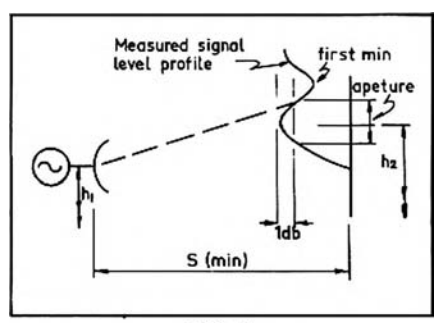


FIG. 5

Fig 5 illustrates the points of the above discussion. The same set-up procedure applies for either horizontal or vertical linear polarization with respect to the Earth surface. However, it is advisable to check by direct measurement at the site for each polarization to be sure that the vertical distribution is satisfactory. Distribution probing in the horizontal plane is unnecessary as little or no variation in amplitude should be found since the reflection geometry is constant. Because of this, antennas with apertures which are long and thin such as a stacked colinear vertical, should be measured with the long dimension parallel with the ground.

A particularly difficult range problem occurs in measurements of antennas which have depth as well as cross-sectional aperture area. Long end-fire antennas such as long yagis, rhombics, V-beams or arrays of these antennas radiate as volumetric arrays and it is now even more essential that the illuminating field from the source antenna be reasonably uniform in depth as well in plane wave in cross-section. For measuring these type of antennas it is advisable to make several vertical profile measurements which cover the depth of the array. A qualitative check on the integrity of the illumination for long end-fire antennas can be made by moving the array or antenna axially (forward or backward) and noting the change in received signal level. If the signal level varies less than 1 or 2 dB (for an axial movement of several wavelengths then the field can be considered satisfactory for most demands on accuracy. Large variations indicate that the illuminating field is badly distorted over the array depth and subsequent measurements are questionable. It is interesting to note in connection with gain measurements that any illuminating field distortion will always result in measurements which are lower than true value.

ABSOLUTE GAIN MEASUREMENT

Having established a suitable range, the measurement of gain relative to an isotropic (point source) radiator is almost always accomplished by direct comparison with a calibrated standard gain antenna. That is, the signal level with the test antenna in its optimum location is noted: Then the test antenna is removed and the standard gain antenna is placed with its aperture at the centre of location where the test antenna was located. The difference in signal level between the standard and test antennas is measured and appropriately added to or subtracted from the gain of the test antenna. Absolute hi means with respect to a point source which has a gain of unity by definition. The reason for using this reference rather than a dipole for instance, is that it is more useful and convenient for system engineering.

It is assured that both standard and test antennas have been carefully impedance matched into an appropriately matched and accurately calibrated detecting device.

A standard gain antenna may be any type of unidirectional, preferably planar aperture, antenna which has been calibrated either by direct measurement or in special cases by accurate construction according to computed dimensions.

One type of antenna which may be constructed to prescribed dimensions and will result in an absolute gain standard with a minimum gain of 15 dB and an accuracy of plus or minus 0.25 dB is a simple rectangular horn antenna often referred to as an optimum gain horn. At the end of this

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Model CDR Ham-11 for all hf beams except 40 M **$200**

Model CDR AR-22 L junior rotator for small beams **$ 65**

KEN model KR-400 for all medium size hf beams with internal disc brake **$110**

All models rotators come complete with 230-volt AC indicator-control units.

6-conductor cable for KR-400-500 **65 cents per metre**

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PETER SCHULZ, VK2ZXL

report is design information for standard gain horns for UHF bands.

In the VHF region of the spectrum horns are too large and impractical. In this region a standard gain antenna has been suggested by the National Bureau of Standards which consists of two inphase dipoles one half wavelength apart and backed up with a ground plane one wavelength square (Fig 6). When constructed accurately to scale for the frequency of interest this type standard will have an absolute gain of 7.7 dB with an accuracy of plus or minus 0.25 dB.

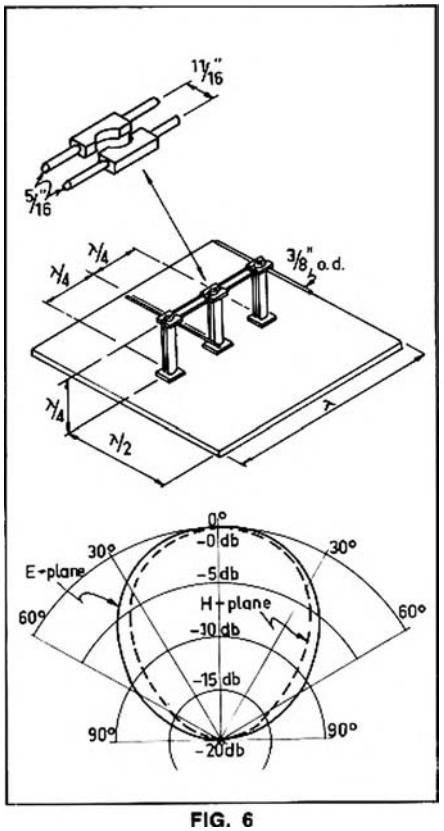

FIG. 6

RADIATION PATTERN MEASUREMENTS

Of all antenna measurements, this is the most demanding in measurement and most difficult to interpret. This section of the Report cannot hope to discuss all the details of radiation pattern measurements and their significance. We will confine ourselves to antennas of the beam radiating type and discuss the main radiation beam shape, its relation to the antenna gain and some discussion of sidelobe radiation.

Any antenna radiates to some degree In all directions into the space surrounding it. Therefore the radiation of an antenna is a three dimensional representation of the magnitude, phase and polarization of radiation over all directions. In general and in practical cases for amateur radio communications, the polarization is well defined and only the magnitude of radiation is important. Furthermore, in many of these cases the radiation in one particular plane is of primary interest, usually the plane corresponding to the plane of the Earth's surface regardless of polarization.

Because of the nature of the range setup, measurement of radiation pattern can only be successfully made in a plane nearly parallel with the Earth's surface. This is illustrated by Fig 7 where the test antenna is rotated about an axis that is slightly tilted towards the source and extends through the centre of the test aperture. With beam antennas it is advisable and usually sufficient to take two radiation pattern measurements, one in the polarization plane and one at right angles to the plane of polarization. These radiation patterns are referred to in antenna literature as the principal E-plane and H-plane patterns respectively, E-plane meaning parallel with the electric field which is the polarization plane and H-plane meaning parallel with the magnetic field. The electric field and the magnetic field are always perpendicular to each other in a plane-wave as it propagates through space.

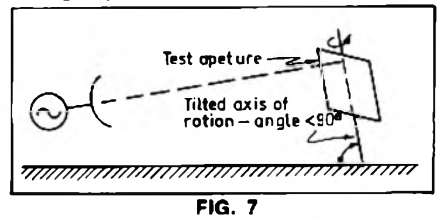

FIG. 7

The technique in obtaining these patterns is simple in procedure but requires more equipment or patience than a gain measurement. First, a suitable mount is required which can be rotated in the azimuth plane (horizontal approximately with the Earth surface) with some degree of accuracy in terms of azimuth angle positioning. Secondly, a signal level indicator calibrated over at least 20 dB dynamic range with a read-out resolution of at least 2 dB is required. A dynamic range of up to about 40 dB would be desirable but does not add greatly to the measurement significance.

With this much equipment, the procedure is to first locate the maximum of radiatoin of the beam antenna by carefully adjusting the azimuth and elevation positioning. These settings are then arbitrarily assigned an azimuth angle of zero degree and a signal level of zero decibels. Next, without changing the elevation setting (tilt of the rotating axis), the antenna is carefully rotated in azimuth in small steps which permit signal level read-out of 2 or 3 dB per step. These points of signal level corresponding with an azimuth angle are recorded and plotted on polar co-ordinate paper. A sample of the results is shown on polar co-ordinate paper in Fig 8 (note labelling and designation). On the sample radiation pattern the measured points are marked with (x) and a continuous line is "faired in" since the pattern is a continuous curve. Perhaps it is also worth mentioning that radiation patterns should preferably be plotted on a logarithmic radial scale rather than a voltage or power scale. The reason is that the log scale is more nearly how your ear responds to signal in the audio range and also most receivers have AGC systems which are somewhat logarithmic in response so that the log scale is more representative of actual system operation.

Having completed a set of radiation pattern measurements one is prompted to ask of what use are they? The primary answer is as a diagnostic tool to determine if the antenna is functioning as it was intended to function. A second answer is to know how the antenna will discriminate against interfering signals from various directions.

Consider now the diagnostic use of the radiation patterns. If the radiation beam is well defined then there is an approximate formula relating the antenna gain to the measured half power beamwidth of the E and H-plane radiation patterns. The half power beamwidth is indicated on the polar plot where the radiation level falls to 3 dB below the main beam 0 dB reference on either side.

The formulae is:—

$$\text{Gain} = \frac{40{,}000}{E \times H} \text{ approximately}$$

Where E and H are the half power beamwidths in degrees of the E and H-plane patterns respectively.

To illustrate the use of this formula assume that you have a yagi antenna whose boom length is two wavelengths. From known relations (handbooks) the expected gain of a yagi with a boom length of two wavelengths is about 13 dB, or in real numbers, G = 20. Using the formula the product of 0 x 0 = 2000 square degrees. Since a yagi produces a nearly symmetric beam shape in cross-section, 0 0 = 45 degrees. Now if the measured value of 0 and 0 are much larger than 45 degrees, like say 60 degrees, then the gain will be much lower than the expected 13 dB.

As another example, suppose that the same antenna (a 2 wavelength boom yagi) gives a measured gain of 9 dB but the radiation pattern half power beamwidths are approximately 45 degrees. This situation indicates that although the radiation patterns seem to be correct, the low gain shows inefficiency somewhere in the antenna, such as lossy materials, poor connections, etc.

Large broadside colinear antennas can be checked for excessive phasing line losses by comparing the gain computed from the radiation patterns using the formula with the direct measured gain. It seems paradoxical but it is indeed possible to build a large array with a very narrow beamwidth indicating high gain but actually having low gain due to losses in the array distribution system.

In general and for most VHF-UHF amateur radio communications gain is the primary attribute of an antenna. However, radiation in other directions than the main beam, referred to as sidelobe radiation, should be examined by measurement of radiation patterns for effects such as non-

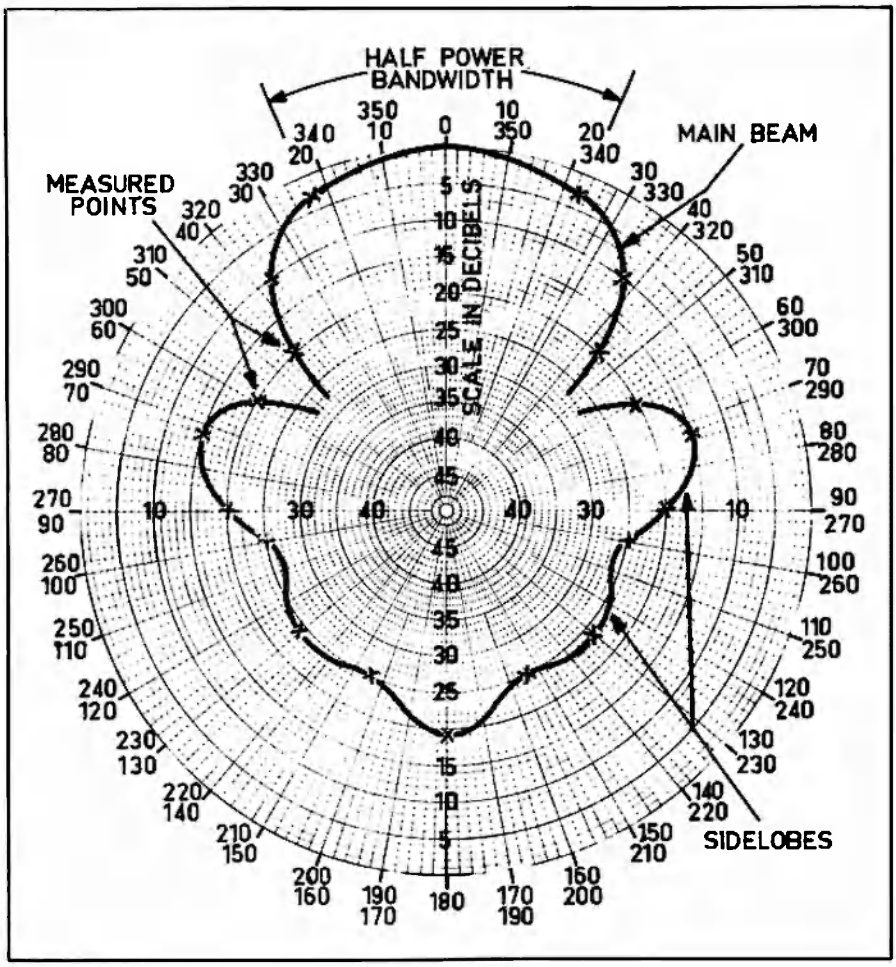

FIG. 8

symmetry on either side of the main beam or excessive magnitude of sidelobes (any sidelobe which is less than 10 dB below the main beam reference level of 0 dB should be considered excessive). These effects are usually attributable to incorrect phasing of the radiation elements or radiation from other parts of the antenna which was not intended such as the support structure or feedline.

The interpretation of radiation patterns is intimately related to the particular type antenna under measurement and handbooks should be consulted for the particular antenna type which you are measuring to verify that the measured results are in agreement with expected results.

To summarise the use of pattern measurements, if a beam antenna is first checked for gain (the easier measurement to make) and it is as expected, then pattern measurements may be academic. it is advisable to make the pattern measurements as an aid in determining the possible cause of low gain.

In concluding this discussion of radiation pattern measurements it should be strongly emphasised that the results measured under proper range facilities will not necessarily be the same as observed for the same antenna at your home station installation. The reasons should be obvious now after discussion of the range set-up, ground reflections and the vertical field distribution profiles. For long paths over rough terrain where many large obstacles may exist, these effects of ground reflection tend to become diffused although they can still cause unexpected results. For these reasons it is usually unjust to compare antennas over long paths. ■

STANDARD GAIN HORN DIMENSIONS

Design for optimum gain pyramidal horn is 3.1 dB below area gain.

Frequency MHz		1296	1296	2390	2390
Gain in dB		15	20	15	20
Rectangular waveguide		WR650	WR650	WR340	WR340
Waveguide	a	6.50	6.50	3.40	3.40
ID	b	3.25	3.25	1.70	1.70
Aperture	A	21.47	41.67	11.62	22.56
Dimensions	B	15.78	32.52	8.55	22.62
	H	8.19	47.45	4.49	22.83
Slant	L	12.99	55.71	7.05	28.91
Heights	L	15.92	59.96	8.60	32.44
Layout	H	10.31	49.66	5.65	27.03
Dimensions	H	11.10	50.60	6.09	27.55
	D	14.79	58.83	7.99	32.83
	D	13.98	56.22	7.59	30.49

All **dimensions** are in **inches** to inside surfaces

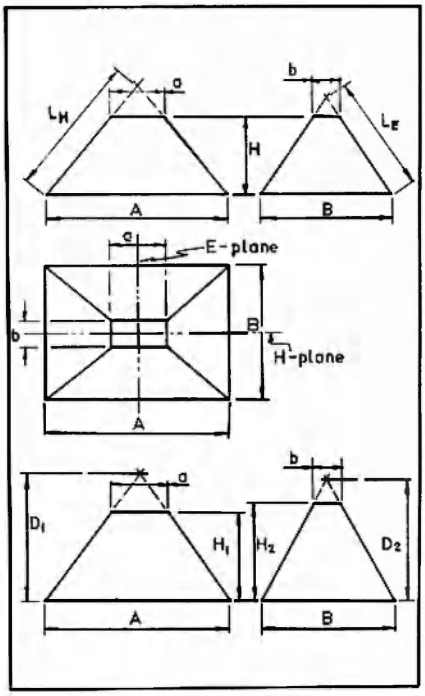

FIG. 9

FINDING OSCAR WITH YOUR POCKET CALCULATOR

Ian Milne VK7IR

As David Hull remarked in the 1976 May issue of AR, exactly when to expect to contact the OSCAR satellites still seems to cause some difficulty. The following notes may help to simplify this problem, and should be read in conjunction with VK3ZDH's "Project Australis" column mentioned above, using the data for equator crossings given therein.

Two methods of using calculators are described here — others will have used similar schemes, but it is hoped that these will prove useful.

The first method uses a manual calculator such as the Novus "Mathematician" but could easily be adapted to suit whichever one is available, provided it has a storage memory.

The second process is more sophisticated and involves a programmable calculator. The program given is for an HP25 but others should be suitable. Using the time and longitude of the ascending node, the local time of the three evening passes, followed by the three for the following morning are obtained with just one keystroke for each time required. However firstly the manual method.

STEP OPERATION

1 Store 28.73 in memory.
2 Put the longitude of the ascending node in the display — from AR data.
3 Recall memory.
4 Add.
5 Recall memory.
6 Add.
7 Continue this process until 165 or more appears in the display. For VK6 use 180 or more for this step.
8 Put the initial longitude in the display once more.
9 Subtract.
10 Recall memory.
12 Put 1.915 7 in the display (the orbital period.
11 Divide.
13 Multiply.
14 Insert the time of the ascending node as shown in the AR listing after first converting the minutes to decimal hours by dividing them by 60.
16 Insert 11.56, if using Eastern Standard Time, OR insert 11.06, if using Central Time, OR insert 9.56, if using West Australian Standard Time. (Add 1 to each of these if daylight saving is in use.)
17 Add.
18 Note the result and multiply the decimal part only by 60 to convert to minutes. The resulting answer is the time of the start of the first evening pass. The second pass follows 1 hour 55 minutes later, and the third 1 hour 55 minutes after that.

HP25 PROGRAM

Now the the easy way! Shown here is the program listing for the HP25 calculator. As programming takes a little time and care to set up the best way of doing things is to run through the whole of the AR data list for the month and make a note of the results. Or leave your calculator switched on at your operating position. (Not necessary with HP25S model — Ed.) It becomes tedious to put the program in each time and tends to defeat the simplicity of the method. Once set up the relevant numbers are placed in registers 1 and 2 and the R/S key is pressed. This will give the time of the first pass in hours and minutes. Pressing R/S again gives the second pass, and so on.

If there are other numbers in the calculator (for of course it can be used normally while the program is stored in it) these will have to be cleared. This may be done by successive "R/S" operations until the sequence settles down, displaying three evening passes followed by the *subsequent* morning passes. To recap, if you use the data for the tenth of the month you get the passes for the evening of the tenth and the morning of the eleventh.

The first pass will either be low on the Eastern horizon or about 45 degrees above the horizon to the East. The second pass will be between 45 degrees elevation East and 45 degrees elevation West, usually close to overhead. The final pass will be between 45 degrees elevation West and low on the Western horizon. The first and last passes may not always be heard in all areas.

HP25 PROGRAM

DISPLAY LINE	CODE	KEY ENTRY
00		
01	24 05	RCL 5
02	31	ENT
03	24 02	RCL 2
04	24 04	RCL 4
05	51	+ (add)
06	14 51	f x gr/eq y
07	13 09	GTO 09
08	13 04	GTO 04
09	24 02	RCL 2
10	41	— (subt.)
11	24 04	RCL 4
12	71	-:- (divide)
13	24 03	RCL 3
14	61	× (mult.)
15	24 06	RCL 6
16	51	+ (add)
17	24 01	RCL 1
18	15 00	g to H
19	51	+ (add)
20	14 00	f to HMS
21	74	R/S
22	15 00	g to H
23	24 03	RCL 3
24	51	+ (add)
25	14 00	f to HMS
26	74	R/S
27	15 00	g to H
28	24 03	RCL 3
29	51	+ (add)
30	14 00	f to HMS
31	74	R/S
32	15 00	g to H
33	24 03	RCL 3
34	24 07	RCL 7
35	61	× (mult.)
36	51	+ (add)
37	14 00	f to HMS
38	24 00	RCL 0
39	41	— (subt.)
40	74	R/S
41	15 00	g to H
42	24 03	RCL 3
43	51	+ (add)
44	14 00	f to HMS
45	74	R/S
46	15 00	g to H
47	24 03	RCL 3
48	51	+ (add)
49	14 00	f to HMS

Note that variations in the constants etc occur for different regions of Australia and this simple program can't allow for them all. The figures in the register 5, 6 and 7 are shown below for the Eastern States.

R0 24
R1 Time ascending node: hrs, min.
R2 Longitudinal ascending node: degrees
R3 1.915 7 (period)

R4 28.73 (increment)
R5 165
R6 11.56
R7 2.75

For other areas the following are suggested although some experimentation may be required.

R5 For VK6 180
R6 For VK5 11.06, for VK6 9.56
R7 For VK6 3.75

In all cases, if daylight saving time is in force 1.0 should be added to the number to be used in register R6. For example 11.56 becomes 12.56, as in the manual program step 16.

The other variation to acquisition times that will occur is that in areas far north of the area for which the sums have been done; Tasmania — so of course that's most places. (Works FB in Melbourne without modification.—Ed.) In practice this means that for evening passes the satellite will be later in the North than calculated and in the morning passes will be earlier than calculated. This may be corrected, for instance, for North Queensland by adding 0.166 to register R6 (or step 16) and subtracting 0.1 from register R7. This is approximate only but should be close enough to allow experimental adjustment. Other regions between Northern Queensland and Tasmania may adjust their numbers on a "pro rata" basis. I shall be very interested to hear from users how this works out —— it may not be very important in practice except for overhead passes.

Well there we are. Hope to see you all via Oscar 6 or 7 — the programs work for both. ■

"RUA HAMA"

Alan Shawsmith VK4SS
35 Whynot St., West End, Brisbane, 4101

We all meet up with compulsives, like the worka, the slacka, the punter, or the alco — but have you ever come across a hama — a Hamaholic? Maybe you're even one yourself and don't know it. On the law of averages, there has to be quite a few in every AR group.

A Hamaholic is a poor enslaved soul, who needs another QSO like an alco needs another drink. Hamming is the peer of pastimes and it's right to be keen, even dedicated — but there's a dividing line between keenness and compulsion. In one, you're the boss, the other, the slave.

How does a Ham get this way? Some are so born, that getting "hooked" on one thing or another is their final lot, no matter what. For others, chronic marital punch-ups, or "rat race" stress will, in time, do in the best of us. Those put down by a nagging bag of strife (YF), or salt mine sweat, withdraw from their world of dragons and disasters to the shelter of the den, where they are accepted with no judgements made. Eventually, the shack is to them what a pub is to an alco: the only world worth being in.

There is the avid DXer who sees the top of the DXCC Totem Pole as the heavenly achievement of all AR has to offer: a Hilary on Everest. All praise and status will be his, if he makes it. It's the staying there, rather than the making it, that produces the neurosis. He can't afford to miss just one new country or DXpedition.

Then there is the obsessive who sits permanently at the rig. His real need isn't for a QSO but an ego boost; turned on by the narcissistic infatuation of his own "duck talk".

The Amateur's code clearly insists that our hobby falls into its rightful place with our other demands. This puts it well down the priority list with those who are committed to the saltmines, OG and harmonics — especially the VHF discordant ones. However, when one goes on the air and hears the same old familiar calls, local and DX, clamped to the same spot on the bands, the question has to be asked, "Are they perchance only on when I am, or do they live there?"

One does not need to visit many Ham shacks to feel the antivibes created by that psysically small but influential third party — the rig. Two's company, three's none. OM's don't seem to perceive that their uninitiated OG's are not enraptured by the miracle of space annihilation — especially if it's accompanied by a cacophany of interference. They would much rather chat over a cuppa with neighbours or friends.

A secret ballot conducted among the YF's, here, or anywhere else, on the question "Should your OM join H.A.? (Hamaholics Anonymous)" would likely result in a large "YES" vote.

The truth is often hard to face. If you have a sneaking suspicion about yourself, put the matter beyond doubt and take these tests. Just answer Yes or No.

1. If you can't manage to get on air almost every day, do you feel cheated?
2. Do you rack your brains planning how to maximize your "on air" periods?
3. (a) Do you put off taking a vacation because of the DX you'll miss? (b) When you do go, is it Imperative to take a rig along? (c) If forced to go without a rig, do you, after a few days, begin to show the signs of the Pavlov dog syndrome — nervous, irritable, because your routine is out of sync?
4. If called from your bed in the night, do you turn on the rig to see what's doing?
5. If you have to stand in line for a QSO, do you feel impatient at the delay?
6. Is AR your only interest — by choice?
7. Do your friends who are not Hams now bore you?
8. Are your dreams most about AR? (If in colour, you could be in a bad way.)
9. Would you suffer the YF's nagging rather than leave the rig to do the chores?
10. Do you really burn if someone picks up a "rarie" you missed?

Answered in the affirmative (YES) — 60 per cent or less means you're about as rational as a Ham can be. Between 60 per cent and 80 per cent is the fringe or borderline area: take heart, you're with the majority. If 80 per cent and higher, it's "London to a brick" you've crossed over: you're "hooked", just as sure as any mainliner. It's not another QSO you need — nor a drink — but H.A., or a "headshrink". ■

TRY THIS

With the Technical Editors

Conduit and broom handle or a method of connecting a balun to a wire antenna.
Harry Capsey VK2OQ. ■

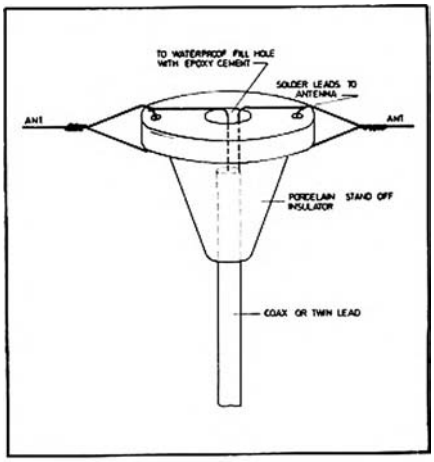

FIG. 1

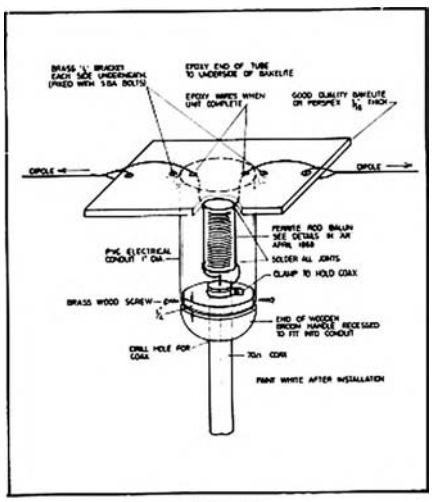

FIG. 2

To the new Ham . . .
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IC502	$219
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IC211	$785
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BC20 nicad pack for IC202	$57
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The **NRD505** is designed specifically for the Amateur Radio operator with AM, RTTY, CW, SSB modes available.

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Optional reception of 4 pre-set spot frequencies with the selected frequencies stored in CMOS IC memory. Completely modular construction using 9 boards, no preselector tuning, high image rejection with a first IF of 70MHz creates a receiver with superb stability, sensitivity and versatility.

Standard features include noise blanker, AGC (fast/slow), attenuator, AF filter, RIT, separate BFO, IF output, RTTY line output, recording, phones monitor sidetone and external VFO.

A VFO converter to allow operation with any other transmitter will be available soon as an option.

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P.S. If you are a potential professional user, don't pass this up!

Features:
Traditional front end tuning coils are out! In their place we have RF input filters electronically switched in 6 ranges between 100KHz and 30MHz.

The RF amp? Uses 2 bipolars in push-pull, the same goes for the mixer with 2 FET leading to the 1st IF 70.455MHz crystal filter.

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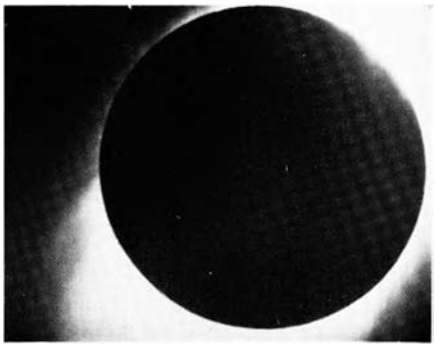
AN AR SPECIAL —

THE 1976 TOTAL SOLAR ECLIPSE

This is a report compiled from the recorded observations of many amateurs and others of the effects of the total eclipse of the sun that took place on 23 October 1976. A preview of this event was featured in AR October 1976. For most of us this was a unique experience.

As can be seen from the following detailed reports propagation was much as predicted, yet many unusual events were recorded. The changes in propagation are fascinating.



Photograph of 1976 Eclipse.
By I. Downes.

Perhaps one of the keenest and best prepared observers was Harry Roach a well known VK3 SWL. He writes "It is with some feeling of excitement that I have arranged five receivers, a panoramic adaptor and a tape recorder to monitor events as they happen". In addition Harry enlisted the help of five amateurs—VK3's EN, WU, TE, WQ, AMD. Now to the detailed composite report. The observations refer to the Melbourne area unless otherwise indicated.

BROADCAST BAND
3NE about 200 km NE of Melbourne rose from S7 to S9 plus 40 dB during totality. Deep QSB was apparent and the signal fell back to S7 as the light returned.

1.8 MHz
As totality approached ZL signals became audible and signals from Warrnambool, Geelong and Ballarat were greatly enhanced. Signals fell in strength as totality passed.

3.5 MHz
Weak signals to ZL during totality at Geelong. The signals peaked dramatically as the shadow moved East and faded right out five minutes later. Local VK3 signals peaked from S5 to S9 plus 20 dB during totality.

7 MHz
European DX was heard on this band until 15 minutes before totality when all but local VK's vanished until 16 minutes after totality. Signals to Sydney were observed to dip. XE1UF was worked during totality and five minutes later his signals disappeared into the noise. The band was back to normal 10 minutes later.

14 MHz
Good signals to UK5, ZS1, LZ1, DL8, ZE1, ZE7, G5, DL3, I3 during the eclipse but QSB and reduced signal strength from OK2BKK was noted during totality. Signals from VK7 peaked to S8 — VK7's are usually inaudible.

21MHz
Japanese signals were present all afternoon but no effects of the eclipse were noted.

27 MHz
DX signals from VK2, VK4 and JA heard in the morning but only local activity all afternoon.

28 MHz
A UA4 was worked in the morning. A weak VK8 was heard during the eclipse.

52 MHz
No apparent effects although an opening to Japan and Russia did occur that day.

144 MHz
The Melbourne beacon was monitored in Ballarat and suffered from fading up to 10 dB during totality. Before and after it was stable in strength.

432 MHz
Nothing heard.

7.5 MHz VNG
This signal was monitored in Sydney on a Barlow Wadley receiver which has a 0-5S meter scale. The average reading before and after the total phase was 2. For about ten minutes either side of totality the reading was 0.

So much for the observations of radio amateurs; what did other eclipse watchers see? L. A. Hajkowicz of the University of Queensland reported (Nature, Vol. 266, 10 March 1977) that US Navy satellites on 149.988 MHz were subjected to 5 dB of fading. This effect is attributed to gravity waves in the atmosphere. These waves are in essence a bow wave caused by the cooling of the air in the moon's shadow which is travelling rapidly eastwards. The waves are present at a great height and not noticeable to a ground based observer. M. Waldmeier of the Swiss Federal Observatory, Zurich, also reports (Nature. Vol. 265. 17 Feb. 1977) that the computer predicted visual appearance of the sun's corona was in satisfactory agreement with that actually observed.

CONCLUSIONS
The ionosphere changes rapidly from its day time to night time state in those areas experiencing totality. In the period when most of the sun is obscured intermediate conditions prevail.

Signals received after reflection from the shadowed part of the ionosphere are dramatically affected. Below, say, 4 MHz signals are enhanced, particularly those involving stations up to 3000 km apart, but situated on the line of traverse of totality. Signals around 7 MHz and 14 MHz were degraded although some signals were enhanced. The effects on higher frequencies were apparently negligible.

Some disturbances of the atmosphere, such as reduced temperature and gravity waves, degrade VHF signals. ■

MODIFICATIONS TO THE YAESU FT220 TRANSCEIVER

Steve Mahony VK5ZIM
19 Kentish Rd., Elizabeth Downs, 5113

A modification to enable "Reverse" operation on the Repeater mode, that is, listen normal transceiver transmitting frequency and transmit on normal transceiver listening frequency is described.

In the unit when the RPT button is ON and lamp ON, the transmit frequency is shifted down 600 kHz, by diode switching. To obtain RPT/REV all that is required is to transpose the two leads to the diode switching worked by the RPT switch. To eliminate the possibility of operating "Out of the Band", only one offset crystal is provided, on the FM/Repeater range, e.g. 146.5-147.0 MHz.

If the switch diodes are transposed with only a DPDT switch, trouble could be caused when the RPT switch is in the "OFF" position. To eliminate this, a

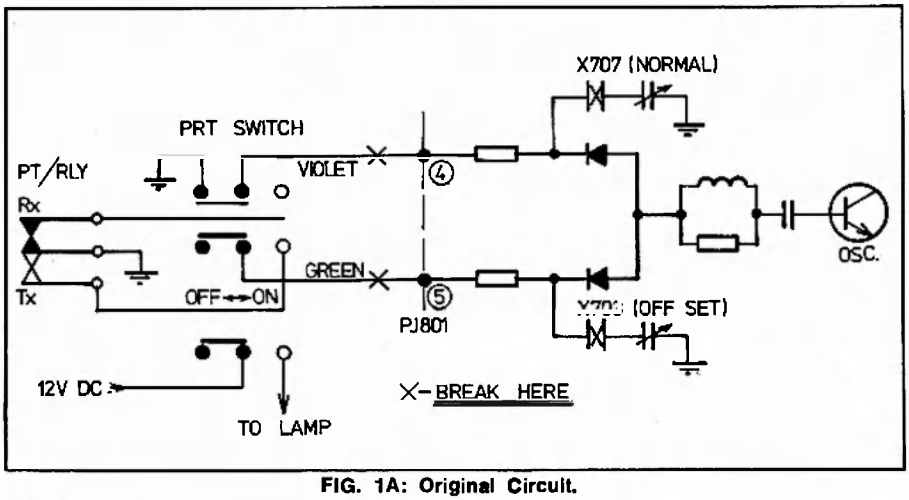


FIG. 1A: Original Circuit.

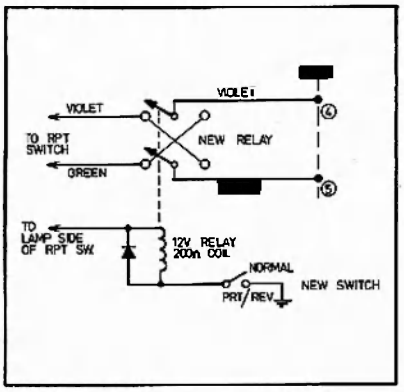
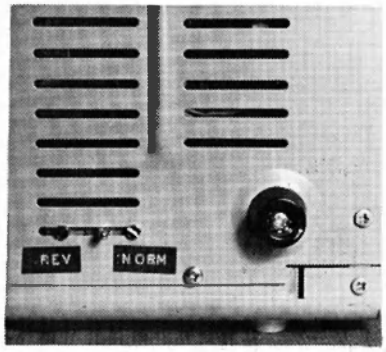


FIG. 1B: Modified Circuit.



Switch Mounting for Reverse Repeater Operation on FM.

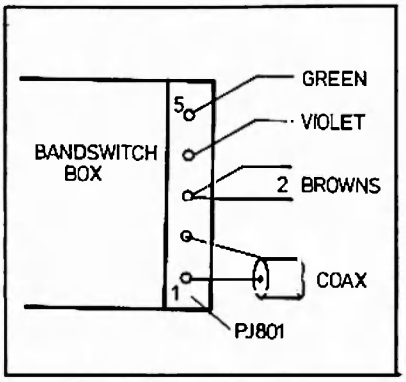


FIG. 2: Control Connections.

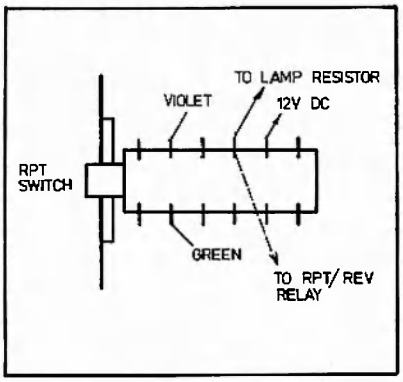


FIG. 3: Switch Wiring.

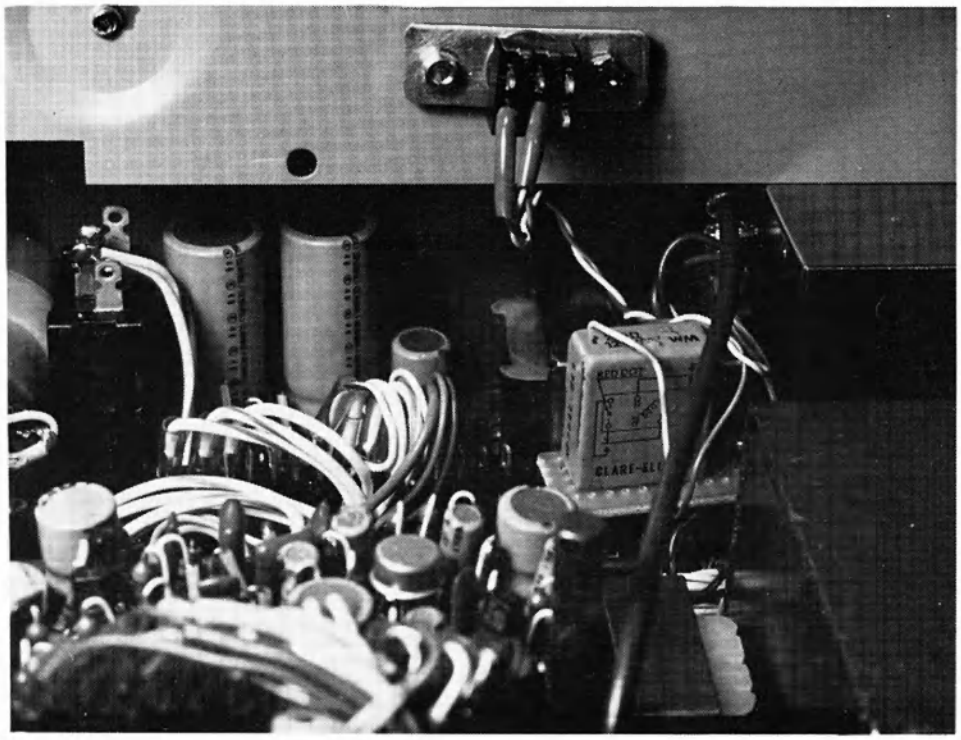


Photo shows Relay Mounting and Switch Location inside Unit to enable Reverse Operation of the FM Repeater Mode.

changeover relay is used, the operating coil of which is supplied from the DC used to light the RPT lamp. In this way the REV/RPT function can only take place when the RPT facility is used. On releasing the RPT switch the unit automatically resumes the NORMAL function.

As shown in the photograph the relay is mounted on a small bracket supported by the screw holding the band switching box quite close to the two switching leads.

The REV/RPT switch is mounted as shown in the photograph on a small metal plate, which is in turn mounted with only the toggle lever passing through the ventilating slots in the bottom plate on the same side as the RPT switch and just above the power supply. Mounting the switch in this way does not require any holes to be drilled in the case. The two DYMO labels save you embarrassment at a later date.

To operate RPT/REV you only reach along under the left side of the case and flick the switch with your finger. This modification to the FT220, besides enabling you to go REV Repeater, also allows you to listen on the segment of the FM band previously not covered, that is, 146.0-146.5 MHz. Because you are using the 600 kHz offset xtal, you actually cover 145.9-146.4 MHz, and just miss out on Ch. 49, 146.450 MHz.

Thanks to my wife, Christine, for her help in producing the photographs.

In conclusion, I have found the FT220 a delight to use, in both modes, FM and SSB. It proved itself two days after delivery by working VK6KJ at Albany from Elizabeth, S.A. ■

AN OPERATOR'S EYE-VIEW OF THE HW7 AND QRP OPERATION

David S. Down, VK5HP
17 Brodie Crescent, Christies Beach, SA, 5165

To Bas VK3AUN, Noel VK4NL, Tony VK2BWC and Ken VK5XD whose perseverance, interest and enquiries inspired this article.

Articles on the Heathkit HW-7 QRP transceiver have appeared on odd occasions, AR May '73 and "73" Sept. 75 to name but two, but not much has been publicised regarding local operator evaluation of the rig, and how it is being used. This is such an article.

VK5HP runs one — it's been the main station Tx for some time — in company with an Eddystone EA12 amateur band Rx 40-20-15m quad and RSGB-style Z-match.

In general, QRP operation requires a lot of attention to otherwise neglected minute details such as antenna construction, methods of feeding and so forth, and suffice to say that coax is OUT and 75 ohm twinlead is IN for the quad feeder, tuned through the Z-match, with nothing but an SWR of 1:1 on all bands — this is ESSENTIAL.

Power supply for the rig comes from the circuit shown, Fig. 1, which will also run a solid state afterburner for the HW-7 for those times when conditions are not conducive for straight out QRP operation. Undoubtedly, this supply would lend itself to many other applications.

An A&R 5509 transformer may also be used, with the two 12.6V 2.5A windings arranged accordingly (wind yellows together and blues together).

The whole circuit is done on one ounce PCB and the 2N3055s sit on a 10 x 6cm sheet copper 3mm thick as a heat sink, and easily handle the amperage without running hot under normal load. Mica insulators are used under the transistors.

The 12.6V from the transformer becomes 16 to 18V DC from the bridge, and the BZY93 in the base circuit of the 2N3055 holds the output down to 13V. The 68 ohm 10W resistor limits the current to the zener so the diode dissipation is not exceeded.

The afterburner is styled along the lines of the VK3YS "Solid State Final for the FT-75" featured in Radio Bulletin April 74. It sports a 2N5589 driving a pair of 2N5591s in broadband amplifier configuration. For those interested, the HW-7 will also drive an 807 or 6146.

For those, like me, who don't like the choice of commercial rigs available in Australia, or the prices we are expected to pay for them, the HW-7 makes a nifty VFO for the Tx such as is under construction at this QTH where a 5763 acts as buffer/multiplier and drives a pair of 6146s. Bearing in mind the basic oscillator frequency of the HW-7 is 80m, a cheap and useful 80-40-20-15-10m Tx is the result. Crystal control for 160m is being incorporated too.

Modifications to the HW-7 thus far are:

1. Removal of the RSA antenna jack and fitting of an SO-239 type.
2. Xtal marker.
3. Fuseholder (and fuse!) to the power cable socket.
4. Diode polarity protection (we're all human).
5. Extra phone jack.
6. 6:1 reduction drive to the preselector capacitor.

In addition, an audio filter (88mH toroid in parallel with .15mF from ground to the midpoint of two .047mF capacitors in series between the kit phone jack and the added jack) may also be desirable to some HW-7 pilots.

Testing of the Rx section (thanks VK5JT) indicates that the Rx comes up to the performance claimed, and indeed, is very good considering the principle and simplicity involved. The USSR CQ-M contest was worked with the HW-7, and in spite of the above statement re the Rx, I am glad that the HW-7 Rx was not used solely for the 18 hours or so of operation!

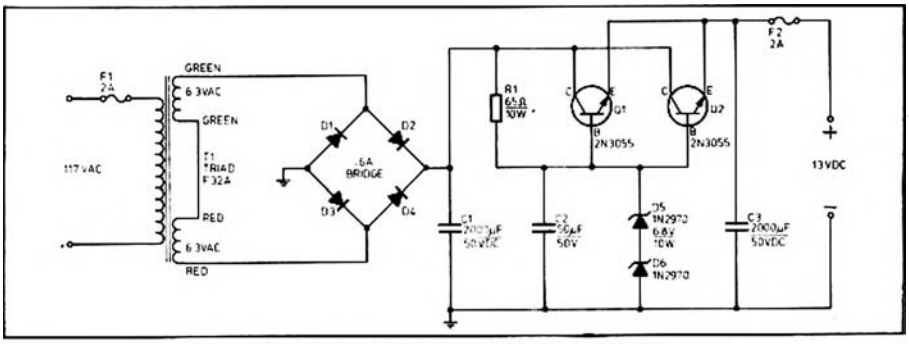


FIG. 1. POWER SUPPLY FOR HW7 AND ACCESSORIES

Conditions and QRM during that event would not have left me with intact nerves if the HW-7 had been used as a transceiver. A contest, involving 16-18 hours continuous CW operation is a fair test of rig as well as man, and from a transmitting point of view, the HW-7 came through with flying colours and neither missed a beat nor overheated. No-one complained of chirp, drift or any other problems, and the rig certainly sounded FB here.

For those who find the sidetone too harsh, try a .01 ceramic from base to collector of Q10, add a 47K between C45 and R34, change R35 from 1K to 270 ohms and see if the resulting note agrees with your palate. Personally, I prefer continuous off-the-air monitoring with a separate Rx, but each to his own.

A 6:1 reduction drive on the receiver preselector is a nice refinement — makes it a lot easier when trying to find the right pF out of nearly 400.

The break-in facility is good, responding well to any adjustment to suit individuality, and we haven't found the relay noise objectionable after even 1200 plus QSOs.

Perhaps the heavy breathers clutching calculators would like some figures from the Tx point of view.

Band	V (supply)	I (mA)	Pin	Pout	Efficiency
40	13	295	3.84W	1.6W	42%
20	13	300	3.9 W	1.5W	38%
15	13	277	3.6 W	0.99W	27%

40 and 15m have not been used extensively as maximum effort was sustained to achieve WAC, DXCC (105 countries) and several JA awards on QRP 20m between January and May 76. The 40m quad loop has been removed for a specific reason, but as soon as the new quad is erected, an assault will be made on those two bands.

It may be of interest to some, that of the 20 or so antennas tried, including Zepp, groundplane, 4 el beam and various quads, the quad eclipsed all others from this QTH even when allowing for height etc.

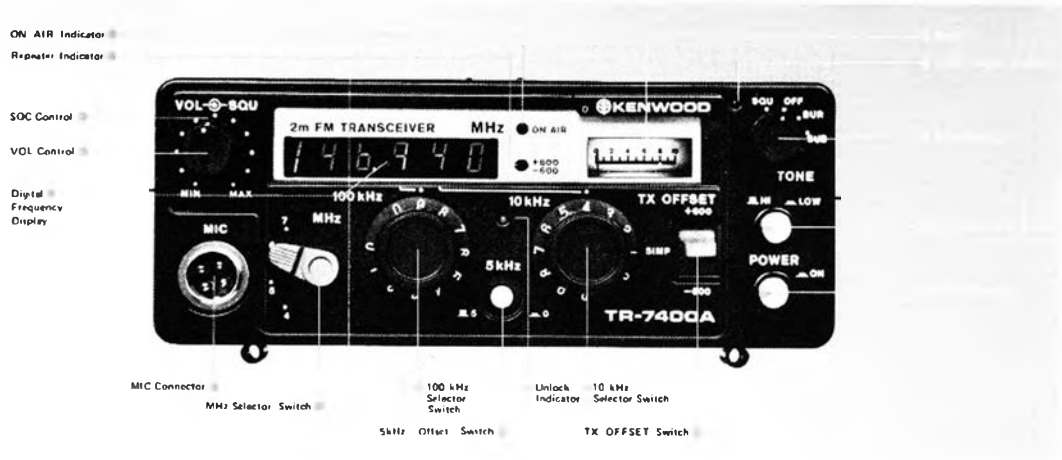
Obviously, each op, each QTH and associated antenna will indicate results differing from those with which I have been rewarded in a short space of time, but from an operator's point of view, the HW-7 is an excellent QRP transceiver for fixed station use (not yet tried /P).

If you want a budget-priced challenge, try one of these little rigs and feel the thrill when the op at the other end says *Unbelievable signals . . . . highest number of kms per watt (quote HB9AGK)* then bangs you a direct QSL within a fortnight.

If you are not keen on QSLing, DON'T take QRP up, because you surely will become interested in QSLing!

BCNU wid an HW-8 maybe??? ■

ANNOUNCING NEW 2 METRE FM TRANSCEIVER FROM KENWOOD



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HF-3-100L2 Amplifiier (new model)

Frequency Range	3-30 MHz
Input Power	10W Nom., 5-20W PEP range
Output Power	100W Nom., ±½ dB across band, 200-250W PEP output
Input Impedance	50 ohm nom., adjustable to match exciter range under 2:1 across band
Output Impedance	50 ohm nom., up to 3:1 VSWR acceptable with little degradation
Current Drain	16 A nom., 20 A supply recommended at 13.6V DC
Power Supply	13.6V DC recommended for best results, 11-14V DC acceptable positive or negative ground
Pre-amp	18 dB nom. gain across entire HF band, 15 dB typ. at 50 MHz, 3-4 dB NF
Size	19.1 x 16.5 x 8.9 cm. Weight 1½ kg

2M10-80L Amplifier

- All solid state — microstripline design.
- Broadband — requires no tuning across band.
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TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE or ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.
A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

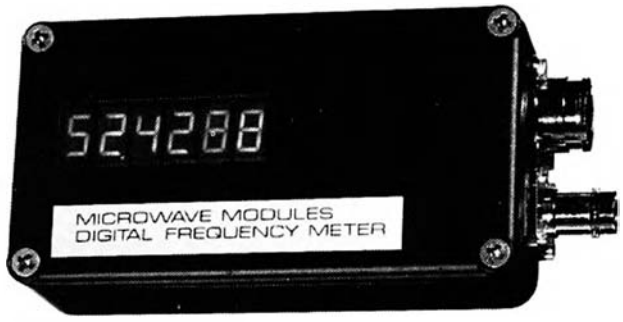
FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output.

MODEL MMT432/144 — Price $260

TRANSVERTER MODEL MMT432/28

FEATURING COMBINATION OF A LOW-NOISE RECEIVE CONVERTER AND A LOW-DISTORTION TRANSMIT CONVERTER PRODUCNG A SPURIOUS-FREE LINEAR SSB SIGNAL, PARTICULARLY WHERE HIGH STABILITY AND SENSITIVITY ARE OF IMPORTANCE.
Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern Microstrip Techniques ★ Power requirements 12 volt nominal at 150 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432 — Price $215



MMT432 TRANSVERTER

500 MHz COUNTER

This counter has two ranges which are selected by supplying +12 volts to one of two pins on the DIN socket. Internal diode switching brings the input in the 0.45 - 50 MHz range to a wide-band amplifier which drives a high speed TTL divider in the main counter logic. On the 50 - 500 MHz range the diodes switch in a high speed ECL prescaler and the demical point is changed accordingly.

A low angle AT cut quartz crystal is used giving a typical temperature stability of 0.5 ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 200 Hz at 50 MHz, or 2 kHz at 500 MHz.

The counter has reverse polarity protection and operates satisfactorily from a nominal 12V DC supply. A suitable 5 pin DIN plug is supplied.

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD050/500 — 500 MHz Counter, $175

New Release — 6 METRE MOSFET CONVERTER

FEATURES 24 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

Input Frequency: 52-54 MHz
I.F. Output Frequency: 28-30 MHz
Typical Gain: 30 dB
Noise Figure: 2.5dB
Typical image rejection: 65dB
Crystal Oscillator Frequency: 24 MHz
Power requirements: 12 volt ± 25% at 35 mA

MODEL MMC52/28LO — Price $49.00

2 METRE VERSION — WITH 116 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

MODEL MMC144/28LO — Price $49.00

NEW READY-TO-OPERATE MODULES AVAILABLE IN THE SALES PROGRAM OF VHF COMMUNICATIONS

1296 MHz CONVERTER
Microstripline, Schottky diode mixer. IF: 28-30 MHz or 144-146 MHz. Noise figure: typ. 8.5 dB. Overall gain 25 dB. **Price: $65**

432 MHz CONVERTER
2 silicon pre-amplifier stages. MOSFET mixer. All UHF circuits in microstrip technology. Noise figure: typ. 3.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. **Price: $51.**

144 MHz MOSFET CONVERTER
Noise figure: typ. 2.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz, 9-15 V 20 mA.

Price: $45

VARACTOR TRIPLER 432/1296 MHz
Max. input at 432 MHz: 24 W (FM, CW) - 12 W (AM). Max. output at 1296 MHz: 14 W.

Price: $74

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All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

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HOW TO WIN RD AND/OR SIMILAR CONTESTS!

Doug McArthur VK3UM
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The true contest exponent has devoted many years of untiring dedication to achieve the remarkable results which place him head and shoulders above the average competitor.

It is far beyond the scope of this article to cover the vast range of methods employed to make one a top line contest operator without he himself spending the many years of additional practice that is so necessary for success. However if the reader takes the time to study this article he cannot fail to benefit and dramatically improve this contest standing.

Preparation is the keyword in contests and an ardent contests exponent paves his way far in advance to the date of the big event. Naturally, of course, you first select the contest you are to win. No negative attitude here, the emphasis is on win.

Anyone who has mildly dabbled in contest working quickly realises the inconvenience the XYL and harmonics have on contests. In fact Mr. Murphy's law indicates that a contestant's score is inversely proportional to his harmonics. We all are aware that XYL's require bread, milk and other essential supplies that must be obtained by yourself during the prime contest hours. Harmonics have to be taken to all manner of sporting activities again during prime contest hours. Needless to say this major obstacle has to be overcome and the simple answer is send them away for the week-end. It may cost a few "bob", however a true contest blueblood accepts this expense as necessary. Avoid at all times sending them to your mother-in-law. This situation causes undue stress at a later date when a return visit is inevitably accepted.

Family pets should be included in this exercise as everyone knows a barking dog punctuates call signs at the most inconvenient times. If one is forced to dog sit then the hound should be fed to such an extent that he is incapable of barking. Disconnect the phone.

The next step is to brief your neighbours about the strange astronomical phenomenon that will occur on this particular week-end. This strange effect will only last for this week-end and will not occur again for a further twelve months.

During this week-end this strange phenomenon will cause mysterious lines across TV sets, weird noises from tape recorders and hi fi's. Take special steps to assure your neighbours that it does not hurt any of the appliances (as it happens on your equipment too) but only lasts for this one week-end of the year.

The experienced contest operator always knows his rivals in the mastery of this fine art. The preceding week of the contest is dedicated in checking out your local QRM potential. Here you should note each particular station thus wise. Whilst he is in QSO with another station check your effective radiation capabilities against him. The noble art of carrier dropping (gleaned from 27 MHz operators) is used to ascertain if you flatten him or he flattens you. A careful record of these stations must be kept. This is vital as during the contest one must know who he can use as a "clear channel" and who to give a wide berth.

After determining your local QRM and competitors you should make available sufficient "bugs" to overcome the problem. The experienced operator should have sufficient quantities available off the shelf. Oh, what is a "bug"? Well it's a device which, when subjected to a RF field, transmits in the frequency range 46-212 MHz, and it is normally thrown into a dense bush adjacent to his aerial. If their XYL does not close them down their neighbours will!

The shack must be placed on full alert immediately prior to the contest and a check list helps in overcoming small items which could be missed. The fridge must be checked (what! all good shacks have a fridge) to ensure sufficient 807's are available. Here again contest experience is vital in knowing the consumption contacts ratio. A good tip is to use cans for contest work as it keeps the operating bench clear of unnecessary glasses; besides cans don't break and can be ejected without fear. Those who require coffee or tea will have to work this situation out for themselves as the writer has a distinct fear of rust! Food — not on. Never eat during contests. You could get caught with your mouth full and miss a vital QSO. However, if you have to indulge, eat only during your CW stint.

Now to the equipment side of things. Remember Mr. Murphy? He nearly always calls during contests. Firstly to your power board. Replace shack fuses with "contest fuses" calculated by using the formulae, expected load current by 10, the figure is in amps.

At the same time similarly wire several other spare fuses and leave in the bottom of the box. Remember to lock your fuse box (if outside), as it has been known to have had an untimely power failure when a local competitor or neighbour delights in a practical joke.

Don't forget to reconnect the high power taps on all transformers previously set for RI's visit, and wind speech processors flat out. Disconnect ALC wiring and TVI filter which all cause losses.

If you are fortunate to have all band coverage and prefer three HF transcelvers and separate 6, 2 and 432 MHz equipment for both FM and SSB you are set to go!

Now it's on! For the first couple of hours you are flat out and you will find it difficult to operate more than two rigs. That is to get those initial but so vital VHF/UHF contacts which will from then on be treated on a time basis.

For log-keeping, never use help as they could make a vital mistake which you would never ever make. If you are using the failsafe VK8KK logging system (refer AR December 1963) you have of course set yourself well on the way to success. However, if you are using a microprocessor, remember to change your softwave to adapt to your particular contest. Instant interrogation is vital. This is easily achieved by feeding the output of your CW/ASCII VDU direct into your microprocessor to give instantaneous display of YES/NO, have/have not worked on this band. Unfortunately, on using voice, you have to manually type in his call (VNG and bano selection already hard wired).

When contacts start falling away (less than 60 per hour) then this enables you to bring in another rig or two. These of course are fully independent and have their own aerial arrays. Call CQ contest on three rigs on three different bands! Don't forget CW of course (use your programmable keyer) (see VK8KK article AR May 1972). Again experience counts when you get three replies at once. Make the bloke who has the most number of contacts wait. This has been determined earlier as you have dodged working him because of his big score. Most importantly work the station worth the highest points. Tie them all up by acknowledging their calls! Incidentally if you are working an overseas contest and are being swamped by Californian Kilowatts and are in a humorous mood, always pick out the very weakest, give him a 9 + 40 report, and comment on his large signal off his barefoot rig and vertical aerial. Then, when the big Kilowatt bloke next calls, ask for several repeats, give him a 3 x 3 and leave him to look for his fault!! Clears the ether considerably!! Fun if you can spare the time to slip off and listen to the results!

Well, as the contest proceeds and your score mounts, the sorting out of the men from the boys becomes more dramatic. Remember, if you strike a bloke getting close to you, jump a hundred numbers and floor him. He could even give it away in disgust!

Although these predescribed methods are only basic, in fact you could say only for openers, they should however set one on the right track.

Finally, always remember to have built up enough "flexitime" to take the next day off, and don't forget the vital plastic bucket!

And remember it's the **FRIENDLY CONTEST** attitude that counts. ■

VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	Mt Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.850
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato *	145.150
	ZL1VHF, Auckland *	433.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Manawatu †	52 500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Manawatu *	533 250
	ZL2UHF, Wellington *	433.000
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

*** Denotes addition to list.**

† Denotes change of location.

There have been some changes to the beacon listings this month. Firstly, VK4RTL, the Townsville beacon, still continues to be off the air during rebuilding, so I will await word from the TARC that it is operational again before listing. From the 1977 "Break-In" Call Book I have noted some changes to the New Zealand beacon listings, and have added or amended accordingly.

SIX METRES

Those of you who read these columns regularly know how much I have been pushing everyone to become fully operational on six metres for a long time now, and I have always said the frequencies between 47 and 54 MHz will be the ones producing the most surprises during the next few years. So far my predictions have been right on the ball, and with the information I have to present to you this month from several letters received those who are not prepared by September could miss out — and that means a reasonable transmitting power, say 50 to 100 watts of SSB or CW, the best possible receiving set up, and a really good antenna. And there is no point in listening all the time, try some transmitting! Use the 52.050 calling frequency. If you can arrange to have another converter and antenna system to allow coverage from about 47 to 50 MHz you can do some monitoring of northern and north-eastern TV stations' frequencies, some of which were listed in these notes a few months ago. Keep a watchful eye and ear on 28 MHz — when that is full of signals start looking higher. I use a modified VK3 VHF Group 6 metre converter retuned for coverage from 47 to 50 MHz with a 44 MHz crystal fed into a 3 to 6 MHz Command receiver, much modified, to produce good signals on SSB, CW and FM, plus a broadband type of yagi centred on 48.750 MHz. This total combination is far superior to the fairly cheap type of all band radios available which also cover this range, if for no other reason than frequency can be read accurately, and it doesn't drift. This, together with the FT620, which covers 50 to 54 MHz, plus 200 watt linear amplifier if needed, and a wide spaced 6-element yagi, give me a fairly good six metre set-up; one which will be working quite a lot during the equinoxial periods when most such across the equator activity can normally be expected.

However, back to the letters. First one from Steve VK3OT, which arrived too late for inclusion last month, but which contains some interesting information. Firstly, in regard to the following repeaters in California, USA, WR7ACC Phoenix, Ariz., WR6AAJ Los Angeles, and WR6AAK California, all on 52.525 FM. WR7ABR Arizona on 53.760 FM and on 53.720 is WR6ADP. WA6JUD is running 2 kW PEP and looking for VK contacts. KM6IAA/DU2 is operational on 50 MHz.

ZL1AA/K Kermadec Is. will be on from October, and Steve is doing what he can to implore the organisers of the visit to take 6 metres. VK9ZM will be ORT from Willis Is. from 30/6/77. VK9JD will be on 6 metres from October, QSL via VK3OT. The beacon on Fiji, 3D3AA will be back on the air before long when the new antenna is installed. TV DX from ZL and VK, in Fiji, is big news and is also being seen in Noumea, reports FK8KAA. YB1AZY, from Australian Volunteers Abroad, is going to try to listen on 6 metres but the band is restricted to Indonesia.

On 24/5 Steve noted long distance DX on 15 metres which was producing back scatter paths, one SW, the other NE from VK. Up to 4 echoes were heard from Joan VK3BJB over 300 miles to north. 7Q7 from Africa was 5 x 9+++. At the same time weird telemtery signals were coming in from the west on many frequencies around 50.400 with a multi-channel tone modular carrier on 50.700. A TV FM channel was on 53.780 approximately at 5 x 9+++ from West South West. Steve suggests you try Mawali or Zambia which just happens to have a brand new TV station on Channel 1! Time 0700 to 0730Z. (There seems no reason against hearing and perhaps working Africa on 6 metres, it's no further away than the USA . . . 5LP.) Steve is also holding cards for some 50 or so QSO's made by VK stations to YJ8KM. If you want your card write to VK3OT via P.O. Box 414, Hamilton. Incidentally, YJ8KM will be on 6 metres again this year. Good to hear from you, Steve, many thanks.

Geoff VK3AMK sends a letter with news of 6 metres, and many thanks to you for the information. He writes "Two letters from JE1RXJ, first with news of openings from JA to KL7HAM in western Aleutian Islands, being 15/5 0300 to 0400Z, 23/5 0100 to 0300Z, 25/5 0020 to 0030Z. Approximately 130 JA's worked KL7HAM! The second series of openings took place on Sunday morning, 5/6 2150 to 2330Z. Many JA's worked K6DVI, K6JDV, WA6ABH, WA6JRA, WB6ECD/6 and WB6NMTI From my understanding of the propagation between JA and W it is much rarer than for VK to work JA. Almost all previous openings seem to have been either at sunspot cycle peaks or at least during the favourable portions of the cycle.

"During recent months the JA's have worked the following areas: DU, HL, JD1, JD1 (Marcus Is.), K6, KL7, KG6, KG6 (Saipan), KH6, P29, VK, VS6. What a fantastic list! The most obvious and notable exception is ZL. The following are active from DU2 — WA6YOU, K9PNT, KOWIQ and KH6IMH. KL7HAM is said to be leaving KL7 in September or later and shifting to ZL. This is most unfortunate as given good late spring conditions it could have been a possibility to work him from at least northern VK. Great circle distances from here are not greatly in excess of VK-JA. (Whatever the outcome of his move he may promote some 6 metre activity in ZL, which should help . . . 5LP.) The way conditions seem to be improving lately the signs for a bumper DX opening in the near future look really promising. My own experience on 15 metres lately have shown the best conditions there in years."

Graham VK8ZCJ writes from the Darwin area with happenings up there on 6 metres. There seems no doubt we in the south live in the wrong places at times! He tells us:

"JA openings rather scarce at the moment, worked JA6WKI on 19/5 at 1225Z. Other signals were heard but not worked on 18/5, 23/5, 24/5, 26/5, 5/6 and 9/6. On 6/6 and 7/6 both Graham and Brian VK8VV were fortunate to work Lyell VS6BE in Hong Kong. Lyell had read in JA 'CQ' magazine of openings to Australia and began calling CQ on CW with his beam towards VK. Lyell was calling on 50.100 and listening 52.010. On 6/6 we talked for about 1½ hours with his signals peaking to S9. He has worked many JA's and KG6 this year.

"The VS6BE QTH is about 2000 feet a.s.l. and has 360 degrees of clear take off. On 6 metres he runs an FT620B to a 4CX250B linear to an 8 element KLM log periodic antenna. On 2 metres he runs an IC211 to a 300 watt linear, and on 432 he uses a Liner 430 to a separate 300 watt linear!

"The 6 metre allocation in Hong Kong is 50 to 51.500 MHz so to work VS6 we must work split frequency. We suggested to Lyell that he listen on 52.100 to allow us to use the band change switch on the transverters instead of separate receivers. He saw the sense in this and will be calling on 50.1 and listening on 52.1 in future. His second receiver is a 75A4.

"On 7/6 and 8/6 I heard an AM signal on 51.909, it peaked in the direction of Indonesia and turned out to be the 11th harmonic of RRI in Padong on Sumatra operating on 4.719 MHz running 50 kW. It is a pity there is no 6 metre activity over that way.

"While talking to Lyell VS6BE he informed me there is no TV in Hong Kong on 51.750 so the station I previously mentioned as coming from there would be in error as to location. However, the TV video on 49.750 still remains a very good indicator of openings to the north." Thanks again for writing, Graham.

My next letter comes from Nev VK4ZNC, and is in a different form from most, and the relevant parts are as follows:

"Most amateurs who have 6 metres would be keen to work a new country. Most were surprised and pleased to work Ken YJ8KM last year. I wondered why we haven't heard from some other countries in the Pacific in the range of Es, so decided to write to Jean FK8AB in New Caledonia, who I had heard had 6 metre gear back in 1957. Since then a cyclone had destroyed his equipment. If some new equipment could be provided for Jean I am sure he would come back on the 6 metre band.

"I wonder if there are enough keen 6 metre operators around VK to perhaps donate a small amount each to buy Jean an IC502? Forty stations each donating $5 would buy one. I would be prepared to build him a 6/40 linear to tack on the IC502. Perhaps someone might like to loan their 6 metre SSB rig for the next season. I believe the only way YJ8KM got on 52 MHz was because some generous VK2 donated or loaned him an FT650 transverter.

"Well, Eric, I hope the VHF amateurs of Australia are as keen as I am to work another country on 6 metres. Jean tells me that none of the other amateurs in his country are really interested in the band, so he is our only chance." It's over to you, chaps, what can we do to help? If you care to write, send to Nev Cooper VK4ZNC, 5 Cahill Street, Strathpine, Qld., 4500.

Incidentally, just a few lines from the letter Jean FK8AB wrote to Nev. He mentions the 2 metre band is very popular in New Caledonia, many using IC202's and some with 6/40 linears! Jean says he will try to arouse Vincent FK8BI and Felix FK8AC to also try 6 metres. Felix is very active on 144 via satellites.

To change the subject a little, I had a phone call from Graham VK5GW recently, and he advised that Ed VK8ZER/6 (also known as VK8NER/6) will be spending six months from 27-6-77 at the Giles Weather Station, c/- PMB., PO, Alice Springs, NT. He proposes operating on 6 metres SSB on 52.050 using an FT650B plus his FT101B, to a 5 el beam. He will also operate 52.525 FM. On 2 metres he will use an FT221 and calling on 144.1. He will use a KLM 160 watt linear to a 20 element cross polarised yagi, and will operate on all FM channels, but giving preference to Ch. 50. On 432 MHz he will be using a 16 el. long yagi. He has the equipment capability for both Oscar 6 and 7.

To give you a chance to see if he is around, he will be using his N call as well, and will operate on 3569, 3575, 21150, 21175, 21195, and Ch. 14 on 27125 USB. He has an 80 to 10 metre trap vertical and a 10 to 30 MHz log periodic!

It looks as though Ed means business. As most of the usual activities associated with more

civilized areas will be missing at Giles, no doubt Ed will be on the air quite a lot when not at work. The distance to VK5 is between 700 and 800 miles, a not impossible distance for 144 MHz. It is rather unfortunate for all those people still waiting for a VK8 for Worked All States on 144 MHz that Giles is in Western Australia! About the best we can suggest is for Ed to gather up his gear on Sunday afternoons and travel the 50 or so miles to the border with the Northern Territory and operate from there! Whatever happens, I do hope contacts will be made with Ed after all the trouble he has been to to take so much equipment with him. My suggestions would be to look for him on 80 metres and then try the VHF bands with him; if you know he is at the other end listening or transmitting that's a start in the right direction.

I have had a letter from Winston VK7EM who indicates he is very interested in the idea of an HF net to promote VHF activity. He suggests around 3520 or the low end of 14 MHz. Additionally, he will be active on 1296.1 for the first time, on AM, CW or FM; also on 435 MHz FM, 432 MHz tuneable, as well as 426 MHz ATV! So naturally Winston is looking for skeds with others with similar interests and would like to hear from you. He makes a suggestion that during evenings of good tropospheric openings that there be a back up HF channel available, preferably on 80 metres but also perhaps 20 metres, where one could call and activate some other stations, e.g. if you are in the shack you could be monitoring one of these special frequencies. That's a further thought. Thanks for at least writing, Winston, that's a lot more than everyone else seems to have done!

Lyle VK2ALU writes his Moonbounce report in "The Propagator" of June, 1977, as follows:

The scheduled EME tests for May were carried out in pouring rain on 28/5. The quantity of water on the ground almost made it seem like a maritime-mobile operation, with Charlie VK2ZEN having quite a damp few hours attending the dish.

"First time contacts were made with K9AQP/1, M/O copy and then with K3NSS, who uses an 85 foot dish, at 11 dB and more on peaks, allowing 5 x 9 reports to be exchanged. However, the strength dropped for some reason to approximately 6 dB above noise. They are certainly not obtaining results which could be expected from a dish of this size.

"A half hour VK2AMW CQ period then followed, during which we were called by a station which was almost certainly W7GBI. T reports were exchanged but no contact resulted.

"As there is no other VK station on 432 MHz EME yet and we are not allowed to transmit with the dish pointing lower than 10 degrees above the horizon, the only way to make our 70 cm band WAC was to arrange a low power scheduled test with VK2AYF, some 8 miles distant! Local reflections from side lobes radiated from the dish were used.

"VK2AYF is the only station, apart from VK2ALU, who operates on 70 cm in the Wollongong area, so this contact doubled his score! As Stuart is leaving Wollongong this month to live in Sydney, VK2AMW had to get in quick to catch him. At the present rate of amateur activity on the UHF bands in Wollongong, the CB-ers will be showing us the way!"

As a matter of further interest, Lyle VK2ALU has been putting RTTY into Oscar 7 Mode B to try out equipment capabilities. Anyone interested in trying to make a contact in this mode?

I have received a letter from Bill Tynan W3XO, the Contributing Editor for the QST "The World Above 50 MHz", who questions his listing of the 70 cm record of K4NTD to K5LLL, as he had heard about the 1516 mile contact between Les VK3ZBJ and Wally VK6WG. I did some stirring in this column recently about you two guys getting on the job and claiming the record — you don't deserve it if you don't complete the deal! Bill also asks about the 1296 MHz record as he had also heard about the record contact between Reg VK5QR and Wally VK6WG. That's another one for you to seek, Wally.

Bill W3XO also asks for advice to be sent to him direct of any noteworthy VHF/UHF happenings in this part of the globe. This I will do, as he points out that by the time I write the information in AR, and the copy finally gets to the USA, and he gets it into the columns of QST, almost a year has elapsed, so we will both try and shorten this time for noteworthy happenings. With the co-operation of all you good people who write to me I am sure we can speed the messages around the globe when we do something special, like working Africa on 6 metres!

Well, we haven't touched very much on other activity this month, mainly because there hasn't been a lot. But not let us worry, there is always next month, and another equinoxial period will soon be here and so will the long distance 6 metre DX!

Closing with the thought for the month: "Those girls who burned their bras are in for a shock when they decide to start wearing them again. It's like finding another job after retirement: they'll be doing the same thing, but at a lower level!"

The Voice in the Hills. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

Since our first report, the ATV activity has really started to increase, with the addition of about another 15 stations in the receive mode. Of these about six are building transmitters. This is only in VK3; what is happening elswhere?

The VK3 liaison channel is really starting to get cluttered. How about using it as a calling and listening channel and using the secondary frequency for those crossband QSO's.

REPEATER PROJECTS

The VK5 group is well and truly into their project. Equipment is being built now that they have standardised all of their boards, connections, and other constructional techniques. We hope to have a report first hand from VK5 in the near future. There is a fairly close liaison between the VK5 group and the VK3 group, and ATV points are discussed on the 40m net between VK5KG and VK3AHJ every Sunday morning after the VK3 WIA broadcast. John and Ron would welcome any VK's from interstate or intrastate to join in and let us know what is happening in their particular areas.

The VK3 repeater project is fairly quiet at the moment due to some of the key members being tied up with pressing local problems. The application for a licence has been lodged and the site for the repeater has been authorised in a very select position on Mt. Dandenong. The receiving and transmitting aerial patterns have yet to be finalised and we would appreciate any feedback from Gippsland as to the need to cover this area.

GENERAL ACTIVITY

Mt. Gambier is to have its own ATV activity as VK5TH is setting himself up with a receiving and transmitting set-up using the VK3 frequencies. We will be looking forward to seeing pictures from that area. Once there is one station on in a particular area, more will follow. Ray VK3ATN, in Birchip, is also setting up his station to get pictures to and from Melbourne. Winston VK7EM is already on 1296 MHz and will be trying to get pictures into Melbourne on that band.

The only information that we have been able to extract from VK2 was from Pierce Healy VK2APQ, who advises that Sydney has very little ATV activity, if any. There is some activity in the Gosford area associated with the Central Coast Amateur Radio Club, but we are unable to provide any more information than that.

We received a note from far Northern Queensland about some interest in starting some activity and that is the only information that we have received at all from VK4.

Electronic call sign generators and video typewriters have been under construction during the last few weeks and some very nice results have appeared on our screens. Some TV game colouriser kits have been brought into action giving good effects. I have designed a call sign generator which gives two lines of information. There are six characters in each line so you can have a call sign and a location or a Christian name. If anyone wants more information on this, please send a SAE to —

Kevin Callaghan,
34 Gordon Grove, East Preston,
Victoria, 3072.

A more elaborate generator, with many lines of information, has been designed by John VK3ZTO. His design details will be available at an early date. The new FET oscillator as described in last month's column to replace the BF180 oscillator in the VK2ZIM ATV converter has been incorporated in a brand new converter design using FET's and having a better noise figure than the current standard. More importantly, it does not suffer from any cross-modulation problems that the current models are prone to. Details for this converter design plus a PCB designed for the job can be obtained from Les Jenkins VK3ZBJ.

A SAE to his address as per the call book will get you more information and prices of the various units. He also has a pre-amp design for the very serious ATV DX-ers or even just 70 cm operators. This uses a fairly expensive FET and when set up correctly will give a noise figure of around 1 dB. Yes, that figure is correct! The pre-amp can be purchased from Les all set up if sufficient people are interested to make a bulk buy of the special FET. The more people purchasing, obviously the cheaper will be the units.

To round off this month's news, I am pulling out another appeal for news from all ATV groups around Australia. Please write to Peter Cossins VK3BFG or myself Kevin Callaghan VK3ZVJ. Peter's address is in the call book and mine is published in this column.

What are your thoughts about an ATV convention? This has been mentioned by a number of ATV-ers. Sounds good. What are your comments on where and when?

INTRUDER WATCH

Alf Chandler, VK3LC

As I shall be overseas until late December this year, all Co-ordinators please note that reports are to be forwarded to Ivor Stafford VK3XB, 16 Byron Street, Box Hill South, 3128, until January next year, when I shall resume my responsibilities as Federal Co-ordinator.

For our information ARRL has forwarded to me some copies of FCC complaints as issued to offending countries, and one such is here reproduced:—

From — Federal Communications Commission.
Action ETAT. March 1977.
Name — DRSPALT: MVB/I & OD: E.
To — CENTEL, CAIRO.

32008 Radio Cairo 7050 and 7075 kilohertz reported causing daily harmful interference to amateur service generally 1700 to 0600 GMT Stop Request USCAN 115 assistance regards.

FEDCOMCOM.

Thus, our contemporaries in the USA are doing their best to rid our bands, with the help of our Administration and Intruder Watchers as well as their own Observers. See you next year. ■

IARU NEWS

WARC 79

Perhaps the main international news this month is that Article 41 of the International Radio Regulations has been included in the agenda. Details of the contents of this Article, which set the operating regulations, will be found in IARU News on page 20 of AR May 1976. The implications of this will be discussed at the IARU IWG meeting in the UK late June.

Meanwhile the FCC in the USA has released its fifth Notice of Inquiry which could well be the last opportunity amateurs in the USA will have to respond to the Commission's proposals for WARC 79. The latest proposals reflect some changes from the 3rd NOI in docket 20271; for example the 40m band now proposed is 6.95 to 7.25 MHz on an exclusive basis. Amateur proposals for new bands about 10, 18 and 25 MHz (see AR July 1975, p. 28) were accepted only insofar as 25.76-25.86 MHz was proposed as an exclusive amateur band.

The ARRL in response to the 3rd NOI stated there existed a vast gulf between the 7 MHz and 14 MHz amateur allocations which makes it extremely difficult for a low-power service to meet its long distance communications needs on a reliable basis in the face of widely varying propagation conditions.

In West Germany DARC reports quite good relations with their Administration. One proposal envisaged the addition of 10 kHz to the lower limits of the 3.5, 7 and 14 MHz amateur bands with the intention of granting priority to amateur emergency traffic, especially rescue operations. All the proposals go forward to the CEPT (the permanent organisation consisting of 26 European telecoms administrations) for comparison purposes at their meeting in mid-June.

The WIA voted in favour of the admission to IARU membership of the amateur radio societies of Turkey, Papua New Guinea, Jordan and Oman. In regard to Turkey the TRAC reported that, although amateur licences are not presently being issued by the government it is hoped that their national Parliament will resolve this shortly. The Jordanian application said that since the Society (RJRAS) is officially sponsored by the King of Jordan the Society acts as the licensing authority, and it is therefore "naturally inclined very favourably" toward amateur radio in Jordan. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

RUBENS AWARD — BELGIUM

Belgium is celebrating the anniversary of Pieter Paul Rubens, one of the famous painters in the history of that country.

The Antwerp Radio Amateurs have an active part in this celebration. On the occasion of this anniversary the Antwerp sections of the UBA uses a special QSL card, and also issue the Rubens award, during the period 1st July till 30th September.

Required number of contacts with stations in the Province of Antwerp are as follows:

1. For the first time: 40 QSL's via Antwerp repeater ON0AN on 2m FM 145.800-145.200 MHz.
2. Belgian stations: 20 QSL's directly.
3. Frontier countries (PA0-DL-LX-F-G): 10 QSL's directly.
4. Other European stations: 6 QSL's directly.
5. DX stations: 3 QSL's directly.

PHONE, CW, OR MIXED, ALL BANDS.

This award is also available to any SWL.

Five IRC's, and extracts of logs, certified by two other amateurs, should be sent to —

Belgium Amateur Radio Station ON6KC,
Van Riet Robert,
Beukenhofstraat 47,
B 2060 Merksem.

WAP AWARD — NEW ZEALAND

General —

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts after November 1945 are valid.
3. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. Certificates will be endorsed for various bands and modes provided the necessary proof is submitted.
5. There is no fee for the award. It is suggested that 2 or 3 IRC be sent to help defray expenses.
6. The address for applications is —

NZART,
Wellington, New Zealand.
Post Box 489,

Requirements: Confirmed contacts are required with 30 of the listed Oceania "countries".

List of Countries:

C21/VK9—Nauru Is.
CR8/CR10—Timor.
DU—Philippines.
FB8—Adelie Land.
FK8—New Caledonia.
FO8—French Oceania.
FW8—Wallis Island.
FU8/YJ—New Hebrides.
JD—Ogasawara Is.
JD—Minami Torishima.
KB6—Baker, Howland, Phoenix.
KC6—East Carolines.
KC6—West Carolines.
KG6—Maroanas Is.
KG6—Guam.
KH6—Hawaiian Is.
KJ6—Johnston Is.
KM6—Midway Is.
KP6—Palmyra Is.
KS6—Am Samoa.
KW6—Wake Is.
KX6—Marshall Is.
PK YB 8F—Java.
PK YB 8F—Sumatra.
PK YB 8F—Borneo.
PK YB 8F—Celebes.
PK YB 8F—West Irian.
VK—Australia.
VK2—Lord Howe Is.
VK4—Willis Is.
VK0—Macquarie Is.
VK9 (P?)—New Guinea.
VK9—Norfolk Is.
VK9 (P2)—Papua.
VK9—Christmas Is. (ZC5).
VK9—Cocos Is. (ZC2).
VR1—Gilbert Is.
VR1—Ellice Is.
VR1—Br Phoenix Is.
VR2/3D2—Fiji Is.
VR3—Fanning and Washington.
VF4—Solomon Is.
VR5/A3—Tonga.
VF6—Pitcairn Is.
VS4—Sarawak (9M8).
VS5—Brunei (9M).
ZC3—North Borneo (9M6).
ZK1—Northern Cook Is.
ZK1—Southern Cook. Is.
5W1—Samao (ZM6).
ZM7—Tokelau Is.
ZL/K—Kermadec Is.
ZK2—Niue.
ZL—New Zealand.
ZL/C—Chatham Is.
ZL/A—Auckland and Campbell Is.
ZL5—Antarctica. ■

LARA

Ladies Amateur Radio Association

This month we start with a report of the LARA (VK3) meeting held in June. At this meeting the LARA Reporter saw no less than six licensed YL's sitting along one wall. A photograph was duly taken to commemorate this event, and a caption would have read: Mavis VK3KS, Mavis 3BIR, Norma 3AYL, Heather Bedson (YF/VK3ZEB), Heather Mitchell (call sign pending), Rhonda VK3ZYL and Vicky Edmonds (also awaiting a call sign). Other partially qualified, or not-yet-qualified, members were present, of course, and to even things up, there were six gentlemen (associate members) present. Items included on the agenda for this meeting were (in order of importance): lunch, followed by the opening of the meeting, discussion of money (which is looking good at last) and discussion of the birthday party (July 30th-31st), and the All-Australian Z/L sked.

A point raised at this meeting was the suggestion that there should be a roster for the position of Net Controller for the sked. Myrna VK5YW, who has been doing a wonderful job as the net controller, now feels that other YL's should perhaps have a go. All suggestions and volunteers welcome. By the time this issue goes to press we will have held the special birthday sked, where we hope YL's all over Australia will come up on air (with their own stations or as guests on other stations, as the regulations allow) to meet other YL's and join in the chat.

Our special feature for this month's news concerns a very interesting family. Brenda and John Edmonds (VK3KT and VK3AFU) have four recently qualified amateurs in their family. Vicky and Charles have both passed the AOLCP and Brenda, Junior, and Alex have become Novices. Six licences in all (two in each category), and three of these belonging to the YL members of the family. With so many active amateurs in one place the shack is certainly going to get crowded! Anyway, best of luck to this talented family. ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

August		
	6/7	Romanian Contest
	13/14	REMEMBRANCE DAY CONTEST
	13/14	European CW contest
	20/21	RAST SEANET WW DX Phone Contest
	20/21	SARTG RTTY Contest
	27/28	All Asian CW Contest
September		
	10/11	European Phone Contest
	10/11	Albatross SSTV Contest
	17/18	Scandinavian CW Contest
	24/25	Scandinavian Phone Contest
October		
	1/2	VK/ZL/Oceania Phone Contest
	8/9	VK/ZL/Oceania CW Contest
	15/16	Manitoba QSO Party
	15/16	RSGB 7 MHz Phone
	29/30	CQ WW DX Phone Contest
November		
	5/6	RSGB 7 MHz CW Contest
	12/13	European RTTY Contest
	19/20	WWDXA CW Contest
	26/27	CQ WW DX CW Contest

RD CONTEST

This contest is on again on August 13 and 14. This is the contest where many old friends can be met on air and many more made. There have been a few changes made to the rules, which should close the big gap in trophy points scored by the Divisions. No Division can win without individuals participating though, and also submitting logs. Last year we had a record number of logs, and with a small amount of extra effort, a new record could be set this year.

BARTG SPRING RTTY CONTEST

Results have come out, and show in 58th place VK2SG with 54,318 points, VK3KF 68th with 38,080, and VK5WV with 18,420 in 89th place.

ALBATROSS SSTV CONTEST

Two periods, 1500 to 2200 GMT on Saturday, September 10, and 0700 to 1400 GMT on Sunday, September 11. Exchange picture with call sign, signal report and contact number. Score 1 point for contacts on 14 MHz, 5 points on other bands and 25 points via Oscar. Multipliers are 5 for each country and 10 for each continent worked. W/K and VE call areas are considered as separate countries for scoring. Final score is total exchange points times the sum of multipliers (counted once only). Frequencies are 3754, 7040, 14230, 21340, 28670.

Logs must be received no later than October 30th and go to Prof. Franco Fanti I4LCF, via Dallolio n 19, Bologna 40138, Italy. Include a dollar or equivalent to cover mailing expenses for copy of results and future contest information. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN April 1977

Some Ideas for Home Brewing; Printed Circuits the Easy Way; The Quick Brown Fox Generator; Some Modifications to the Wellington Branch Direct Conversion Receiver; How Flat is NZ.

HAM RADIO March 1977
IF Amplifier Design; Improved Digital AFSK: Reducing International Distortion in High-Frequency Receivers; Second Generation IC Voltage Regulators; The Polarization Diplexer—A Polaplexer; 24 Hour Clock with Digital Readout and Line Frequency Time Base; Audible S-Meter for Repeaters; Function/Units Indicator Using LED Displays; Control Function Decoder; Synthesized Channel Scanning; Improved Method for Calibrating Time-Base Oscillators.

QST April 1977
The VHF Quagi; Some Basic Antenna Information; Broadband Steerable Phased Array; A Multi-Band Vertical Radiator; Quad Log-Periodic Fixed-Beam Antennas; Sweep 6 Metres and Really Clean Up; Build This C-T Quad Beam for Reduced Size; The Inverted-L Antenna; A Two-Metre J Antenna; Efficient Short Radiators; My Feedline Tunes My Antenna; Build This Quickie Pre-Amp; Solid-Tubes—A New Life for Old Designs; Getting to Know OSCAR from the Ground Up; Amplifiers, Type Acceptance—FCC's Latest Proposals; ARRL Responds to FCC Frequency Proposals; Demise of the Computer Kid; We Want You at the National.

RADIO ZS March 1977
The Ugly Duckling; Digital Receiver Dial.

73 February 1977
Give that Professional Look to Your Home Brew Equipment; You Already Have an Atomic Frequency Standard; Give the Hamburglar Heart Failure; Contest Special Keyer; The Chintzy 12; You Can Sound Better with Speech Pre-emphasis; Are You Really Insured?; Getting a Patent—Is It Really Worthwhile; Keeping the Wind Down; SSB: The Third Method; The TTL One-Shot; DVM's Get Simpler and Simpler; Instant PC Boards; Computerised Satellite Tracking; Building the Polymorphics Video Board; RTTY Goes Modern; How to Use Those Old Teletypes; Drive More Safely with a Mobile Dialler; An Automatic BC Squelch; Tune Up a Random Wire.

73 March 1977
Pitcairn Island; How Do You Use IC's?; Super Low Voltage Power Supply; QLF Not with the Great Lakes Sideswiper; The Capacitor Comparator; Logical Storage for Logic; CB Can Do Some Things Better; A New Breed of Voltage Regulators; High Quality Displays; Save Time with the Micro OS; PROM Message Generator for RTTY; FCC Approved Microprocessor; How Computer IC's Work; Inexpensive Variable DC Supply; The History of Ham Radio; Remember the Windom; The Agonies of Tower Raising; The Speedy Audio Counter; Versatility Plus for the HW-202; The Boomless Microbeam; Making Your Own PC Boards: Announcing the PCF; Build Your Own Car Regulator; The Happy Flyers; 10 and 11 Metre Predictions. ■

QSP

JUST BELONG —

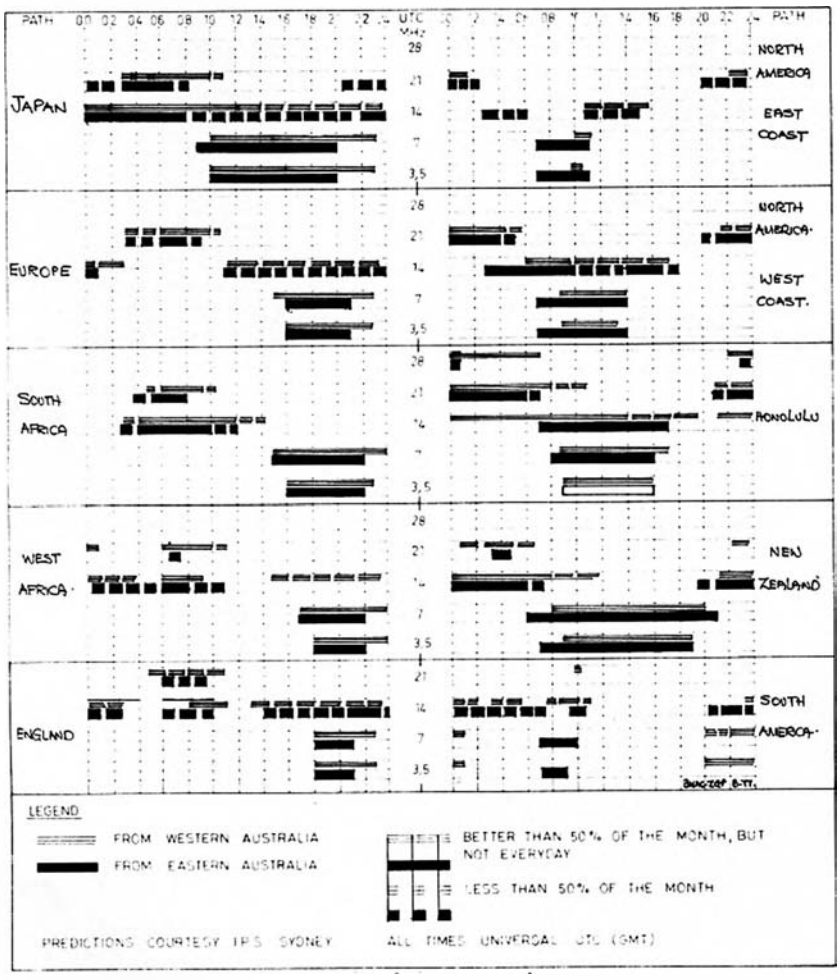
Are you an active member, the kind that would be missed —
Or are you just contented that your name is on the list?
Do you attend the meetings and mingle with the flock —
Or do you stay at home and criticize and knock?
Do you take an active part to help the work along —
Or are you satisfied to be the kind that "Just Belong"?
Do you ever go to visit a member who is sick —
Or leave the work to just a few and talk about the clique?
We have some serious problems that I'm sure you've heard about —
And we'll appreciate it if you, too, will come and help us out.
So come to the meetings often and help with hand and heart
Don't just be a member, but take an active part.
Think this over, remember you know right from wrong,
Are you an active member, or do you "Just Belong"?

From QTC July 1977.

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP/NAC

It has now been confirmed that the running smooth sunspot number reached the minimum in July 1976. This, of course, is a mathematically smoothed figure and it is still too early to be certain. If it is correct then it seems probable that the next maxima will occur in the early 1980s with the swag of predictions that I have mentioned earlier.



The new cycle will start slowly, but after the first few months the general pattern should change. The amount of solar radiation should increase with a corresponding increase in the density of the ionosation of the ionosphere. The 27 day recurrent magnetic and ionospheric disturbances which have been of major importance to HF communications over the last few years will become less noticeable and the shorter more severe storms associated with active sunspots and solar flares will occur more frequently along with daylight fadeouts which have been rare during the last few years.

Predictions for the various paths will start to show more predictability and the conditions will exist for a greater proportion of the month than has been in the past few years.

Already evidence is sufficient to show the increased ionisation with good openings occurring across long daylight paths on 10 and 15 metres. The recurring storms barely affect conditions for more than 24 hours and then bounce back very quickly.

The 2800 MHz solar flux figures are showing pronounced rises evident of the increased solar activity — at the time of writing over 110 with WWV giving solar activity as moderate, as distinct from very low or low. A decided change to the usual — for so long the pattern.

My records show a steady rise in the solar flux over the past three months and augers well for some interesting conditions during and past the September equinoxial period. With as much as a 25-30 per cent increase possible in conditions since last September, some good DX is being worked on the higher frequency bands.

From reports 6m is getting a share of the DX with trans-pacific openings East-West and over the North-South American paths. I venture to suggest by September the new cycle should be showing plenty of activity which will put many into areas they have not worked for considerable periods of time. Long path openings on 15m into Europe are quite good before noon EAST. Even the novices are getting their share of the DX. Conditions to North and Central America are quite good around noon almost daily.

Predictions of the running smoothed number to come are at May 31, 1977, Sept. 21, Oct. 23, Nov. 24.

Monthly means 3/77 = 8.0, 4/77 = 13.2, 5/77 = 18.4

Running smoothed number 7/76 = 12.9 8/76 = 14, 9/76 = 14.2, 10/76 = 13.4, 77/76 = 13.4

Sunspot data courtesy Dr. Waldmeier, Swiss Federal Observatory, Zurich.

Prediction data: IPS, Sydney. ■

PROJECT AUSTRALIS

Bob Arnold
VK3ZBB

For several years Dave Hull VK3DZH has ably filled the office of Chairman of Project Australis and operated the Australian command station for Oscar 6 and 7.

With two more satellites envisaged in the near future, Dave's command role will become more exacting and consequently I have agreed to assist with Australis administration.

Therefore, I shall be your scribe and I look forward to receiving news for publication from my many Oscar friends.

Activity on Oscar 7 Mode B continues at a high level with the following new stations being heard:

VK2ZFX, ALU, ZXL
VK3ACR, ATN
VK4ZRF
VK6ZKO.

It is particularly pleasing to see Ray VK3ATN on this mode — his 16 ft EME dish has already enabled him to work JR6AE in Okinawa.

Steve KH6IHP, in Hawaii, is conducting high power tests on Mode B in the hope of working VK and ZL areas. He has already been heard on CW and SSB by ZL3AR.

The next tests will be for a few minutes after the following equator crossings —

Date	Time	Orbit
2 Aug.	0842Z	12411
4 Aug.	0836Z	12436
6 Aug.	0830Z	12461
8 Aug.	0823Z	12486
7 Sep.	0843Z	12862
9 Sep.	0836Z	12887
11 Sep.	0830Z	12912
13 Sep.	0824Z	12937
15 Sep.	0817Z	12962

Please let me have any reception reports.

Unfortunately Oscar 6 is now very sick due to battery failure and it is switched off for the present (June) to give it a chance to revive.

Graham VK5EU has been portable in VK2 for several months using low power and simple antenna systems. His fine signals via Mode B demonstrate what can be achieved with basic equipment.

AUGUST 1977

	OSCAR 8			OSCAR 7		
	Orbit	Time	Long	Orbit		Long
Date	No.	Z	°W	Date No.	Time	°W
1	21919	01.54	91.00	1 12394	00.08	56.12
2	21931	00.54	76.00	2 12407	01.03	69.74
3	21944	01.49	89.75	3 12419	00.02	54.62
4	21956	00.48	74.75	4 12432	00.56	68.24
5	21969	01.43	88.50	5 12445	01.51	81.86
6	21981	00.43	73.50	6 12457	00.50	66.74
7	21994	01.38	87.25	7 12470	01.44	80.36
8	22006	00.38	72.25	8 12482	00.43	65.24
9	22019	01.33	86.00	9 12495	01.38	78.86
10	22031	00.33	71.00	10 12507	00.37	63.74
11	22044	01.28	84.75	11 12520	01.31	77.36
12	22056	00.28	69.75	12 12532	00.31	62.24
13	22069	01.23	83.50	13 12545	01.25	75.86
14	22081	00.23	68.50	14 12557	00.24	60.74
15	22094	01.18	82.25	15 12570	01.19	74.36
16	22106	00.18	67.25	16 12582	00.18	59.24
17	22119	01.13	81.00	17 12595	01.12	72.86
18	22131	00.12	66.00	18 12607	00.11	57.74
19	22144	01.07	79.75	19 12620	01.06	71.36
20	22156	00.07	64.75	20 12632	00.05	56.24
21	22169	01.02	78.50	21 12645	00.59	69.86
22	22181	00.02	63.50	22 12658	01.54	83.48
23	22194	00.57	77.25	23 12670	00.53	68.36
24	22207	01.52	91.00	24 12683	01.47	81.98
25	22219	00.52	76.00	25 12695	00.47	66.86
26	22232	01.47	89.75	26 12708	01.41	80.48
27	22244	00.47	74.75	27 12720	00.40	65.36
28	22257	01.42	88.50	28 12733	01.34	78.98
29	22269	00.42	73.50	29 12745	00.34	63.86
30	22282	01.37	87.25	30 12758	01.28	77.48
31	22294	00.36	72.25	31 12770	00.27	62.36

SEPTEMBER 1977

1	22307	01.32	86.05	1 12783	01.22	74.81
2	22319	00.31	71.05	2 12795	00.21	59.69
3	22332	01.26	84.80	3 12808	01.16	73.31
4	22344	00.26	69.80	4 12820	00.15	58.19
5	22357	01.21	83.55	5 12833	01.09	71.81
6	22369	00.21	68.55	6 12845	00.09	56.69
7	22382	01.16	82.30	7 12858	01.03	70.31
8	22394	00.16	67.30	8 12870	00.02	55.19
9	22407	01.11	81.05	9 12883	00.56	68.81
10	22419	00.11	66.05	10 12896	01.51	82.43
11	22432	01.06	79.80	11 12908	00.50	67.31
12	22444	00.06	64.80	12 12921	01.44	80.93
13	22457	01.01	78.55	13 12933	00.44	65.81
14	22469	00.01	63.55	14 12946	01.38	79.43
15	22482	00.55	77.30	15 12958	00.37	64.31
16	22495	01.50	91.05	16 12971	01.32	77.93
17	22507	00.50	76.05	17 12983	00.31	62.81
18	22520	01.45	89.80	18 12996	01.25	76.43
19	22532	00.45	74.80	19 13008	00.24	61.31
20	22545	01.40	88.55	20 13021	01.19	74.93
21	22557	00.40	73.55	21 13033	00.18	59.81
22	22570	01.35	87.30	22 13046	01.12	73.43
23	22582	00.35	72.30	23 13058	00.12	58.31
24	22595	01.30	86.05	24 13071	01.06	71.93
25	22607	00.30	71.05	25 13083	00.05	56.81
26	22620	01.25	84.80	26 13096	01.00	70.43
27	22632	00.25	69.80	27 13109	01.54	84.05
28	22645	01.20	83.55	28 13121	00.53	68.93
29	22657	00.19	68.55	29 13134	01.47	82.55
30	22670	01.14	82.30	30 13146	00.47	67.43

■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
In recent weeks, with the sudden influx of new Novice calls, I have noticed that the Novice band on 80 metres has become cluttered and at times unusable due to QRM.

Forgetting about the QRM caused by intruders I found that most interference was being caused by full call operators running high power and having rag chew skeds amongst themselves. At the same time I have observed that the 80 metre segment 3.6-3.7 MHz has been almost unused.

Could I suggest that these full call operators QSY to the upper portion of 80 metres and make things easier for the Novices who must run low power and usually inferior antennae.

Their move will also utilise our 80 metre band allocation more effectively.

Mike Hennessy. ■

ST. GEORGE AMATEUR RADIO SOCIETY

May 12, 1977.

Dr. David Warlaw,
Federal President,
Wireless Institute of Australia.
Dear David,

At the regular monthly meeting of this Society we were informed by our WIA Liaison Officer that a general appeal for funds to assist with expenses of delegate/s to WARC 79 has now been launched.

The Committee of this Society has now fully discussed this appeal and I have been instructed to inform you that the St. George Amateur Radio Society hereby pledges the amount of $2 per member towards this important appeal. It is envisaged that the total contribution will amount to $300.

We would advise that this money is yet to be raised and will be available at your request from this Society when finalisation of your appeal draws closer.

On behalf of the Committee of Management and the members of this Society we wish you and the WARC Committee every success with planning for the forthcoming conference and it is our wish that the Amateur fraternity of Australia must be actively represented at the WARC 79 Conference.

Yours sincerely,
Allan R. Pettiford, Hon. Secretary. ■

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.

FOR SALE

Returning to UK, must sell FT101, ex cond, Pye 2m tcvr 15W; new QM70 2m/70cm compact tripler/convertor, ASAHI mobile whips 10-160m, Hygain antenna switch, SWR/wattmeter, 14 el 15 dB 2m parabeam, new Kit 2m 40W PA, 14 AVQ antenna. Ph. Andrew VK1NAM/ZDA (062) 51 1195, A.H.

Tektronix model 453, CRO with leads, approx. 5 yrs old, $1,200. Ampex model 5800 1 inch colour, editing, video tape recorder, $1,000, plus tape. Teletype machine, model 15, fully serviced, with keyboard, $60. VK2ZPM, QTHR. Ph. (02) 476 2304.

Mobile helical whips, 66 inch solid fibreglass, ½-inch taper to ¼-inch, 3/8-24 standard screw ftg. Well proven, high efficiency; adjustable tip for frequency variation. 80, 40 and 20m bands, $18 each. VK3JQ. Ph. (03) 818 8749.

AWA MR10 2m carphone, complete with Ch 40, xtals, remote control unit, AC and DC power supplies. Ideal base station, $25. VK3AFO, QTHR. Ph. (060) 24 2537.

TCA1674 hi-band transceiver converted for 2m. QQE03/20 output with spare QQE06/40 and other spare valves. Crystals and spares for Ch 40, Ch. 37 Rx only, $45. Also interested in exchanging (or selling) spare Ch. 37 and 40 crystals (D-type) for other channels (1—36 Tx (—2 MHz) —7 RX). VK3ZLM, 3/113 Gordon St., W. Coburb. Ph. (03) 386 7902 A.H.

Swan 250 with speaker and 240V power supply, $170. VK2SI, QTHR.

Drake TR4C transceiver with AC4 240V P/S (both as current units), 10-180m, SSB, AM, CW, 300W PEP input, with handbook; also complete set of new tubes and transistors to suit, no mic. $500, ONO. Used to receive only, going solid state. VK2ZWG. Ph. (069) 42 1392.

Kenwood TS520 SSB transceiver, inbuilt AC/DC supply, complete with spare American 6146B's, microphone and English instruction manual, condition as new, rarely used due absences overseas, $500. Ross Treloar VK2BPZ. Ph. (02) 239 5267, Bus.

AM TX WW2 mod. 3BZ, v. good cond., 7W 2-10 MHz xtal cont., 12V, offers. Also many bits and pieces, including many radio and TV parts, speakers, valves, etc.; also many surplus bits. K. Anderson, 8 Ida St., Hornsby, 2077, NSW

Transceiver, "Multi 7", 2m FM, with crystals in 17 channels. Rx good, transmitter faulty, with mike, manual, etc., $100. (Less than cost of crystals.) VK2CE, QTHR. Ph. (02) 871 7758.

Drake 2A Rx, 80, 40, 20, 15, 11, 10m. V. good condition, manual and power supply, $120. M. Wright RMB 619, St. Arnaud, Vic., 3478.

RTTY equipment (Creed), 6S/5m auto transmitter, 7P/N4 perforator. Both units in excellent condition, supplied with 20 rolls of tape and manufacturer's manuals, $150. VK5JE, QTHR. Ph. (08) 262 4622.

FT220 2m transceiver, very little use, just 3 years old, new condition, AC and DC powered, FM, CW and SSB modes. Reason for sale—unable to find time to use it. $400, ONO. VK3ATR, QTHR. Ph. (03) 336 1054.

Honda E300 generator, 240V AC or 12V DC, little used, as new, $200. Paint sprayer, gc., $60. VK3BBH, QTHR. Ph. (057) 59 2518.

9, 10, 11 and 15 yd lengths of 75 ohm coax, 3/8 in. dia., 12 yds 12 way colour coded cable all in one screen, ½ dia. Never been exposed to the weather. New valves, U19, 6CW4 (Nuvistors), 815, 416B. Geloso VFO 4/101, complete with dial, etc., new and unused. Pwr trans, 565-565, 250 mA, 2 x 6, 3V, 4A and 5V 4A. 575-575, 250 mA, 6.3V 4A, 5V 4A. 100W mod transformer. Large chokes and block caps. Vintage AWA car radio, working, complete with all cables. Offers to Maurie Batt, RSD, Rokewood Junction, Victoria, 3351.

Test equipment, as new: FET VOM "TMK" 150, $50. Audio sig gen "Tech" TE22D, $50. RF sig gen "Tech" TE20D, $50. Lens, "Canon" Macro FL3.5, $100. Flash gun, "Sunpak" 107 professional, with charger, $30. Screen, 6 ft sq, roll-up, with stand, /40. VK2CE, QTHR. Ph. (02) 871 7758.

Heathkit SSB Ixcvr, SB101 and AC psu/spkr, 80-10m plus 11m, v clean, incl mic and manuals, $320, ONO. B. Bathols VK3UV, 6 Ann Court, Aspendale, Vic. Ph. (03) 90 6424 (A.H.).

Cushcraft 6m beam in perfect condition, heavy duty, 5 el, all hardware included, $25. Ph. (03) 457 2131, Bus.

IC502, new condition, in packing, $160. Contact Barry Mews. Ph. (02) 816 1972.

Icom IC502, very little use, mint condition, $180, ONO. VK2YDY, QTHR or Ph. (067) 52 1185.

AWA high-band repeater, solid state, 12V, plus diplexer. Sell or swap for good scope, i.e. BWD 539D. VK6JJ, QTHR. Ph. (092) 37 7914.

Clegg FM27B 2m FM transceiver Continuous coverage, separate Tx and Rx frequency selection, 25W, with lockable mobile cradle, manual. Quality US gear, $250. 10A 12V adjustable regulated power supply, $45. Offers considered. VK2HS, 23 Brisbane St., Bondi Junction, NSW, 2022. Ph. (02) 387 2492.

Oscilloscope, magnificent lab quality Fairchild type 766H. Bandwidth 50 MHz. Dual trace, delayed sweep, solid state with big screen. Beautiful condition, with manuals, probes and accessories, $550. Offers considered. VK2HS, 23 Brisbane St., Bondi Junction, NSW, 2022. Ph. (02) 387 2492.

Collins KWM2 transceiver, with homebrew P/S. In excellent condition. Best offer. VK3BAJ. Ph. (03) 725 6223, A.H.

FT101B transceiver, complete with mic, CW filter, handbook, all leads, in original carton, mint condition, $550. IC215 2m FM transceiver, fitted with channels 2, 4, 6, 7, 8, 40 and 50, with mic, handbook, original carton, mint condition, $180. VK3BFS. Ph. (03) 277 3082.

Comdel speech processor, $50. VK3AIF, QTHR. Ph. (03) 857 5401.

Hewlett and Packard 25 Calculator, stock registers, 8 storage registers, 50 program memories, c/w instructions, AC power supply, book of programs, etc., $215. Ph. (03) 97 6031 or 41 2934, ask for Leon.

Hewlett and Packard 65 Calculator, fully programmable, 9 storage registers, 200 program memories (stores it on magnetic tape), c/w instructions, AC power supply and programs. Can supply programs on math 1 and 2, finance, electrical engineering 1 and 2, etc. Excellent condition. This machine does everything. Retails around $700, will accept $345, ONO. Ph. (03) 97 6031 or 41 2934, ask for Leon.

Commercial Radio Mast, four 25 ft winch-up telescoping sections. Fitting for pipe at top, $380. VK2ALX, QTHR. Ph. (02) 949 3761.

52 ohm air dielectric rigid coaxial line 1.625 in. OD, four 24 ft and three 14 ft lengths. Offer to VK3XY, QTHR. Ph. (03) 97 1265.

Yaesu Musen FL200B Tx, 10-80m, CW, AM, SSB, 240W PEP, very good condition, $210. Telescopic tower, 80 ft, four section wind-up, $120. VK2BFB. Ph. (02) 639 8367.

Kenwood TS510 5 band 180W PEP transceiver, incl power supply. As original, no mods, looks good and goes well, $300. VK3CDX, QTHR. Ph. (03) 877 1135 (except 19/8 to 3/9).

Telefunken Rx E127 kW/4 and separate antenna diversity combining unit. Rx 1.5 to 30 MHz in 5 bands with 2-speed dial, variable band-width switched for 0.1, 0.5, 1.5, 3 kHz, RIT, AGC on-off, field strength/audio meter switch, RF-AF gain, 240V mains power. Many other features and quality construction. Antenna diversity combining unit is separate unit with 17 transistors. Selects electronically from 3 antennae. Mains or battery supply. Designed for use with above Rx, but will split. Full handbooks for both. Reasonable offer, or swap with adjustment either way for good gear. VK2KR, QTHR. Ph. (02) 449 4524.

2m FM Transceivers, AWA MR6 single channel with ch 42, MR10A two channel with ch 40, both with handbooks and all accessories, new valves and operating inst. Good condition, $70 the lot. VK3ZKS, QTHR. Ph. (03) 380 6793.

At half retail or swap. All new and boxed. 6AJ8, 7360, 6146, KT66, 866A, 6DQ6A, 1629, 83, 1625, 6AU6, 6AG5, 6J6, 6BE6, 6BQ7A, 6AQ5, 12AT7, 6CB6, 6AK5, 6BJ6, 6C4, 6N8, EF86, 6M5, 6AV6, 12AV6, 6X4, 12AQ5, 12BA6, 12BE6, 85A2, 6AH6, 6AT6, 5R4GY, 6Y6, 807, 6V6, 2E26, 6AG7, 6AC7, 6BQ5, 6CA7, 6N7. VK2KR, QTHR. Ph. (02) 449 4524.

FT75 Transceiver with nine xtal freq, DC power supply FV 50c VFO. Used less than 1 hour, $350 the lot. VK3SS, 34 Henry St., Maffra, 3860.

Hall SX101 Rx, ex cond, $220. HT37 Tx, slight fault, $90. Old WR300 transceiver (similar to Drake TR3), not working, repairable, $50. Will exchange for VHF SSB equipment. W. Melrose VK3AWD, 32 Lackenheath Dr., Tullamarine, Vic., 3043. Ph. (03) 338 8574.

RTTY AFSK generator kit, designed for West Australian version of popular ST5, RTTY demodulator is incorporated inside cabinet. Generator can be used to modulate any SSB rig if required. Price is $23. Creed 7B teleprinter, very good condition, $65. Plenty of spares available, except motors, for the 7B Creeds. Please advise your requirements. VK3AQB. Ph. (03) 337 4902.

Lafayette Rx, 80m-6m, as new condition, model HA800B, complete, handbook, 12V DC/240 AC, $135. VK4ZBI, QTHR.

WANTED

3000 rpm motor to suit Creed 7B teleprinter, armatures must have straight shafts; if not electrically OK, must be capable of being rewound. VK3AQB. Ph. (03) 337-4902.

"S" Meter No. 699 for Eddystone 888A, also similar for 750 Rx. VK4ZBI, QTHR.

FT101 Transceiver, 6m and 2m, transverters suitable for same. Must be GWO, IC202 with lin, etc. W. Melrose VK3AWD, 32 Lackenheath Dr., Tullamarine, Vic., 3043. Ph. (03) 338 8574.

National NCL2000, first class condition only. Advise serial number and price. Clipsal military keys WT No. 2, complete VK3BR, 201 Spring St., Melbourne, 3000.

Borrow, rent or buy crystals for KP202 for ZL repeater channels during November. A Dixon VK7ZAJ, 54 Adelphi Rd, Claremont, Tasmania, 7011.

Yaesu FT200, unmarked, with power supply and manual. R. Cant, 94 Edgecumbe St., South Como, WA, 6152.

Whip Antenna, in sections, any length, ex army, navy, RAAF. VK8CO, Box 40441, Casuarina, NT, 5792.

FT75B or FT76, power supplies not essential, but may be considered. Price and particulars to Terry Hine VK8NTA, Box 753, Darwin, 5794. Ph. (089) 81 2769.

Hand morse key, ex RAAF or PMG. P.O. Box 334, Coolangatta, Qld., 4225.

6m Rx suitable for SWL (both home-brew and commercial units considered). Circuit diagram for hi-fi deluxe model KT1002W reel to reel recorder. Details to Graham Mutton, 85 Finlay St., Bridgewater, 7401.

B28/CR100 Rx in good unmodified condition. Price and particulars to VK6TO, 43 Strickland St., Mt. Claremont, WA, 6010.

Linear amplifier for use on 10 to 80m. Please contact VK5ADP. Ph. (08) 337 4668.

2m mobile FT221, IC22 etc Must be good and include manual and mounting hardware, etc. VK7AR, P.O. Box 90, Devonport, Tas., 7310. Ph. (004) 24 5666.

Atlas 210X or similar physically small transceiver, like Swan monobander, in any condition, for portable and mobile use. VK4XT, QTHR, or Box 496, Dalby. Ph. (074) 62 2389.

EXCHANGE

Swap Yaesu FRDX400 Rx for FT75BS (power supply also if possible). Covers all HF amateur bands; 50-52 MHz (change xtal to cover 52-54 MHz) and 144-146 MHz, very good condition, passed NAOCP, awaiting licence. Write B. G. Roche, 103 Sig. Sqn., Lavarack Bks., Milpo, Townsville, Qld., 4813.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. W. J. ROBERTSON VK2BWL
Mr. W. L. JACKSON VK3XM
Mr. R. E CONRAD VK7TR
Mr. D. PORTHOUSE VK7DN

Mr. E. SALAMY VK3PS

VK3PS Ted Salamy of 61 Verdon Street, Warrnambool, previously VK3AJ, and prior to that held a number as an experimental licence in the very early days. He obtained his AOCP licence No. 35 on the 1st December 1924 at a cost of 2 shillings and sixpence. He passed away on the 11th of June, after a long illness. Ted was the man who pioneered radio in the City of Warrnambool in the days of 200 metres under the call sign of 3AJ. He also was the first district amateur to contact the USA in 1926.

The late Lang Osborne of Terang and Ted Salamy carried out transmission tests for the PMG. He was also a very good fist on the key, being one of the old original brass pounders as they were called. He also wrote technical articles for the local paper, the "Warrnambool Standard" under the name of "Circuit" in 1927-28-29,30, and was also responsible for many radio enthusiasts taking up positions as technicians with the PMG in the early days.

He attended clubs, Scouting groups, etc., lecturing them on the facets of radio. Ted served in the army in the signals training CW operators.

Ted is survived by a sister, Rose.

The funeral took place at the Warrnambool cemetery on Tuesday, the 14th June. Coffin bearers were radio amateurs who had known him all his life — Les Kermond, Norm Gee, Harry Duggan, Bill Wines.

Submitted by Bill Wines.

Mr. THOMAS DAVID HOGAN VK3HX

Tom Hogan VK3HX, who died suddenly on 8th June, 1977, was first licensed about 1937 when he resided at Charlton in North Central Victoria, where the family published the district newspaper. His experience in this field was of great value to the WIA when he came to Melbourne and became a member of the Magazine Committee. He is perhaps best remembered as Editor of Amateur Radio, which office he held from 1941 until 1956.

In particular, the period from March 1941 until September 1945 was an extremely difficult one. It was during this period that Amateur Radio was produced on a hand-operated duplicator and the amount of work which Tom did could only be appreciated by those who worked with him. In recognition of this service he had been made a life member of the Victorian Division. Over recent years his main activity was on 80 metres Sideband and 2 metres FM, where he continued to keep in touch with many of his old friends.

Despite a severe physical disability, Tom always maintained a keen interest in Institute affairs. His sense of humour and cheery smile will be remembered by many "old-timers" and he will be greatly missed by all who knew him.

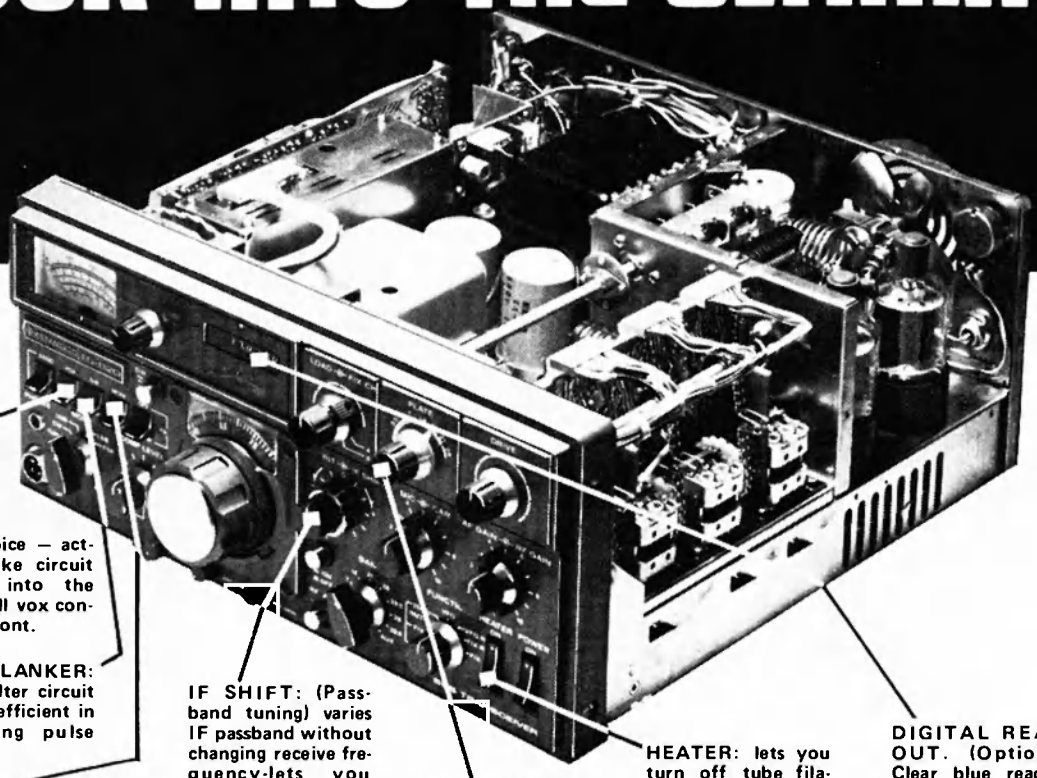
From Jim Marsland VK3NY.

Mr. BILL ROBERSTON VK2BWL

Friends of William Joseph (Bill) Robertson (VK2BWL) will be saddened to learn of his passing on 1st June last in Coffs Harbour. Bill will be particularly remembered when he was active from Coopers Plains and later Charleville, with the call VK4WL, during his employment with the Department of Civil Aviation. He passed away after a short illness, having retired only a few months previously. To Val, his XYL, and family go our deepest sympathies.

VK4ZGL.

LOOK INTO THE ULTIMATE



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CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
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CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
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CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA3090Q	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
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CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
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7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
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7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
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7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
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7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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PLENTY OF PARKING AT REAR

STD 02

amateur radio

VOL. 45, No. 9 SEPTEMBER 1977

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TECHNICAL

GENERAL

DEPARTMENTS

COVER PHOTO

Bruce Bathols VK3UV, the Editor of AR, is sometimes able to find time to operate on the amateur bands. Bruce is a relative newcomer to amateur radio, being first licensed in November 1971. He has been a member of the Publications Committee since early 1972. The antenna system is a 4-element monoband Yagi on 20 metres (inset), and a homebrew multi-band dipole system for the other HF bands.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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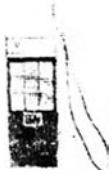

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amateur radio

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SEPTEMBER 1977

Vol. 45, No. 9

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QSP — REQUIEM

We have lost a frequency band — temporarily, we are told. All amateurs voice alarm when any privilege is lost; whether or not they themselves used that privilege to any appreciable extent is immaterial.

As has already been reported last month the Institute has been active in seeking adequate compensation for this loss. With this must be linked the staffing position of the Department.

The new Novice segment on 10 m is one spin-off. A letter was sent to the Department about Third Party privileges for radio amateurs. Additional frequency allocations form part of the WARC 79 negotiations by the WIA. The text of the Institute's submissions is printed in full elsewhere in this issue.

The Institute's attitude to CB was reached after consultation amongst all Divisions and represents the view of the majority. However, the whole matter raises the question of whether other amateur frequencies are vulnerable to "strong arm" pressure groups in Australia. ITU and WARC 79 must be considered a special case in their own right.

Membership in a strong WIA is the only hope for the future of radio amateurs in Australia. A weak Institute has little bargaining power and an ineffective lobby.

That is one message for us all.

The second message really need not be spelt out. If you have any complaints take them to your Division. Tell the WIA about them.

Please remember, we are not running a dictatorship. The Institute arrives at a collective decision based on what the membership wants.

D. A. WARDLAW VK3ADW,
Federal President. ■

WIRELESS INSTITUTE OF AUSTRALIA

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President — Mr. T. I. Mills VK2ZTM
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VIC.:
Secretary — Mr. J. A. Adcock VK3ACA
Broadcasts— 1825, 3600, 7135 kHz — also on 6m, 2m SSB and 2m Ch. 2 repeater: 00.30Z (Also on Radio 3HA).

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SA:
President — Mr. C. J. Hurst VK5HI
Secretary — Mr. C. M. Pearson VK5PE
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PETER SCHULZ, VK2ZXL

WIANEWS

The main news is published elsewhere in this issue, namely, a consolidated list of the numerous items the Institute has submitted to the Postal and Telecommunications Department.

This sets out the fears expressed about amateur bands in the future, apprehensions about the staff shortages in the Department, and various submissions for streamlining the system.

On the question of frequency allocations the reader of AR will be aware of the preparations being made for WARC 79 and what the Institute, in collaboration with IARU, have put forward. These details, perhaps forgotten by many people, were broadly set out on page 28 of AR for July 1975 (please note the "400" therein was a typographical error for 4000). Please see IARU News herein for further details.

At the July Executive meeting suggestions coming forward from various sources were examined but no decisions could be reached in the absence of policies from the Federal Council. Increased power for Novices was one such item. Another related to the amount of pressure the Institute deemed desirable in relation to additional HF frequencies. It was agreed to proceed with the submission for additional 2 m repeater channels via a postal vote.

The proposals put forward by the VK4 Division for recommended conversion frequencies to the 10 m band for Novices' channelised 11 metre gear were considered as the most acceptable and will go forward as a postal vote to Divisions. Basically this means that the 23 Novice channels be directly translated upwards by 1.335 MHz. Thus the 11 m band Ch. 1 becomes 28.3 MHz, Ch. 2 becomes 28.31 MHz and so on. On some sets tested in VK4, changing only one row of crystals provides the 6 primary frequencies on USB and AM (LSB is not used on 10m) of 28.3, 28.35, 28.4, 28.45, 28.5 and 28.55 MHz and also results in minimising spurious emissions in some cases. This is considered better than changing vertical column frequencies as 28.3, 28.31, 28.32, 28.34 in the first column and so on for the 6 columns (27.235 to 28.57) and 28.6 omitted because USB would be outside the Novice segment. It appears reasonable to anticipate that this postal motion will be passed.

On 27th June a letter was addressed to the P. and T. Department pointing out the concern felt by the Institute for many years about the absolute prohibition on third party traffic, particularly the effect of this on training for, and involvement in, emergency situations. It was pointed out that the basis of Government policy had always appeared clear, namely, the protection of revenue in the preservation of its own monopoly of communications.

But this must now be assumed to have changed by the introduction of the CB service acknowledging the needs and desires of a section of the community being given priority. The change is welcomed because if it can be extended to the amateur service it will enable that service to play an even more meaningful role in the community by gaining experience in message handling on behalf of others.

Not desiring to move away from the amateur service definitions in the ITU Radio Regulations, the Institute suggested that in the flow-on from the decisions already made, it proposes that a regulation similar to the FCC's 97.114 should be adopted in Australia as a matter of urgency.

The letter concluded with the comment that the adoption of this course would play a significant part in minimising conflict between the Department and amateur licensees, since this had been the basic cause of so many past disputes.

As a matter of interest, FCC regulation 97.114 deals with third party provisions applicable in the U.S.A. International third party traffic is prohibited between the U.S.A. and any country which has not agreed to such traffic for its amateurs — i.e. Australia, etc. ITU Radio Regulation 1562 allows third party amateur traffic to be conducted between countries for which the administrations concerned have made special arrangements.

Another letter to the Department in July dealt with beacons in the 10 m band. ■

A LOW COST VIDICON AMPLIFIER

Andrew Pierson,
1 Bindana Ave., Salisbury Park 5109

For the home-brew ATV enthusiast this article will be a very helpful reference regarding the parameters involved in video amplifier design and their importance in the easily-reproducible amplifier described.

At present, many television cameras are in the process of construction by amateurs, and also by others with no direct amateur radio interest. The uses to which these cameras will be put are very diverse, varying from straightforward closed circuit television to use with an ATV transmitter on UHF or microwaves. The current popularity of amateur slow scan techniques has generated a new demand for the CCIR standard TV camera, because the setting up procedure is less arduous than with a direct slow scan unit. The fast scan pictures may then be converted to the slow scan format by a simple sampling process.

Although commercial cameras (usually employing the 2/3 inch vidicon, and of Japanese origin) are readily available, the price tag of between $200 and $500 is fairly steep. Consequently, many people have decided to "brew their own", and learn something about TV in the process. Everyone who attempts this, however, finds himself somewhat of a "loner" because of lack of standardization in deflection assemblies, etc. The precise circuit each constructor chooses will therefore depend on which deflection yoke he has managed to beg, buy, cadge or (brave man!) wind himself. There are also a fair number of circuits around which specify components and circuit configurations that have since become obsolete. One of the worst examples of this has been that of the vidicon amplifier (sometimes referred to as the "head" amplifier). More often than not, the transistors which are specified are expensive and difficult to obtain. Also, the older transistor circuits often exhibit poor S/N ratios, which does not help the man who is trying to achieve a reasonable picture indoors under normal lighting conditions whilst using a modest lens. A vidicon obtained because it has "done its hours" will probably be down in sensitivity, which is not going to help matters.

Whilst it is easy to specify exotic transistors for vidicon amplifier designs, it is also possible to utilise devices like the humble BC109, which for its 20 cents or less gives you low noise performance, high current gain and an FT of 300 MHz. Used properly, I reasoned that this and similar devices could be employed in a very low cost good quality vidicon amplifier. With these facts in mind, I set about designing and building an amplifier specifically for amateur television purposes, and which would satisfy the following requirements:—

(1) Low cost
(2) Easy-to-obtain components
(3) Simple circuitry
(4) Good bandwidth (resolution)
(5) Low noise performance
(6) Stable performance
(7) Easily reproducible
(8) Simple to set up
(9) Plenty of reserve gain for low-output vidicons.

I am very happy to say that these aims have been achieved, and in fact, two designs were produced. The first is presented here, and represents the simple, low-cost approach to a vidicon amplifier. The second design uses more components, but provides ultra low noise performance (FET output), and also facilities for line-by-line clamping, signal blanking, sync insertion and a 75 ohm cable driver output. This more sophisticated circuit will be the subject of a later article.

The circuit shown (Fig. 1) is that of the low cost (Mk I) design, and is the result of the initial work carried out. The amplifier uses four BC109's and two 2N3638A's, which can be bought anywhere; the remaining components are only R's and C's. Before continuing with the circuit description, the basic operating principles and requirements for a vidicon amplifier will be briefly discussed.

PRINCIPLES OF OPERATION

The signal output circuit via the photoconductive target of a vidicon has a characteristically high impedance, and behaves essentially as a constant current source. Operating bias must be applied to the target from a positive DC potential, and is supplied via the target load resistor. The video signal voltage will therefore be developed across this resistance. Since the current is essentially constant, the larger the value of load resistor the greater will be the amplitude of the developed video signal. This should make the amplifier design easy, but this is not so because another factor lurks — the target shunt capacity and also that capacitance introduced by wiring, together with the input circuit of the amplifier. These will total about 10 to 20 pF. If a high value of load resistor is employed (say 1 Megohm), the shunting effect of these capacities will be very serious at the top end of the video spectrum being produced. (Generally speaking, an industrial camera will produce frequencies of up to about 5 MHz and a studio camera up to about 10 MHz, although there are exceptions in both cases). The roll-off will have the simple slope of 6 dB/octave or 20 dB/octave, and must be compensated for in the amplifier by introducing a characteristic with an equal but opposite amplitude Vs frequency slope.

The alternatives now become clear. A low band load resistor will produce a low level signal which means that the wide band voltage gain of the amplifier must be high. However, due to the fact that capacitive losses are minimised, the amount of compensation required will be small. On the other hand, a high value load resistor will produce a large signal which requires little low frequency amplifications, but due to the high capacitive losses involved the amount of compensation required will be great.

The initial consideration in any vidicon amplifier design is generally a trade-off between the factors just outlined. The low value load resistor approach gives more flexibility in use, since a change in shunt C will not have such a drastic effect on the overall compensation requirements. A disadvantage is that the internal noise produced by the amplifier is spread further over the whole video frequency spectrum than in the case of a high value load resistor, where most of the amplifier gain is concentrated towards the high frequency end. A given RMS value of low frequency noise is much more objectionable than the same RMS value of high frequency noise, since it results in intermittent "streaking" rather than the usual fine speckly "snow". The high value load resistor wins on this point, but if the value is made too large the amount of compensation then required results in excessive high frequency noise. Also, the amplifier's compensation characteristic will have to be altered if for any reason the overall shunt capacity changed (e.g. a vidicon replacement). Note that the effective signal load impedance may not necessarily be equal to the value of the physical target load resistor, because the input impedance of the amplifier will appear in parallel with this resistor, as far as the AC coupled video signal is concerned.

CIRCUIT DESCRIPTION

In the amplifier design presented, a "medium" value of video load resistor has been chosen, in order to balance the benefits obtainable from both approaches. The input circuit of the amplifier proper (Q3-Q6) has been buffered from the target load circuit by means of the super-alpha pair (Q1-Q2), so that the actual video load impedance is approximately 100 k ohms (the first emitter follower's bias feed resistor) in parallel with 470 k ohms (the target bias feed resistor).

The target bias voltage is supplied via a 100 k ohm resistor, and a 100 nF capacitor to ground forms a low pass filter to ensure that no spurious signals are passed to the amplifier via the target bias voltage supply.

The bias divider for Q1 is decoupled with a 100 uF electrolytic and a 100 nF Hi-K ceramic capacitor, which serves as a bypass at high frequencies where the inductive effects of electrolytics may tend to become troublesome.

Q3 is a DC coupled common emitter, compensated amplifier stage with a DC/LF gain of 20 dB. Adjustable low frequency (smear) compensation is applied by emitter regeneration to Q3.

Q4 is a DC coupled phase reversing stage with a DC/LF voltage gain of 1. However, this arrangement leaves the remainder of Q4's current gain available for high frequency compensation, again applied by means of emitter regeneration.

Q5 is a DC coupled common emitter amplifier stage with a DC voltage gain of 1. but the wide band AC gain is set by the emitter decoupling network consisting of a 47 ohm resistor and a 1000 uF electroletic capacitor. Under these conditions, the wide band AC gain is given by the ratio

$$\frac{470\ (470\ +\ 47)}{470\ \times\ 47}\ \text{or}\ 11.0$$

The above relationship does not take into account minor loading effects due to the input impedance of the emitter follower stage Q6.

Q6 is a DC coupled emitter follower output line driver stage. Under quiescent conditions, the DC voltage appearing at the emitter of Q6 is +10V, and the overall amplifier +12V rail drain is 50 mA. These figures will vary between individual unit samples, due to spreads in transistor parameters and resistor tolerances. A variation of ±500 mV from the nominal +10V at the emitter of Q6 would be permissible, and a check of the voltage at this point is a quick and convenient method of determining if the amplifier's DC operating conditions are normal. The dissipation requirements of Q6 are minimised by including two 100 ohm series resistors in its collector circuit. Sufficient voltage is still maintained across Q6 to provide an adequate output voltage swing. The emitter circuit of Q6 is decoupled from the rail by a 10 ohm resistor and a 1000 uF electrolytic capacitor. An additional 100 nF Hi-K ceramic capacitor is connected across the large value bypass to maintain decoupling at high frequencies. The maximum output of the amplifier is 1V p-p from blanking level to peak white, which is positive-going.

In the days of valve camera chains, the large physical size of the equipment made it necessary to place in the camera head only that circuitry which was absolutely essential for its operation. The remainder of the circuitry was contained in the camera control unit, located at some distance from the camera and connected to it via a multi-core cable. Under these circumstances, the output of the vidicon amplifier was required to drive a coaxial cable. However, the advent of transistorised equipment has largely meant the demise of the two-unit camera, since all of the circuitry may be located in the camera unit itself. And so it is that the output circuit of the modern vidicon amplifier has generally a higher impedance, because the sync assembly circuit which it feeds is close by — many times on the same PC cards.

The design of a general purpose amplifier such as described here imposes a few more restrictions on output impedance, because it is likely to be connected to a variety of circuits with differing impedances and shunt capacities. Since it is desirable that the compensation characteristics of the amplifier be not influenced by variations in output capacitive loading, the output circuit has been arranged to present a driving impedance of 75 ohms to the connecting cable. Because of this arrangement, the amplifier will drive at least 3 metres of 75 ohm coaxial cable without the need for a terminating resistor at the receiving end. The output is AC coupled via a 100 uF electrolytic capacitor, and will drive circuitry with input impedances of 500 ohms and upwards. The 10 k ohm resistor across the output line has a small value when compared to the leakage resistance of the coupling capacitor, thereby preventing the occurrence of a DC potential at the output terminal when no load is connected.

It will be seen that the use of DC coupling between stages has considerably reduced the cost and complexity of the amplifier by eliminating electrolytic coupling capacitors and bias resistor networks. The main +12V supply rail is bypassed with a 1000 uF capacitor, together with a 100 nF Hi-K ceramic capacitor for the same reasons as described earlier.

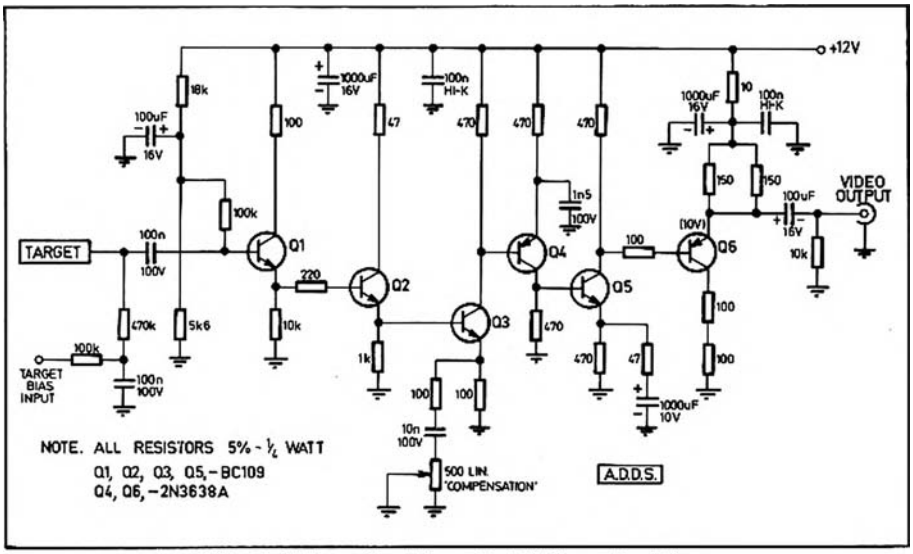

FIG. 1: Schematic of Low Cost Vidicon Amplifier.

CONSTRUCTIONAL DETAILS

The amplifier may be constructed using hard-wired or PC card techniques. Veroboard is also suitable. Whatever the method of construction, two important considerations must be observed if stable performance is to be achieved. The first is that the component placement should be such that the signal progresses logically from left to right, or vice versa. In other words, the isolation between input and output should be at a maximum. The second consideration involves the supply and earth rails. In order to avoid trouble from common impedance paths, the rail conductors should be as heavy as practicable. If you feel doubtful about this aspect, additional 22 uF, 16V tantalum "tag" electrolytics (which have good high frequency characteristics) may be used across the +15V and earth rails at various points throughout the circuitry.

The ideal physical construction for amplifiers of this type is to hard-wire the components between tagstrips inside a die-cast box. However, this circuit is very "tame", and recourse to this action should not be necessary.

COMPONENT TYPES

For the sake of convenience, all resistor values specified are from the E12 series and are easily obtainable, but they should be good quality 5 per cent tolerance, ¼ or ½ watt cracked carbon or metal film types. The compensation adjustment preset potentiometer must have a non-inductive (e.g. carbon) element. All electrolytics are etched aluminium foil types, and the remaining capacitors are split into Hi-K ceramics and polyester film "Greencaps". The BC109's and 2N3638A's may be by any manufacturer, provided that they meet the original specifications for these devices. This is very important, and substitute types should NOT be used.

INSTALLATION

It is imperative that the connection between the vidicon target ring and the input of the amplifier be as short as possible, and that stray capacity to ground be kept to an absolute minimum. Also, the general area surrounding the target and amplifier

input should be shielded to prevent the entry of spurious signals. These two requirements conflict to some extent, so commonsense should be the guide. Try to keep the input lead less than 25 mm long, and at least 5 mm away from all other earthed objects. The lens mounting plate MUST be earthed. If this is not so, RF interference will enter the amplifier by capacitive coupling when the lens is touched during focussing. etc.

ADJUSTMENT PROCEDURE

The compensation adjustment is simplicity itself. At one end of the potentiometer's travel, black objects in the observed picture will give rise to a following black smear. At this position the amplifier's +3 dB "corner" frequency is above the —3 dB corner frequency of the low pass filter formed by the effective load impedance and the total input shunt capacity. Under these conditions, the amplifier is said to be "undercompensated".

At the other end of the potentiometer's travel, black objects will give rise to a following white smear. This indicates that the amplifier is "overcompensated", because its +3 dB corner frequency is below the —3 dB point of the signal input network. The correct potentiometer position is that setting which does not produce any smear at all.

SENSITIVITY

In terms of internally generated noises and overall sensitivity, the performance of the prototype amplifier was very pleasing. When using a normal 1 inch vidicon with a target voltage of +50V, an f1.4 25 mm lens, and an inside scene under fluorescent illumination, the output from the amplifier was 1.5V p-p. The picture was clean and finely graded, displaying excellent amplitude linearity.

NOISE

With a short circuited input, the output noise was 60 mV p-p. However, due to the compensation characteristic of the amplifier this figure is correct only for the upper end of the video frequency spectrum, where it is practically invisible. For lower frequencies, the noise amplitude decreases at the rate of 6 dB/octave.

APERTURE CORRECTION

Whilst amplifier compensation has been discussed at some length, another form of compensation is required when one is seeking the very best from a camera tube. This is termed "aperture correction", and its need arises because the cross section of the scanning beam is not rectangular and infinitely small, but circular and of finite size. The required correction curve has a more complex function than 6 dB/octave, and may be compensated for by using a circuit which possesses a frequency response equal to the inverse of the frequency characteristic produced by the aperture effect. Since the frequency roll-off caused by a symmetrical aperture introduces no phase variation with frequency, the correction circuit should likewise be free from this effect.

Practically, delay line circuits or T-section equalizing networks are used, but a reasonable approximation for aperture correction may be made by increasing the amount of HF amplifier compensation to above that value which will theoretically fully correct the amplifier. In any case, it is not very important, and is only worth worrying about when one is seeking resolution in the 500-800 line region. Few industrial cameras include proper compensation for the aperture effect. I have adopted the "over-compensation" compromise, since it involves less circuit complexity and avoids the necessity for inductances.

Because the final value of equalization is usually arrived at empirically, it is difficult to ascertain the point at which the normal 6 dB/octave compensation leaves off and the additional aperture correction lift takes over. If you are using an average TV receiver for a monitor, it is doubtful whether the difference between this form of aperture correction and that provided by more sophisticated circuits could be detected anyway.

RESOLUTION

The resolution of a television system may be defined as the total number of alternate black AND white vertical bars PER PICTURE HEIGHT which can be discerned when the system is used as a medium for visual image transmission.

The accepted method for determining the resolution of a television camera is to televise a bar chart which contains several sets of vertical stripes which, when placed at a certain distance from the centre, correspond to various increments of resolution or frequency. The resulting video output from the camera is observed on a wide-band oscilloscope or video waveform monitor, and the percentage response at each step is noted.

A more widely used (but not so comprehensive) method is by making use of the resolution wedge, which is an integral part of most standard TV test patterns, e.g. the Marconi Resolution Chart No. 1. By observing the point at which the converging lines disappear, the overall limiting resolution of the camera, transmission system (if used), and monitor may be determined. The method is fast, but does not give any detailed information about the overall frequency roll-off characteristic. Only a few per cent of signal is required to give an indication of wedge line continuity (5 per cent or —26 dB is a popular figure), so if the maximum resolution is judged to be, say, 5 MHz, it means that there is very little signal left at this point, and the roll-off may have commenced several MHz before. It is also a fact that only a small percentage of high frequency signal is required to give an image the appearance of sharpness, so the whole system is quite acceptable. The monitor is also included in the resolution check, which makes it very useful for amateur applications.

The point at which the total signal amplitude as observed on the screen of the monitor falls below the level necessary to observe wedge line continuity depends on the algebraic sum of the following frequency characteristics:—

(1) The output signal from the camera tube target, which also implies:
   (a) Optical focus
   (b) Scanning beam spot size
   (c) Target granularity.

(2) The frequency characteristic of the camera tube amplifier. Neglecting aperture correction, the +6 dB/octave lift from the amplifier will oppose the —6 dB/octave loss from the input circuit. This process will result in an overall flat amplitude Vs frequency characteristic until the amplifier's compensation circuits run out of gain. The response will then fall at a rate of 6 dB/octave, plus the amplifier's roll-off value.

(3) Losses involved in camera processing and transmission.

(4) The frequency response of the monitor's video amplifier.

(5) The spot size of the scanning electron beam in the display CRT.

Because of practical difficulties associated with simulating precisely the target circuit of a vidicon camera tube, a direct specification of the amplifier's amplitude Vs frequency characteristic has been avoided. However, to cut a long story short, if you use a normal 1 inch vidicon in the low voltage beam acceleration mode (approximately +250V to +300V) and a modified TV receiver as a monitor, you can expect to resolve at least 450 lines on the monitor screen. This corresponds to 5.625 MHz, which is well above the transmission bandwidth limit anyway. If you use a 1 inch vidicon in the high voltage beam acceleration mode (approximately +600V to +700V) and a high bandwidth monitor, you can expect much better resolution figures.

LOW FREQUENCY RESPONSE

The capacitive coupling elements employed have a sufficiently long time constant that no appreciable frame (50 Hz) tilt appears on the output video waveform.

GAMMA

This is the final parameter which should be discussed, and is the relationship between the light input to the vidicon target and the corresponding signal current output (transfer characteristic).

Since the object is for the overall television system to be able to reproduce a maximum number of shades of grey, the gamma of the camera tube should exactly complement the gamma of the displaying CRT, which is approximately 2.2. However, a system with an overall gamma of unity produces pictures which have a rather flat appearance. This effect may be offset to a large extent by making the overall gamma slightly greater than unity, e.g. 1.1 or 1.2.

Since the Input Vs output voltage characteristic of this amplifier is linear and the gamma value for a vidicon is between 0.5 and 0.6, an acceptable overall gamma figure is achieved without the need for a non-linear correction amplifier. ■

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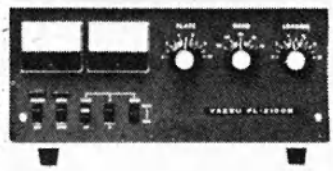

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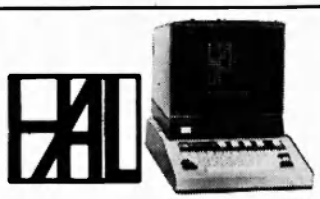

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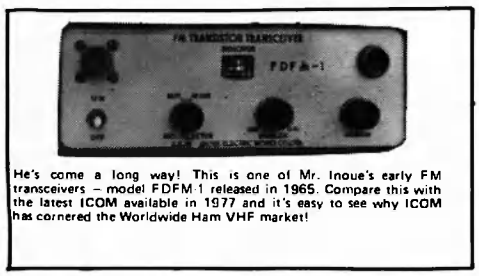

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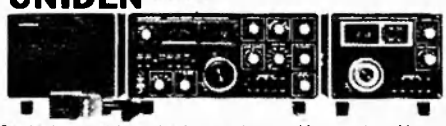

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AN IMPROVED 45 WATT TWO METRE BOOSTER AMPLIFIER FOR FM OR SSB

By Roger Harrison VK2ZTB
and Phil Wait VK2ZZQ

This amplifier originally appeared at the Central Coast Amateur Radio Club Convention in February 1976 and was subsequently described by the authors in the April 1976 issue of ELECTRONICS TODAY INTERNATIONAL, designated "project 710". Its intended purpose was to amplify the output of the many popular two-metre FM transceivers, which generally have an output power of around 10 watts, to a level of 35-45 watts. The amplifier used the then popular 2N6084 RF power transistor, which was at that time readily obtainable and not expensive. The amplifier featured printed inductors and diode antenna changeover switching. Many people have successfully constructed this amplifier, judging by the number encountered on air.

However, some constructors have experienced difficulties with certain shortcomings of the 2N6084. Their minimum gain is specified as 4.5 dB, which means it will only give 28W output for 10W drive under the specified conditions. Raising the supply voltage and drive power improves matters if a min.-gain transistor is encountered but you don't get something for nothing — efficiency is poor. Some transistors proved to have less than their specified minimum gain. Some transcelvers also, proved to have less than their specified output power! The occasionally encountered combination resulted in output powers of less than 20W from the amplifier! This caused gnashing of teeth, tearing of hair and cursing of authors !!$?*$*! Ducking tomatoes at radio club meetings is not a habit the authors wish to cultivate.

Another problem arose concerning the combined shortcomings of operators and 2N6084's. Although the 2N6084 is assuredly "rugged" according to the data book, and ". . . resists transistor damage caused by load mismatch", they cannot be treated in a similar manner to valves. Alas, some transistors — and attached bank accounts — have come to grief. It is unwise to apply drive without the power supply connected to the amplifier. Mismatched antennas should likewise be avoided. Some individual transistors "resist" abuse better than others.

Apart from its application with FM transceivers, there were many people desirous of having a linear amplifier, of similar specifications, for use with SSB on two metres. The authors received a number of on-air enquiries as well as a spate of letters on this subject. Attempts to employ the 2N6084 in linear mode, while moderately successful, showed up a few more limitations of the device. Gain in class B (or AB) proved to be less than its gain in class A. Comment on the linearity would likely be defamatory. It is possible, by selecting devices, to construct a passable linear using the 2N6084 but that may prove expensive at around $17 per device!

The solution to these irksome problems is found by modifying the circuit to use a CTC transistor, the B40-12. In actual fact, the modifications are quite minor. The circuit, showing the new configuration and changed components, is given in Figure 1. Linear operation is discussed later.

The B40-12 has a minimum specified gain of 5.5 dB at 175 MHz which results in an output of at least 35 watts from 10 watts drive. Its gain at 146 MHz is higher. Experience shows that B40-12's generally exceed their minimum gain specification. They are rated to withstand an infinite VSWR at full drive with 15.5V supply applied. This makes them somewhat more rugged than the 2N6084. Thus, whilst abuse is not encouraged, open or short circuit antennas and operator mishaps, etc., are not likely to be disastrous, or expensive.

THE DIODE SWITCHING CIRCUIT

The original article specified 10 x 1N914 (or 1N916, or BAX13) diodes for the diode changeover switching circuit. Better diodes are the Philips BAV10 and, as they are adequately rated for the powers encountered, only six are required as shown in Figure 1. Take care when tuning up that you don't short either C5 or C7 as this will cause at least one of the diodes to be overloaded and they will go open circuit (pphhuttangg!!!).

RFC's

The base choke, RFC2, is changed, now consisting of a miniature RFC (of the unencapsulated or the moulded variety — whichever) having a value anywhere from 0.15 uH to 0.27 uH with a 4 x 1.5 x 9.5/F8 Neosid suppression bead slipped over the lead from the RFC to the base of the transistor. This "combination" chow mein . . . er, base choke . . . should be mounted as close to the base as possible — right up at the transistor header.

The collector choke, RFC3, is wound with more turns and is a smaller diameter than that specified for the original circuit.

MISCELLANEOUS COMMENTS

Note that C6, which was a 60 pF trimmer (ELMENCO A4004/OX) is now changed to a higher capacity — the 15-115 pF type (ELMENCO A4006/OX or similar). Any suitable trimmer having a maximum capacitance greater than this however will be satisfactory.

The component layout is exactly the same as in the original amplifier and the general construction and tune-up details remain pertinent.

PERFORMANCE

With the full 10W drive, using a 12.5-13.5V supply, driving a dummy load or well-matched antenna, at least 35W output should be obtainable. Generally, 40-45W would be more usual, and sometimes as much as 50W or so. More can be obtained, but the maximum collector current and maximum dissipation of the B40-12 should not be exceeded. Better efficiency is also more readily achieved with the B40-12 than with the 2N6084.

SSB OPERATION

A simple diode base circuit, as shown in Figure 2 is quite satisfactory. A 1000 pF feedthrough capacitor or ceramic "button bypass" capacitor is mounted on the PC board adjacent to the grounded end of RFC2 to form a "standoff bypass".

The base choke, RFC2, is then mounted between this and the transistor base. The silicon power diode, two ½W resistors and the trimpot may be mounted in any convenient position. If you wish the diode to be thermally connected to the transistor, in order to provide a measure of thermal tracking, it may be glued to the cap of the B40-12. Use a strong, quick-setting glue such as "Bondza" or "Super Glue". This refinement is not all that necessary though.

The diode switching arrangements as configured will not work with SSB. Two changeover relays, operated from the transceiver Tx/Rx circuitry are recommended. Alternatively, a bias network to provide DC bias switching for diodes could be devised to effect fully solid-state changeover switching.

To set up the amplifier for SSB operation, a suitable power meter, power supply (preferably variable current-limited) and a dummy load should be attached. Insert a current meter in the B40-12 collector supply line. The maximum allowable collector current is 7.0 amps. Observe it.

Set the 470 ohm trimpot to maximum resistance initially. Connect the power supply and adjust the trimpot for about 150-300mA of quiescent collector current.

Next, apply a small amount of drive so that there is some increase in collector current and tune C5, C4 and C6, C7 to obtain a peak in the power output. Further increase drive and again peak C4, C5 and C6, C7. If all is going well, apply full drive and peak the trimmers again for maximum power output. About 30-35W PEP minimum should be obtained with 10W PEP drive.

If desired, linearity may be checked by simultaneously monitoring input and output power and making measurements over a range of power levels. The ratio of output to input should remain almost constant until the point where the amplifier begins to flat-top and output compression occurs. That is, an increase in drive power does not cause a corresponding increase in output power.

If you can arrange to listen to your own signal, so much the better. Some adjustment of the quiescent collector current may be necessary to improve linearity. The values quoted provide a starting point. Individual transistors have different characteristics and the collector current is best adjusted in service for best linearity.

Copies of the original article are obtainable from Electronics Today (at 15 Boundary Street, Rushcutters Bay 2001) for 45c per page. The article commenced on page 86 of the April 1976 issue and continued on pages 87 to 91 inclusive (six pages). ■

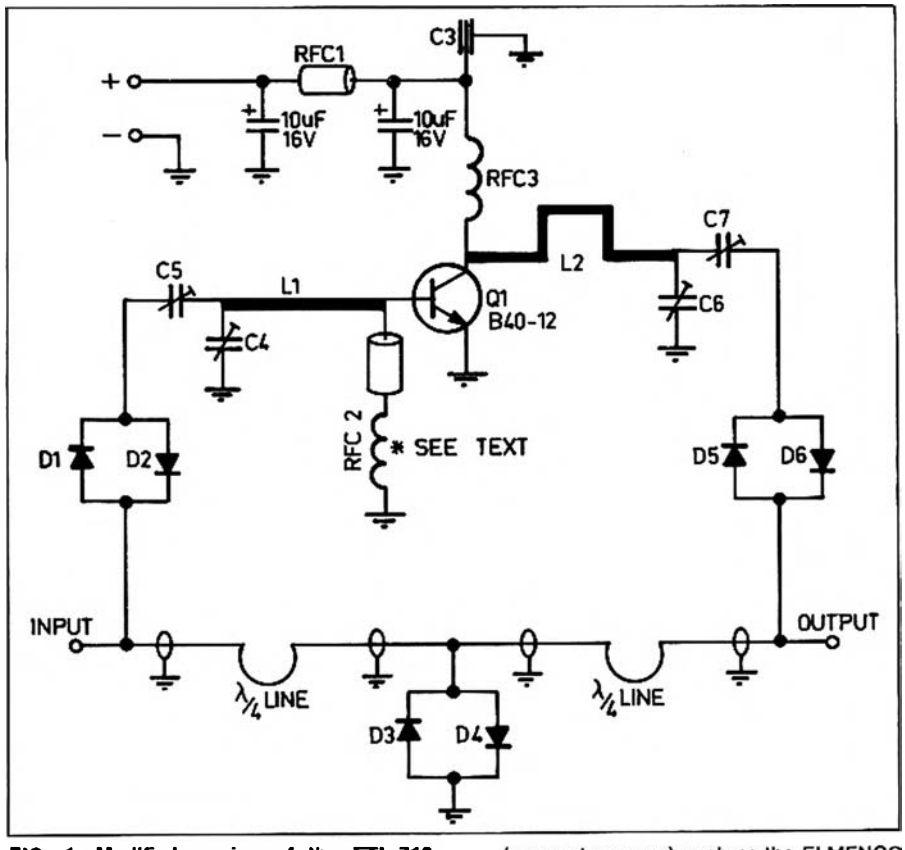

FIG. 1: Modified version of the ETI 710 amplifier employing a B40-12.

6 x BAV10 diodes may be substituted for the 10 x 1N914 or 1N916 diodes specified for the original diode switching circuit.

The 2N6084 is replaced by a CTC B40-12.

C6 is replaced by a 15-115 pf Trimmer (or greater range) such as the ELMENCO A4006/OX.

RFC2 is replaced by a combination choke — a 4 x 1.5 x 9.5/F8 bead is slipped over one lead of a 0.15 to 0.27 uH miniature RFC.

RFC3 is changed to 6 turns, 18 swg tinned or enamelled wire, 5 mm inside diameter, 15 mm long. No resistor in parallel.

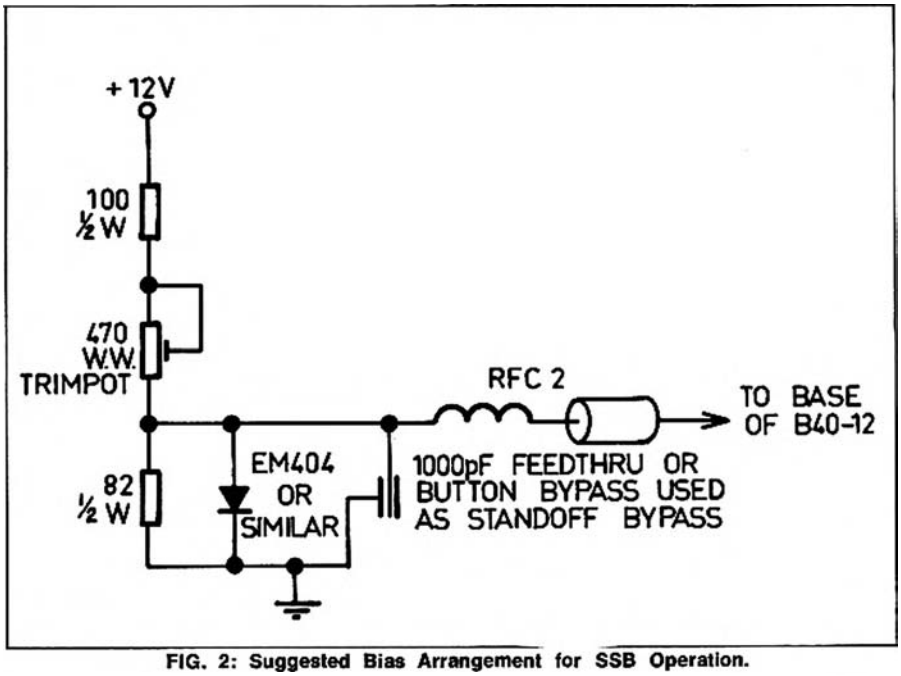

FIG. 2: Suggested Bias Arrangement for SSB Operation.

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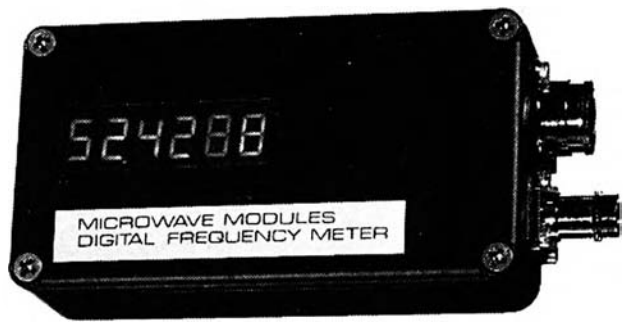

MMT432 TRANSVERTER

500 MHz COUNTER

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD050/500 — 500 MHz Counter, $175

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GUIDELINES ON THE TEACHING OF MORSE CODE

Donald E. Pugh VK6DN
(formerly VE3HRA),
c/o Christchurch Grammar School,
Queenslea Drive, Claremont, 6010

The future of amateur radio depends upon the fresh influx of eager novices into the hobby, who are enthusiastic in their support of morse code. The degree of enthusiasm expressed by novices towards the continuous wave means of communication depends upon the quality of instruction to which they have been exposed while mastering the skill. This article suggests a number of scientifically proven steps for the teaching of skills, and applies them to the learning of CW.

1. For the systematic development of skills, it is necessary to identify not only the specific skills to be taught, but also the activities which nurture them. Morse code should not be taught in an isolated context, separated from the rest of amateur radio. It must be seen as an essential and integral part of Amateur Radio. Amateurs with the best of equipment still find morse useful today for communicating with foreign amateurs who are unable to speak English well, but who can write and send simple English. Furthermore, for amateurs with less effective antenna systems, CW makes possible readable DX contacts which are impossible by phone. CW for the beginner should be seen as a unique, exciting means of communication with distant amateurs who are inaccessible in any other way. Consequently, it is important that code practice take place as often as possible over the air, to offer the excitement, immediacy, realism, and meaning that goes with CW communications. Rather than listening to tapes, all learners should be encouraged to listen to DX CW contacts, as soon as possible.

2. An emphasis on the teaching of skills implies an emphasis on student-centred activity as opposed to teacher-centred explanation. The role of the amateur teacher is the structuring and timing of student practice and the actual transmission of morse code. Only through regular listening to CW will the novice learn the skill.

3. Skills should be developed in connection with on-going activities and not in isolation. The actual content of morse transmissions should always be aimed at improving the student's competence in passing the theoretical part of the amateur examination. Use of Q-codes, and simplified technical explanations of components and circuits over the air, provides suitable content for morse transmissions.

4. Activities designed to promote the development of skills should be meaningful to the learner. It is important that the material being sent should be aimed at the level of the learner and be relevant to the amateur program.

5. Development of different skills should go on simultaneously. Students should be becoming familiar with the operation and characteristic sounds of SSB transcelvers, by using such equipment as their instrument for learning morse code. In this way, students not only learn the code, but also gain additional skill in distinguishing CW through QRM, QRN, and QSB. They become familiar with the sound of different transmitting "fists" Q-codes, amateur radio topics and talk, and with amateur and transmission characteristics of different parts of the world.

6. The development of skills calls for individualised forms of instruction. Combining students of different level abilities in morse classes is harmful. It is important that the morse being received by the beginner be within or near his capacity to understand. Code that is too slow is tedious, and CW that is too fast is frustrating.

7. Before instruction can begin, each student's standing in relation to the hierarchy of tasks involved in performing a particular skill has to be determined. The type of morse being sent to the student must be suitable for his actual knowledge of the skill. This is particularly true for beginning students who have not yet mastered all the letters and numerals. The students' abilities may easily be determined by a pretest.

8. Provision of practice and feedback tailored to the individual performance of students is essential. The learning of morse involves regular practice, preferably fifteen minutes a day, rather than longer periods at less frequent intervals. Short but regular practice times have been shown to increase learning speeds and enjoyment.

Students must always be provided with some knowledge of how they did following the lesson, and regardless of their results, should be enthusiastically and consistently encouraged and praised. Such positive reinforcement is essential for avoiding student frustration, anxiety, and despair. It is a useful technique to keep a record of the learner's progress, either in the form of tapes of code speeds sent in the past, graphs of success rates, or simply a notebook of material copies each day. In this way the beginner may feel satisfaction and encouragement from a regular review of his performance. Direction is provided to the exercise. It is amazing, beneficial and encouraging for the student to discover how fast he is progressing, and how slow that morse seems on a tape of a month past.

9. In teaching a new skill, the learner should first be made aware of the terminal objective. He should be aware of all the advantages and enjoyment accruing to participants of the Amateur hobby, and with a syllabus of the examination requirements which he faces. Only if the student is converted to the thrill of DX seeking, and the enjoyment of "chewing the rag", will he be motivated to undertake the work required for the licence.

10. In teaching a new skill, the learner should be provided with a model of what constitutes adequate performance of the skill. Here, a tape with accurately timed morse at five and ten words per minute is useful for the beginner to gauge his progress towards his goal.

11. In teaching of a new skill, the learner should be encouraged to attain the highest level of performance that his/her potential will permit. Successful students, upon passing their full ticket should be encouraged to continue to build their speed. The extent to which forms students actually continue to use morse provides a substantial benchmark for the measurement of the teacher's success in inducing enthusiasm for the skill.

12. In the teaching of a new skill, the learner should be provided with positive feedback telling the learner what he/she should do as well as negative feedback telling the learner what he/she should not do. Rather than criticize a beginner for mistakes, such as erratic sending, teachers should simply and quietly demonstrate the correct techniques.

13. Opportunities should constantly be sought for further practice of previously-learned skills. In slow morse transmissions, it is a poor idea to switch to phone in order to explain what has been sent. Reference to the source of the information sent should also be provided in morse, and the total operation be completed in morse. Not only is further practice provided, but more importantly, the emphasis is upon morse as a practical communications mode, not supplementary, but equal to and self-sufficient from phone.

14. In teaching a new skill, allowances should be made for a wide range of performance of the skill. Not all students will emerge as good CW operators. This must be recognized and tolerated.

15. In the teaching of a new skill, the level of difficulty should be increased as mastery is achieved. It is useful to keep morse difficulty always slightly beyond the ability of the receiver. Morse that is being copied at one hundred per cent is slightly slow for practice purposes.

16. In teaching a new skill, the learner should be introduced to its component subskills one step at a time and in a sequence representing levels of difficulty. The ARRL publishes a useful handbook on the learning of morse code, and undertakes a task analysis of the alphabet by grouping letters and words of various diffi-

culties. This hierarchy of the alphabet in terms of difficulty is an invaluable aid in initially learning CW and the handbook is suggested as a necessary teaching aid.

These suggestions concerning the learning of morse have been successfully shown to be valuable in learning all skills. They offer useful guidelines for amateurs embarked upon the rewarding experience of sharing their expertise with others. The implementation of these guidelines promises to ensure the successful arrival of enthusiastic novices who support and enjoy CW as a viable and relaxing communications mode. ■

"VK" — "CB" WEEKEND SEMINAR

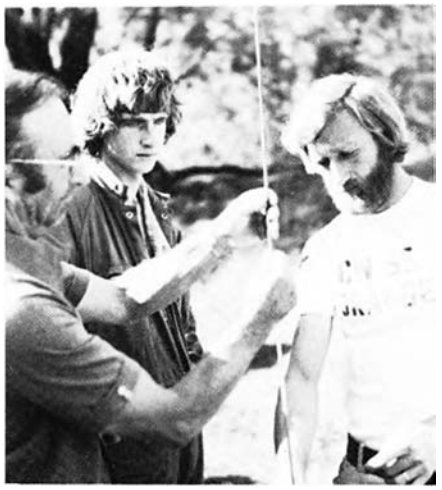
Sam Voron VK2BVS.

The first seminar between CB and Amateur radio operators was held on the Queen's Birthday long week-end of the 11th, 12th and 13th June at Hillend. The seminar, entitled "An introduction to the hobby of radio transmitting", was organised by the 4-Wheel Drive Radio Club of N.S.W. (4WD). The seminar was especially designed to firstly provide a whole range of information to those living in the country areas, secondly to bring amateurs and CB operators together in such a co-operative project, and thirdly to provide the basis for the development of friendship between cb-er and Amateur, city and country. At the seminar, members of the Orange CB Club and the Bathurst CB Club joined with Sydney CB-ers and radio amateurs in discussions ranging from radio procedure, regulations, operating and maintaining equipment and aerials, as well as operating on the 160, 80, 40, 20, 15, 11, 10 and 2 metre amateur bands under the instruction of Sam VK2BVS.

All the aims of this project were realised and the 4WD Club has decided to organise more regular similar seminars between CB-ers and Amateurs.

At the June seminar David Wilson VK2ZCA, from the Youth Radio Educational Service, gave an outline of the new 15 lesson novice hobby transmitting licence course which has since been undertaken at several CB clubs in N.S.W.

The seminar was in the form of a field camping trip with portable generators providing power. Some 50 people attended, ranging from 12 to 70. The BX (Bathurst) CB Club helped enormously, thanks to the organisation of their President.



Members of the Orange and Bathurst CB Clubs learning the art of home-making helical antennas.

RADIO EMERGENCY NETWORK

On Saturday evening, following the crash of a Suzuki bike between Sofala and Hillend, a link between the crash site and Hillend was set up on 11 metres by CB-ers, who passed information on to amateurs who operated a 2 metre link into Orange. The amateur at Orange contacted the Bathurst Hospital where preparations were in progress to receive the accident victim. ■

QSP

COMPONENTS

The Victorian Division Council has decided to terminate component trading as of 31st December, 1977, and members are therefore recommended to send their orders in now as many lines will not be replaced when stocks run out. No more credit notes will be issued. Holders of credit notes are requested to order components to the value of their credit.

UK REPEATERS

"We just cannot understand why the small group which gets its kicks from deliberately interfering with repeaters, cannot leave them alone and find some constructive thing to do. Surely the HF/UHF bands are wide enough to permit all types of operation". From Mobile News June '77.

WANTED KNOWN

If you have held an amateur licence for 25 years or more you are eligible for membership of the Radio Amateurs Old Timers Club now active in all States. If you would like to become a member contact Harry Cliff VK3HC, Max Hull VK3ZS, Stan Dixon VK3TE, Snow Campbell VK3MR, the founder, Bob Cunningham VK3ML, or any existing member of the Club for details of certificate, etc.

SCOUT NETS

Australian Scout Radio Net first Sunday, each month 7090 kHz 09.30-11.00 h EAST or 14280 kHz 11.00-13.00 h EAST. All frequencies plus or minus QRM. Also South Australian Scout net first and third Thursdays 3590 kHz from about 19.30 h to 20.00 h local SA time.

AMATEURS ON 11 METRES

Amateurs who wish to remain on 11 metres by obtaining a CB licence are invited to join the VK CB Club. The aim of the Club is to assist the citizen in the use of his or her CB station as well as assisting CBers who would like to study for the novice amateur licence. Membership to the VK CB club is open to all amateurs, all those studying for an amateur licence and all those who wish to one day become radio amateurs. The VK CB club will work with all other CB clubs and will reflect a spirit of the amateurs' contribution to the development of the Citizens Radio Service.

For more information on the VK CB Club write to Sam Voron VK2BVS, 2 Griffith Avenue, East Roseville, 2069; and enclose a self-addressed stamped envelope to assist in a speedy reply. ■

A Dx-er's BOAST

I've Worked Everywhere"

Alan Shawsmith VK4SS.

(Short Parody of Lucky Starr's "Ive been everywhere" — to be read rapidly.)

I've worked 'em everywhere —
Kamaran, Sudan, Vatican, Cayman,
Afghanistan, Pakistan, Yucatan, Isle of Man,
Beat that if you can.
Libya, Sardinia, Zambia, Nigeria,
Bolivia, Colombia, Liberia, Siberia
— and other places rare and eerier.
Aland, Iceland, Greenland, Finland,
Poland, Thailand, Holland, N'foundland.
Yeah, I swing the beam around.
Highville, Brazzaville, Amityville, Townsville,
Hicksville, Libreville, Abbaville, Hamsville
— and ever other ville and hill.
Sicily, Niamey, Hungary, Enderbury,
Italy, Orkney, Calgary, Canterbury.
Yes sir, I've been busy — very.
Trenton, Gordon, Nelson, Boston,
Canton, Brandon, Saigon, Houston.
Never miss, I'm spot on.
Pusan, Japan, Iran, Bhutan,
Surinam, Jordan, Azerbaijan.
Yep, I've wkd 'em all man.
Shangai, Brunei, Hawaii, Haiti,
Burundi, Alofi, Hanoi, Tbilisi.
Nothing's passed ME by.
Pagoda, Samoa, Eindover, Balboa,
Bogota, Angola, Andorra, Lisboa.
Oh yes and throw in Goa.
From the oldies to the new,
From Samarkand to Timbuctoo.
I've worked 'em all, it's true.
Hullo, who's that calling me?
This is Sikkim calling — AC3.
Boy, I sure want an AC3.
But you've wkd everywhere man.
So you can't need me, 73. ■

AFTERTHOUGHTS

Our resident gremlin has struck again! Greg Brown's article "A Solid State Video Modulation System", AR July 1977, has an error in Fig. 2 as published. A 6.8 k ohm resistor is shown on the input of the MPS 6514 with one end connected to the + 12 volt coil. This end should connect to the collector of the MPS 6514. The other end remains connected to the 5.6 k ohm resistor, 25 mF and 1000 pF capacitors. ■

TOKYO HY-POWER LABS.

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HC-500 $112
HC-500A $119
HC-2500 $246

If you're fighting a constant battle of limited band width, high SWR causing low power output from your Solid State transmitter, poor efficiency from a mismatched Low Pass Filter, then step up to an antenna coupler from Tokyo Hy-Power Labs HC series.

Basically identical except for power handling capabilities, the HC-75, HC-500, HC-500A and HC-2500 use the well tried and proven "transmatch" circuit. High quality components are used throughout, such as large variable capacitors with steatite supports, and high RF voltage rated rotary switches.
The HC series of couplers will match a 10-600 ohm impedance (even higher if load is purely resistive) into 50 and 75 ohms. Multi band operation is possible with a 5 to 20 metre long single wire antenna. Second harmonic attenuation of up to 30 dB can be realized. Receiving advantages include improved cross modulation characteristics due to band pass effect of the coupler, improved signal to noise ratio due to correct front end matching.
These high quality HC series antenna couplers are available from Bail Electronic Services.

Technical Data

*1.9MHz only 200W PEP

	HC-75	HC-500	HC-500A	HC-2500
Bands	3.5, 3.8, 7, 14, 21, 27, 28		1.9, 3.5, 7, 14, 21, 27, 28	
Input Impedance	50 or 75Ω			
Output Impedance	10 ~ 600Ω			
Max. Power	75W PEP	500W PEP	500W PEP*	1.5KW CW 2.5KW PEP
Dimensions	160W 70H mm 200D	240W x 100H x 160D mm		340W 150H mm 255D
Weight	1.5 kg	3 kg		8.5 kg

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1.16	½	16	3	No. 3003	**99c**
2.08	⅝	8	3	No. 3006	**$1.16**
2.16	⅝	16	3	No. 3007	**$1.16**
3.08	¾	8	3	No. 3010	**$1.40**
3.16	¾	16	3	No. 3011	**$1.40**
4.08	1	8	3	No. 3014	**$1.56**
4.16	1	16	3	No. 3015	**$1.56**
5.08	1¼	8	4	No. 3018	**$1.75**
5.16	1¼	16	4	No. 3019	**$1.75**
8.10	2	10	4	No. 3907	**$2.52**

Special Antenna All-Band Tuner Inductance
(equivalent to B. & W. No. 3907, 7 inch)
7" length, 2" dia., 10 TPI **Price $4.36**
Reference: A.R.R.L. Handbook, 1961

Willis Pi-Coupler Unit — $23.95

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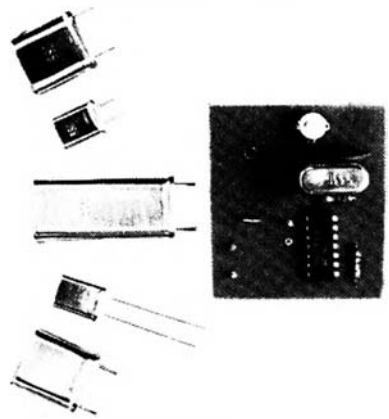

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RECOGNITION FOR JA OPERATOR

Des Greenham VK3CO,
23 Stewart Street, Seymour, 3660

Some time ago in AR, reference was made to a rather special amateur station in Japan.

This is JH6THP, operator Chitary, who is incapacitated and operates his station from his bed in the National Hospital at Kawatana, near Nagasaki in Southern Japan. Chitary, who is very active and very well known by VK stations on the 15 m band, speaks excellent English learned by himself from books — no mean achievement. He currently teaches school students English language in his spare time.

Chitary, during recent years of operating on 15 metre band, has made numerous firm friends in many countries, including Australia, New Zealand, U.S.A., Canada, Philippines, Papua New Guinea, etc.

Recently he initiated a scheme to form a "Pacific Amateur Radio Society" (PARS), to include amateur radio stations in countries bordering the Pacific Ocean. The Society has Chitary as its inaugral President and is currently registering members. Numerous stations have joined to date and the Society is now functioning. Shortly, the first PARS publication will be released to members by mail. A "net" is operated on 15 metres and members "check in" regularly when conditions permit.

Recently a letter was received by Citary from the Australian Ambassador to Japan acknowledging his work in Amateur Radio towards the development of friendly relation between Australia and Japan (see letter).

This letter is a great source of pride to Chitary and is of immense value to him — particularly as he is confined to bed and cannot engage in normal activity. It is gratifying to realise that governments are able to see, and recognise, people who are devoting time and effort towards better understanding between nations — surely something desperately needed in today's troubled world.

Parliament House,
Canberra, A.C.T. 2600

Minister for Post and Telecommunications, and
Minister assisting the Treasurer

Mr. Chitary Moriyama,
Room 11, DMP Ward,
Kawatana National Hospital,
2005-1 Ohaza Shimogumigou,
Kawatana-cho Higashi Sonogi-gun,
Nagasaki 859-36.

Dear Mr. Moriyama,

The Australian Ambassador to Japan, His Excellency, Mr. K. C. O. Shann, C.B.E., has recently written to me regarding your achievements in the field of amateur radio.

Chitary — JH6THP

As the responsibilities of my Ministry include the administration of the radio frequency spectrum in Australia I have a particular interest in radio activities. I was particularly impressed to hear from Mr. Shann of the activities of the amateur radio club, that you and some of your fellow patients have formed at the Kawatana National Hospital, Nagasaki. I understand that you are the President of the Club and that in addition to this, you have also established your own amateur station in your room at the Hospital.

I would like to take this opportunity of commending you on all you have achieved, particularly when these achievements have been made in the face of such a severe personal handicap.

As you are aware, amateur radio is a wonderful medium. I cannot, however, think of the radio art being used in a more beneficial manner than the way in which you and your friends are employing it. The establishment of contacts with people in other parts of the world fosters international goodwill and friendship and I believe that through your efforts, you are contributing in no small way to a greater understanding between the various peoples of the world.

Once again please allow me to convey to you on behalf of both myself, and my Department, warmest congratulations on all you have achieved and best wishes for your future attainments in amateur radio.

Yours sincerely,
(Signed) ERIC L. ROBINSON. ■

AN AR SPECIAL:

REVIEW OF THE MULTI 2700 TRANSCEIVER

New equipment for the two metre amateur seems to be never ending. Further, it appears that technical innovations are appearing more often with this section of amateur gear than perhaps for all other types. The subject of this review is the Multi-2700 transceiver. In a nutshell we have a rig with 144 to 148 MHz coverage on FM, SSB, CW, and AM. Two different methods are provided to cover this range, firstly with a switch selected synthesizer in ten kilohertz steps with a VXO to allow operation between these points. Then secondly a normal VFO with continuous coverage of the range in four, one megahertz, steps. All the usual facilities such as noise blanker, VOX, repeater offset, speech compression, S meter and centre zero discriminator meter are there. But there is even more. Included in the package is a ten metre converter to allow operation through OSCAR. It is hard at this time to think up any addition that needs inclusion.

The FDK Multi 2700 Photo: Reg Goudg

However, back to the beginning. The Multi-2700, which is a product of the Fukuyama Co. of Tokyo, is imported into Australia by Sideband Electronics Imports of Springwood, N.S.W. For the present time these rigs will only be available on order, and it is not anticipated that they will be a stock item. For this reason our review will not be quite as lengthy as usual. We will, however, present a description and performance summary which will enable any interested amateur to decide whether this rig is for him or not.

The Fukuyama Co. is of course well known in Australia with its "MULTI" products and the MULTI 7 was the subject of a review in this magazine some time ago. The MULTI 2700 is actually an adaptation of the MULTI 2000, which was possibly the very first of the multi-mode two metre transceivers available on the Australian market. For those readers interested a review of this transceiver appeared in CQ magazine for January 1976. For some reason the Multi 2000 was not a great success on the Australian market, perhaps because of the lack of a normal continuous tuning arrangement. It seems that this might have been the reason for the Fukuyama Co. to add this to the 2000, making the 2700. However, as well as the VFO, other changes have been incorporated to set this rig apart from most of the other multi-mode transceivers on the market. The synthesized section now has a full LED digital readout, while the VFO section has a very smooth and clearly illuminated dial. The one megahertz steps are indicated by illuminated signs above the VFO dial scale.

In use it was found to be a very convenient system. The synthesized section with the digital readout could be set up on the FM portion of the band and easily switched from one channel to another while the VFO could be set up for SSB operation. There is no doubt that this overcomes one of the problems with the fully tuneable two metre transceivers, that is, accurately setting up the dial for each of the required FM channels. The built-in speech compressor is most effective and with weak signals makes the difference between the signal being readable or not. In appearance the MULTI-2700 is unusual. It has a somewhat wide, low look, with the VFO section looking rather tacked on. The dimensions are 128 mm high, 378 mm wide, and 305 mm deep, and the weight is 14 kg. The transceiver is entirely self-contained with built-in AC power supply and loud speaker. Operation from twelve volts DC is also provided by changing the power cord. In appearance the 2700 has a somewhat "plastic" look. Whilst no doubt attractive overall, it would be very much a matter of opinion whether you would consider it professional. The meters and dial scale are illuminated in vivid green, the LED readout in red, and with red and green indicator light.

THE MULTI 2700 ON TEST

We submitted the 2700 to our normal series of tests. In general it exceeded the published specifications by quite a wide margin.

Power output was first checked with the rig in the high power position.

144 MHz 16 watts; 145 MHz 18 watts; 146 MHz 18 watts; 147 MHz 16 watts; 147.99 MHz 14 watts.

The power output at 148 MHz exactly had dropped to 6 watts. These figures greatly exceed the published output of ten watts.

On SSB, the PEP output was 144 MHz 14 watts; 145 MHz 16 watts; 146 MHz 16.5 watts; 147 MHz 16 watts; 147.9 MHz 14 watts.

Transmitted audio quality was judged to be well balanced and clean on SSB but somewhat bassy on FM.

The receiver section was next tested. Three degrees of selectivity are provided. The mode switch allows either wide or narrow FM reception, while on SSB, AM and CW a common 2.4 kHz bandwidth is provided. The FM bandwidth was checked at a receiver input of .5 mV. The narrow position would handle 5 kHz deviation with low distortion and the wide, 7 kHz. Increasing either of these by only one kilohertz produced noticeable distortion. With stronger signal input the receiver would handle somewhat higher amounts of deviation, but it proved beyond doubt that deviation must be kept down for weak signal reception.

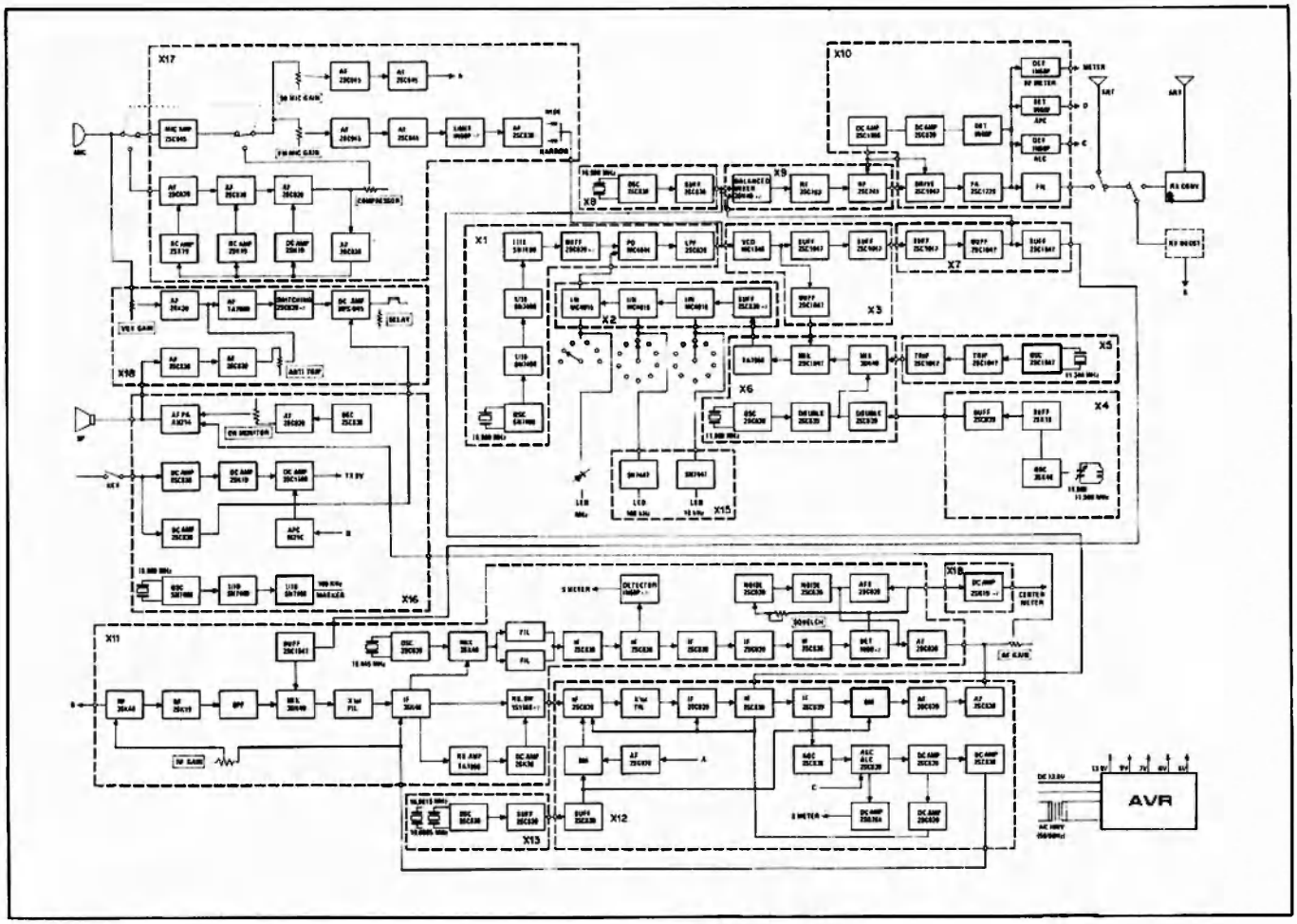
Next the receiver was check for sensitivity.

FM reception. The mute opened .2 uV.

At .5 uV 18 dB quieting was produced an at 1.0 uV the figure was 24 dB. On SSB, the signal to noise ratio was 15 dB at .2 uV and 23 dB at .5 uV. The calibration of the "S" meter was checked.

"S" Reading	SSB	FM
1	.35 uV	.7 uV
2	.4 uV	.9 uV
3	.5 uV	1.7 uV
5	.55 uV	2.1 uV
7	.7 uV	2.5 uV
9	1.9 uV	3.5 uV
9 + 20	5.0 uV	8.0 uV
9 + 40	45.0 uV	30.0 uV

From this it can be seen that S meter readings are somewhat generous but as it is normal to work with very weak signals on VHF they are probably useful in relation to the average signal encountered. The accuracy of the synthesizer was checked and it was found to be 400 Hz high. The 600 kHz offset was within 100



BLOCK DIAGRAM

Hz in relation to the above error. The transmitter deviation on FM was checked and found to be 4 kHz in the narrow position and 9 kHz in the wide. It should be noted that the speech compressor only works on SSB

The ten metre OSCAR converter was checked for sensitvity and found to be 0.5uV for 9 dB signal-to-noise ratio and 1 uV for 15 dB.

The VFO dial calibration and linearity were excellent. Over the full one megahertz calibration was within ± 1 kHz. Stability was likewise good with less than 1 kHz shift over a one hour period from initial switch on.

The MULTI 2700 proved to be a delight to operate. With the synthesizer set up on a favourite FM channel, it was possible to go from FM to SSB with a click of the mode and selector switch. A very handy facility. It is, of course, possible to reverse the functions and operate SSB with the synthesizer and FM with the VFO, but there is no repeater offset facility with the VFO. Only simplex operation is possible.

Unfortunately we were unable to check the OSCAR capabilities of the 2700 while on test as a suitable antenna was not available.

The VFO tuning dial had a two speed drive which proved to be exceptionally smooth to operate. A receiver offset control is provided.

The Instruction book is well written and comprehensive but, as is usual these days, makes little mention of servicing. The trouble shooting page covers mostly operational errors. However, a large and clear schematic diagram is included.

As mentioned earlier, these sets are not available ex stock at the present time. Information on price and delivery can be obtained from the importer, Sideband Electronics Imports, P.O. Box 23, Springwood, N.S.W., from whom the review sample was obtained. ■

C.A.R.E. (COMMUNITY AMATEUR RADIO EVENTS)

ALERT AMATEURS HELP APPREHEND CAR THIEVES

Early on Sunday morning (around 4.00 a.m.), 24-7-77, Jim VK3ZOS, who was mobile in Springvale Road, Keysborough, sighted a vehicle parked on the median strip with a broken side window. As he slowed for closer examination, the vehicle was driven off at high speed. It was apparent that the car was stolen.

Jim was able to follow the stolen car and relay details through the Ch. 2 repeater, VK3RML, to Garry VK3ZSP, who contacted the Melbourne police by phone.

By keeping the phone line open, Jim and Garry were able to relay messages to the police radio room (D24), who in turn directed patrol cars to the area.

A merry chase lasting 15 minutes eventuated.

The efforts of Jim and Garry enabled the police to apprehend the offenders without violence or injury.

Just another small anecdote showing the virtues of amateur radio giving assistance to the community.

(Contributions to this column are solicited.—Ed.) ■

WIA CORRESPONDENCE

8th August, 1977.

Secretary,
Postal & Telecommunications Dept.,
G.P.O. Box 5412 CC,
MELBOURNE, 3001.

Dear Sir,

This Institute, representing the amateur service in Australia, wishes to express concern about a wide range of largely inter-related developments affecting the service.

Of first importance are those matters which stem from the staff shortages within the Regulatory and Licensing Branch as exemplified in paragraphs 53 to 58 of the Report on the Introduction of a Citizen Band Radio Service to Australia and further illustrated by the low priority accorded to amateur service affairs.

The Institute observes that somewhat similar situations have manifested themselves in the United States of America and the United Kingdom. In these countries certain measures have been taken, in acceptance of the fact that the amateur service is largely self-regulating, to abolish a number of restrictions which created an unnecessary loading on the licensing and regulatory workforce.

In various submissions to Government in recent times the Institute has emphasised that the work being done by Departmental officers is of a high standard but, in the light of re-organisations and reduced numerical strength, further assistance is vitally necessary —

(a) To streamline and to reduce to a minimum the various procedures and systems presently in force;

(b) To investigate every possible avenue of assistance in carrying out certain specified duties; and

(c) To strengthen, as quickly as possible, the processes of law and order relating to frequency spectrum usage.

Having regard to the manner in which CB legislation was engineered, a not unsubstantial number of radio amateurs not only anticipate the permanent loss of the 11 m band to the amateur service in Australia, but are most apprehensive about the eventual fate of certain other amateur service bands. The Institute, however, does not necessarily subscribe to these views since it must believe that the Government will adhere to the present intentions and will take such steps as are necessary to contain the situation within existing parameters.

Unfortunately, the lack of urgently required measures to control the sale and/or importation of transceivers designed for use in this part of the spectrum, coupled with almost non-existent spectrum management police action against illegal operators, lends support to those who lack confidence in the bona fide intentions of the Government in this technical field.

This Institute trusts that wiser councils will prevail and therefore asks for reassurance that appropriate measures are to be taken before it is too late. It is not possible to believe that the Government willingly desires to place in jeopardy the credibility of Australia in international radio communications circles built up over so many years. Furthermore, the Minister ought to be reminded at every opportunity of the chaotic conditions surrounding illegal operations in the U.S.A. and how these cannot fail to be taken into account unfavourably at the WARC 79 deliberations.

As will be observed, this Institute wishes to place on record in the strongest possible terms condemnation of illegal operators of transmitting equipment. This has been made clear on numerous occasions in the past. The Institute recommends that the detection and conviction of illegal operators is of paramount importance. Measures to strengthen the forces of law and order must be taken and at the same time every effort ought to be made in every other direction to reduce the work load to achieve this objective.

Consequently, this Institute wishes to propose a number of changes relating to amateur radio licensing and procedures. These are detailed in Appendix A to this memorandum.

The Institute has for some time been disturbed about the low priority accorded to amateur radio affairs in the Department. However, when this low priority rating becomes more evident as exemplified by the very lengthy waiting time experienced by successful examination candidates obtaining their amateur licences, it is of no comfort to the applicants (a) that CB licences can be obtained almost "over the counter" and (b) that the normal delay time for amateur licences was three weeks. The waiting time is now of the order of six months in some States and lengthening.

Some improvements in the examinations area have been welcomed, namely: multi-choice questions and answers (although others, not of an essay type, should not be ignored), quick marking of these kind of papers and announcement of results within a reasonable time. Nevertheless, it is believed that some scope for further improvements exist. Firstly, it is recommended that candidates sitting for amateur examinations should be presumed to apply for an appropriate licence if they pass. If this fact is recognised and accepted it is suggested that an integrated series of forms should be completed by the candidate at the time of the examination so as to reduce the amount of clerical work involved in —

(a) Advising pass/failure,

(b) Issuing a certificate (where appropriate),

(c) Issuing an appropriate licence.

Secondly, the Institute wishes to assist with some or all of the examinations if an independent Education Authority cannot be found to take these over from the Department (cf. City and Guilds Institute for the U.K.). The problems which arise may be listed as —

(a) Infrequency of exams (twice yearly for each),

(b) Inability to examine candidates in many centres of some importance (Launceston, Warrnambool, Kalgoorlie, etc.), necessitating considerable travel and time off for those country area candidates, many of whom can ill-afford either or both.

(c) Some overcrowding in the main centres.

A set of proposals is attached hereto as Appendix B. It should perhaps be pointed out that, so far, there should be little, if any, repercussions internationally in relation to Novice Licensing since no reciprocal licensing arrangements appear to have been announced for this class of licensee. It is accepted that the standards and methods of conducting examinations should receive some recognition for reciprocity of licensing. Nevertheless, the number of amateurs requiring reciprocal licences during the validity of their licence is comparatively small. It should also be pointed out that amateur licence examinations in several countries overseas are conducted by the amateur radio society itself (e.g., Indonesia) or some other body. The fact that no international opposition appears to have been voiced reinforces the Institute's submission that Radio Regulation 1564 is capable of liberal interpretation. It is not necessary therefore to follow British practices and traditions to the letter.

Yours faithfully,

P. B. DODD,
Secretary.

APPENDIX A

This is divided into two parts. Part A relates to matters still before the Department, having been submitted in correspondence dating back to 1976 and earlier. Part B relates to other matters.

PART A

(1) **Third Party Traffic** of a restricted kind, namely:

(a) A revision of paragraph 94 of the Handbook to permit emergency traffic to be handled as an automatic dispensation by amateur r. WICEN stations called in or being used for communications concerning an emergency or involved in properly constituted practice nets.

(b) A revision of paragraph 80(a) of the Handbook to cater for common practices in the amateur service such as passing net traffic lists to establish proper net control.

(c) The items (a) and (b) might fall away if third party traffic is granted to the amateur service as proposed in letter dated 27/6/1977.

(d) Official broadcasts by the WIA should be permitted at any time and on any frequencies.

(2) **Beacons** (attended and unattended) should be licensed for operation in any part of any amateur band subject to compliance with WIA frequency plans.

(3) **Use of telegraphy by limited licensees** should be permitted.

(4) **Station identification** period should be extended to 10 minutes instead of the present 5 minutes (U.S.A. allows 10 minutes, U.K. allows 15 minutes).

(5) Amateur stations should be granted no less assistance in relation to interference problems than is afforded to other services and in particular —

(e) should expect collaboration in obtaining more stringent measures to be taken by manufacturers to reduce the susceptibility of commercial equipment to radio frequency emissions;

(b) should expect that commercial broadcasting stations be moved to parts of the spectrum where their operations are likely to cause less interference to stations in other services and vice versa (TV Channels 0 and 5A are the serious offenders in this respect);

(c) should expect that suitable standards be adopted and policed to reduce interference caused by electrical appliances and equipment of all kinds; and

(d) should expect that radio alarms and other non-specified radio devices should not operate within amateur bands.

(6) **Reduction in licence fees for pensioners and disabled persons:** Promised in letter RB4/4/32 of 19/10/76 but not yet implemented.

(7) **Identification by RTTY stations** — revision of paragraph 112 promised in telex RB4/11/35 of 8/12/76.

(8) **Repeater conditions.** Various matters still require liberalisation, namely:

(a) Since the WIA has published band plans for repeaters in order to avoid chaos, it has previously been submitted that no repeater licence should be issued by the Department unless prior agreement is given by the WIA in relation to the frequency it is proposed to authorise.

(b) The insistence that repeaters should be provided with manual on-site shut down switches cannot be met whilst the Department still requires that proper security measures must be provided for the installation as a whole. There are other methods, acceptable to the amateur service, of closing down repeaters when so required by the Department which necessitate very little time and effort on the part of regulatory staff.

(c) The number of amateur service repeaters should not concern the Department as this is a matter for the service itself to resolve.

(d) Repeaters should be permitted on all amateur bands from 144 MHz upwards; if, however, frequencies are selected on shared bands which could cause interference to the primary service the WIA should be advised (if need be on a confidential basis) accordingly and given options of other channels which are clear.

(e) Various other conditions should be liberalised as requested — letter of 30/7/1976 refers.

(9) The Institute is disturbed to observe that in some States **Amateur Advisory Committees** are inoperative. These are considered to be a valuable service and the alleged lack of funds to pay overtime for the official staff should be reversed. In addition a review of the work of these Committees has been under discussion with the Department for several years but nothing has been initiated to this end.

(10) Applications have been made over a long period of time for **additional frequencies.** The Institute agrees that these might usefully be discussed in the context of WARC 79.

(11) It has been suggested that the **period of validity** of amateur licences should be extended from one year to three years to economise on renewals. Paragraph 28 of the Handbook refers.

(12) **Examination matters** appear in Appendix B.

PART B

(1) **Third Party Traffic.** Relaxations similar to those in force in the U.S.A. have been requested in a letter dated 27/6/1977.

(2) **Portable and mobile operations.** Paragraphs 90 to 93 of the Handbook impose additional work on the Department without, it is submitted, conferring any positive benefits providing the Department insists upon all amateurs advising changes of addresses. The days when mobile operations were comparatively rare events have long gone — many amateurs today operate mobile from their vehicle as a matter of daily routine. Paragraph 92 could be retained. In the light of these proposals paragraphs 87 to 89 and 39 should be revised and liberalised very considerably.

(3) The mandatory requirement to **keep a log book** — paragraphs 85 and 86 in the Handbook — should be modified to become a voluntary requirement.

(4) Paragraph 84 of the Handbook should be modified in relation to radio amateurs to exclude communications transmitted or received directly concerning amateur service matters. In this context it is pointed out that a radio amateur contravenes the secrecy provisions if he reports on pirates or intruders.

(5) It is submitted that a common meeting frequency-segment should be authorised where all classes of amateur licensees may communicate one with another. The Institute would wish to make further submissions in this regard at a future date.

(6) The requirement that amateurs should obtain permits to conduct television experiments should be abolished.

(7) **Novice licensees should be permitted** to use variable frequency transmitters.

(8) Any amateur, upon application, should be granted "Citizens band" licences free of charge.

APPENDIX B

1. Detailed examination syllabuses are considered to be essential. A Novice theory examination syllabus has been submitted by the WIA to the Department but not yet approved.

2. Four examinations of each class should be held every year.

3. More examination centres should be provided.

4. The adoption of "multi-choice" and similar techniques should be universally adopted for theory and regulations examinations. The pass mark should be reduced from 70 per cent to 55 per cent. Any candidate obtaining more than 50 per cent but less than 55 per cent marks in the theory paper should automatically qualify as having passed the Novice theory examination.

5. The identification of examination candidates should include the provision of a signed passport-type photograph returnable on request if a failure results.

6. The results of examinations and the availability of licences should not be delayed beyond three (or at the most, four) weeks after the date of the examination.

7. Lists of successful candidates (or copies of licences issued) should be made available to the WIA within one month.

8. General comments by the examiners about the failure rates and possible reasons why they occurred should be issued after each set of examinations.

9. **Morse code examinations** should be given at speeds other than 5 and 10 w.p.m. and endorsement or "stickers" be made available to successful candidates on application.

10. The spacing lengths between letters should be modified from strict compliance with the ITU standard; submissions on this aspect have already been made but no results are known.

11. The Institute believes, and has stated, that its assistance should be sought on —

(a) Invigilation of some or all examinations by responsible licensed amateurs.

(b) Some of the examinations, especially the morse code tests and Novice theory parts, should be conducted by responsible amateurs under controlled conditions which will now be set out hereunder for consideration:

(i) **Morse Code examinations:**

(a) **Novice:** Should be set, taken and recorded by any full call licensed amateur approved for the purpose by the WIA Divisional Council concerned. Exam may be held at any time and place mutually satisfactory to all parties.
Examination general instructions to be provided by the Department.
Result of exam to be recorded on a special form designed to serve all purposes (advice to candidate, report to Department).

(b) **Other:** WIA Division concerned to submit to Department a panel of members recommended to hold these exams; Department to approve names.
Exams at 10, 12 or more w.p.m. may be held at any time and place mutually satisfactory to all parties.
Examination general instructions to be provided by the Department.
Exam to be held in the presence of a witness approved by WIA if considered necessary; tape recording of proceedings if considered essential.
Results to be recorded on a special form as for Novice exams.
Department to hold one morse exam each year for speeds over 10 w.p.m. for any amateur wishing to qualify for the issue of an internationally recognised certificate — if considered necessary.

(**NOTE:** Automobile Associations overseas issue an International Driver's Licence to any member wanting such a document and this is officially recognised internationally — similar principle is therefore known in other spheres.)

(ii) **Theory examination:**

(a) **Novice:** Department to approve a "bank" of multi-choice (and similar mode) questions for the Novice exam in accordance with an agreed syllabus. Questions might usefully be grouped under such section headings as "Interference", "aerials", "receivers", etc.
Answers key to be held by a Divisional Education Officer appointed by each Division who should attend all exams if possible.
Divisional Councils to nominate licensed amateurs for purposes of holding exams and names to be submitted to Department for approval.
Exams to be held at any time and place mutually convenient to all parties. Department to issue general instructions about such exams. Time and place of exam to be notified one week in advance to local Divisional Education Officer.
Unless otherwise instructed by the Department 15 questions to be put to candidates including at least one question from each section. Allow two minutes to answer each question.
At conclusion of this part the examiner to ask one general question for candidates to answer from a prearranged set (e.g., simple circuit diagrams, write out a simple formula, draw diagram to illustrate skip, etc.).
Collect and where possible mark the papers there and then and issue special integrated form with copies for all concerned. (If Divisional Education Officer unable to attend he can supply the examiner with an answer sheet key in a sealed envelope to be opened by the examiner in the presence of the candidate/s at the conclusion of the exam and this fact authenticated by signatures on the sealed envelope for return to the Divisional Education Officer.)

(b) **Other:** It is recommended that responsible radio amateur invigilators should be appointed. Nomination of specific persons could be by the Division concerned with names being submitted to the Department. These invigilators would be for country areas at some distance from present examination centres. The proposal is that the Department sends to the invigilator a sealed envelope containing the exam papers. If no candidates attend, the sealed envelope is returned intact in an enclosed stamped envelope supplied by the Department. If candidates attend the invigilator complies with printed instructions, opens envelope in presence of candidates and obtains their signatures certifying this was done in their presence.

(iii) **Regulations examination:**
Same principles as for Theory (b).

NOTE: Theory and Regulations exams — It is recommended that, with the assistance of the WIA, the Department should produce a "bank" of questions to enable examination papers for individual examinations to be prepared quickly at small cost. It is suggested that the general question "bank" should be used to produce 75 per cent of each individual examination paper. The remaining 25 per cent of questions can derive either from a separate "bank" or be prepared on an ad hoc basis for each exam. If this suggestion is followed and if answer overlays are used for answer papers keyed one with the other a very quick rate of marking can be achieved. If an integrated application form is also introduced it is suggested that —

(a) Licensing delays can be minimised, and

(b) At least four examinations of each kind should be within the capabilities of the Department each year. ■

IARU NEWS

Six new members have been accepted into the IARU. These are the amateur radio societies of Sierra Leone, Bahrain, Botswana, Turkey, Papua New Guinea and Jordan. The grand total is now close to the 100 mark. But remember, there are 153 members of the ITU.

The SARL received a letter from their PMG stating that their broadcasting services had requested the deletion of the footnote (No. 212) relating to the allocation of 7100-7150 kHz to the amateur service in South Africa and South-West Africa. This was quoted in Radio ZS for May 1977.

For those who like to keep up to date with developments concerning WARC 79, it is difficult at this stage to indicate how frequency plans for amateur radio will finally crystallise into an integrated whole on a world-wide basis.

In some important countries the possibilities of amateur radio obtaining a reasonable share of the spectrum in each band still shows considerable variations resulting from pressures by other services. These pressures tend to vary from one country to another.

The work of the IARU, quite apart from basics already reported, lies in the detection and evaluation of these variables to achieve a common position world-wide.

Look now at the Australian 80 m band. Much of the world's DX is carried on in a small segment immediately below 3800 kHz. This is in a part of the spectrum not allocated to amateurs in Australia.

As explained in WIANEWS this month, the basic frequency bands to be sought are those which are consistent with IARU. These were adopted as long ago as 1975.

There have been some minor modifications since then, as for example, it would appear more sensible to seek our 500 kHz bandwidth on the 40 m band by going slightly downwards in frequency rather than upwards only. The USA position in this respect was reported in last month's IARU News but obviously did not go down far enough.

Still in the system is a request for a 160 to 200 kHz band. The other HF bands are the same as reported in 1975 but the three proposed new bands remain in the melting pot. On balance it is considered that most of the operators would select something in the 10 to 10.5 MHz area in preference to the other two if ever a selection had to be made.

For VHF and upwards the commitment for world-wide frequency bands follows existing patterns. 50 to 54 MHz, 144-148, 220-225, 420-450 and beyond with small exclusive segments for satellite operations. The higher GHz bands are basically as reported in WIANEWS February 1977.

At the last IWG meeting of IARU it was agreed that the next meeting of the group would be held in Geneva during the Aeronautical Mobile WARC next February, not only to discuss the international position but also to observe the proceedings in such a WARC and meet as many participants as possible. Most of these people also would be delegates to WARC 79.

Incidentally, what is WARC 79? A little background information would assist in an understanding of it.

The frequency spectrum is a limited resource. There is just so much of it, no more.

Very early in the history of radio communications this fact came to be recognised. Without some kind of co-ordiantion and control chaos would soon have developed if every country did as it pleased with frequency allocations in the useful part of it then known, namely, the HF frequencies as we know them today. The radio signals were, and are, no respecters of frontiers.

The International Radiotelegraph Union was formed in 1906. This was merged in 1932 with the International Telegraph Union, formed in 1865, to become the International Telecommunications Union — abbreviated to ITU — formally established in 1934.

The ITU was set up as a technical arm of the United Nations organisation and hence forms a part of it. ITU headquarters is in Geneva and its membership are the sovereign countries of the world desirous of joining it and providing subscriptions to run it. The present membership totals 153.

The ITU's principal officer is the Secretary-General controlling a large office costing around $10 million per annum.

The affairs of the ITU are governed by a Plenipotentiary Conference, Administrative Conferences and, of course, the Secretariat. It controls the International Frequency Registration Board (IFRB) and two main consultative technical committees, one for radio and the other for telegraphs and telephones.

The member countries, which includes Australia, New Zealand, Papua New Guinea and so on, all meet in the regular Plenipotentiary Conferences held at various times for various purposes such as Broadcasting, Maritime, Space and Aeronautical. There is also a main Administrative Conference, known as the World Administrative Radio Conference General, held about once every 20 years. This is the one in which radio amateurs have a main interest. The last WARC General was in 1959 and the next is in 1979, which is abbreviated WARC 79.

The WARC General works to an agenda which up till now included almost everything dealing with radio communications — definitions, frequency allocation tables, radio regulations and general operating codes.

The delegations at a WARC General, from the member countries, will be augmented by observers from many other organisations, including the International Amateur Radio Union (IARU) in addition to ITU Secretariat staff.

Because of the enormous complexities involved, the work of the Conference is broken down into numerous working groups which in turn appoint sub-groups as needed. All the work done and agreed in the various working groups — all of which work simultaneously — goes forward into the Plenary sessions. From the latter derive the agreements which may or may not be ratified by all the member countries. Some may ratify with reservations and numerous footnotes could be advised as varying the agreed frequency tables.

It can be seen therefore that the larger countries of the world must send big delegations so that they will be sure of being able to keep track of the work being done in all the groups.

Such a WARC General as WARC 79, scheduled to last 10 weeks in Geneva, will attract a thousand people or more. Before the Conference a vast range of technical material will be prepared by the consultative technical committees. Amateurs are, of course, interested in the radio committee, which is the CCIR, an abbreviation of its full name in French. The work of the CCIR is carried on all through the years by technical experts appointed by member countries. Australia is represented by the CCIR, and as for WARC's the work is broken up into several specialised committees.

The work done by CCIR assists the work of WARC's, although it would not necessarily take precedence over other matters since it is purely technical. The ultimate decisions could possibly derive partially from political or other considerations. These eventually come out as Radio Regulations operative a year or two later.

There is therefore a very wide gulf between what each country originally prepares as a brief for the Conference and the end results. Each country must prepare such a brief for its WARC 79 delegation, and the WIA, with the help of the IARU, are presently involved in the preparations for the Australian brief. ■

AWARDS COLUMN

Brian Austin, VK5CA

P.O. Box 7A, Crafers SA, 5152

WORKED YUDXC MEMBERS (WYUDXCM)

This award is issued by the Yugoslav DX Club for confirmed contacts with members of the Club.

1. YU applicants need 15 contacts (QSL).
2. EU applicants need 8 contacts (QSL).
3. All other applicants need 4 contacts (QSL).

WYUDXCM is available to licensed amateurs and shortwave listeners. Only contacts after 1st January 1970 are valid.

Please send your application (with details from YU QSL cards), confirmed by two other amateurs and 7 IRCs or US$1 to —

YUDXC,
P.O. Box 82, 62253 PTUJ,
Yugoslavia.

Members of YUDXC (until 1st January 1977):

1. YU2DX	21. YU2HDE
2. YU1BQC	22. YU3DJK
3. YU3EY	23. YU2BOP
4. YU1SJ	24. YU2CAW
5. YU1BCD	25. YU3ZV
6. YU1AG	26. YU4EBL
7. YU2NFJ	27. YU2QZ
8. YU1SF	28. YU1ODO
9. YU4HA	29. YU1ELM
10. YU2AKL	30. YU3TXT
11. YU2OB	31. YU2REO
12. YU2LA	32. YU3TDX
13. YU3CM	33. YU1NSX
14. YU2CBM	34. YU1NPG
15. YU1AHI	35. YU3EP
16. YU2RAZ	36. YU2CBE
17. YU2CQ	37. YU3BU
18. YU3DQ	38. YU3TJA
19. YU2QK	39. YU3TFB
20. YU2BHI	40. YU2RTW

Also contacts with 4N2CI, 4N2SO, 4N2BR, 4N2HV, 4N2KO, 4N2KP, 4N2LO, 4N2MT, 4N0DX and YU8DX are valid for WYUDXCM.

DIPLOMA "JADRAN"

This award is issued by YU2AKL — Radio Klub "Ante Jonic" — Split — Yugoslavia to licensed amateurs and SWL's for confirmation of QSO's with Yugoslav amateur stations located on coast or islands of Adriatic Sea.

YU applicants need 25 QSLs with 8 places.

EU applicants need 10 QSLs with 5 places.

All other applicants need 5 QSLs with 3 places.

Your application with details of QSOs, YU QSL cards and 8 IRCs (or US$1), please send to:—

Radio Klub "Ante Jonic" — YU2AKL,
P.O. Box 89,
58001 Split, Yugoslavia.

Only contacts after 1st January 1970 are valid. ■

LARA

Ladies Amateur Radio Association

This month's item of news comes from the Roving Reporter who attended the LARA Birthday Weekend in VK3. This event was held at a small place called Cherokee and our hostess for the occasion was Heather Mitchell (call sign VK3N?), YF of Peter 3ANX. It was a beautiful drive up there and when we arrived there was a blazing log fire to warm us up. Peter drew a set of superb maps to guide us, and in case anyone got lost there was talk-in on radio.

WHAT'S BLACK & WHITE AND TURNS 2-METRE OPERATORS GREEN ?

THE NEW KENWOOD TR·7400

This is the one, the Kenwood TR-7400 FM mobile transceiver of 25/10 watts and complete 2 metre band coverage (144-148 MHz). It has the largest digital readout in its class, and the 800 channel coverage with PLL frequency synthesizer provides you with all existing and proposed Australian repeaters. A convenient front panel switch offsets the transmit frequency up or down 600 kHz.

WHENEVER YOU WANT TO MOVE UP — KENWOOD HAS THE WAY

TR-2200 2-metre VHF FM portable receiver

R-300 all band or ham band communications receiver

The new TS-520S HF transceiver — ideal for the novice

TS-700 2-metre VHF all mode transceiver

Your nearest Kenwood dealer will be happy to give you more information on the entire Kenwood range of amateur radio products including the remarkable new TR-7400. Contact him direct or write to us at Weston Electronics.

KENWOOD

Marketed in Australia by
Weston Electronics Company,
2 The Crescent,
Kingsgrove, NSW 2208.
Distributor for Trio Kenwood
Corporation, Japan.

PLEASE SUPPLY ME WITH MORE INFORMATION ON

NAME

POSTCODE

CALL SIGN

ADDRESS

PHONE No.

WEC.AR 2

A few of the members returned home on the Saturday but a few hardy souls stayed the night then joined in the broadcast call-back on the Sunday. As the week-end coincided with the Mid-winter Field Day, this was also a feature of the program. The traditional barbecue was held on the Saturday evening and as usual "a good time was had by all".

Other Birthday associated activities included a special sked held on Monday, July 25th, on 80 m and a VHF sked held on the Tuesday for Melbourne YL's. These will be reported in the Newsletter by those who took part.

The next edition of the Newsletter will be posted this month, and will include, amongst other things, a voting paper for the LARA emblem, giving members a choice of four possible patterns. Once this is decided, we can print membership cards, notepaper and award certificates, possibly in time for the next AGM.

One of our members unable to join the Birthday Party was Heather Badson. We understand husband Ray VK3ZEB is ill, and we send best wishes for a speedy recovery to him.

In VK3 there will be a September meeting, held on Saturday 10th, at the home of Marilyn Miezis VK3AOI. For other activities of LARA, members can consult the Newsletter or follow the WIA broadcasts locally for news of activities. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

This month I have some news of activity in the West. Rod VK6RH, advises me of some activity in Perth. ATV stations over there are VK6PR, VK6PD and VK6RH. The WIA VHF Group also have a large amount of surplus equipment which includes a 2 inch RCA tape machine, Image Orthicon Cameras, vision mixer and sundry other pieces.

The exciters used for transmission are all from VHF Communications (DJ4LB), although Rod has a 2W linear and plans to build a 4CX250B afterburner. They are all operating on the National Simplex Channel of 426.25 MHz (take note VK5!).

Les Jenkins VK3ZBJ, has designed a new converter for ATV. The unit is very small and has the feature of high rejection to VHF Amateur Band and commercial TV transmissions.

It is a broad-band device, which when correctly aligned is suitable for use in any part of the 70 cm band (no troubles in receiving inter-carrier sound!). Further details may be obtained by contacting Les at his home QTH.

Nice also to hear from our friend in the South — Winston VK7EM. In a letter received recently Winston tells of his proposed experiments on 1296 MHz next summer. Hopefully this will promote activity in VK3 this summer. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

Dear Sir,
Reference the letter by VK6KK Mr. C. Whalley in July AR. I fully concur with all his remarks concerning the DXCC countries lists etc. and also his remarks concerning QSL cards.

Whilst not a DX chaser myself, I found the DXCC countries list very useful as one could tick off the prefix of countries contacted, and at a glance could calculate the number of countries in one's log. It also kept me up to date with any new calls which might have arisen during the preceding year. It seems quite ludicrous to me that a magazine produced for the benefit of the radio amateur should discontinue with this very important service. One can only wonder at the thinking behind the decision.

On the subject of QSL's, as an ex G, I find it difficult to understand why as a member of the WIA I should have to pay for each and every QSL card I send through the bureau, because as an ex RSGB member, I can bear out Mr. Whalley's statement, the RSGB QSL bureau is an absolutely free service to members. Due to the present fantastical high price of having cards printed, plus the extra charge placed on each QSL through the bureau, I no longer automatically fill out a QSL card after each contact, I now wait to receive a card from the other station, before sending off my card. I used to QSL 100 per cent. Whilst on the subject of QSL cards, I understand people wanting their own individual design of card, but for those of us who consider that a QSL card is just a confirmation of a contact, and having regard to the high cost of having QSLs provided, would it not be a good idea for the WIA to design a standard card, have a go at getting them printed at a cheap rate in view of the many thousands which would be required, even if it means having them printed in another country. A space could be left on the card for the station call and address, to be printed in by the operator, or by rubber stamp.

I feel sure that with a little thought these cards could be arranged and I feel sure there would be a ready market in VK for such cards, and with probably a margin of profit for the WIA — what do other members think of the idea?

FRANK BIRD, VK6ZE.

(The DXCC countries list is in the 1977 Callbook — Ed.). ■

The Editor,
Dear Sir,

ROSS HULL MEMORIAL VHF-UHF CONTEST "IS IT AN EVENT OF THE PAST?"

This once remarkably popular contest was first held during the summer of 1950-51 to perpetuate the memory of the late Ross Hull, who did so much towards work in VHF and UHF field. Since the first contest many Australian amateurs of note have participated, among the trophy winners being, in the first year R. V. Galle, 5QR, and since then followed in order 5BC, 4KK, 6BO, 4NG (dec.), 3GM, then the consecutive 3 times winner 3ALZ, 4ZAX, 3ARZ, 5ZDR, 4ZAX, 5ZDR, 3ZER, 3ZDM and 5HP. This takes us up to 1966-67 when my records cease, having at that time obtained these statistics thanks to Peter 3ZPA and David 3QV.

As a long-standing competitor in this contest, having seen many ruthless changes in the rules, I consider I am eligible and competent enough to make these comments for your readers' digestion and thought.

My own humble achievements are the winner of 5 first places in the VK2, three of them consecutive, 1964-65, 1965-66 and 1966-67 and I am particularly proud of these certificates, because they represent three summers in which there were three entirely different sets of rules, mainly as to the duration of the contest for log submissions.

From 1950-51, until 1964-65 there were no rule changes and logs were required for the full 5 weeks duration of the contest. In 1965-66 the WIA decided to shorten log submissions to the best 9 days, consecutively, besides introducing a 48 hour period and in 1966-67, they brought in a period of 7 days, not necessarily consecutive, while retaining the 48 hour period.

Also from 1964-5 to 1965-6 points were abolished for contacts under 50 miles, but this was brought back in 1966-67. As well, there were a number of changes in points awarded for contacts over different mileage ranges over the years, until 1976-77 when the scoring system was changed entirely, with the mileage system being abolishtd in favor of points per contact being made on a State to State basis. This seemed fair enough, when you consider the people who have to check the logs.

Further in 1975-76 the organisers decided to stop issuing certificates to State winners and restricted certificates to first, second and third places in each section, with even this "penny-pinching" attitude being abolished, apparently, in the last contest 1976-77.

The point of my remarks to date, based on facts, leads to the question: "Were all these changes necessary, or were they brought about by 'whinges' from disgruntled competitors?"

Besides, they seem to bring disregard for the man, whose name this contest was "supposedly" designed to perpetuate the memory of and I for one, feel he must turn in his grave at the thought of this state of affairs.

Another question may well be asked, "Where do we go from here, will this once highly regarded contest continue to exist, in view of the seemingly lower number of log entries each year?"

A final question, "Could this be one of many possible causes for the membership of the WIA to be only about 50 per cent of all amateurs in Australia?" My answer being "YES".

Finally, let those responsible get together and give the matter careful thought and introduce a set of rules for future contests, which will remain unaltered over the years, as well as making it "worthwhile" winning or getting a certificate. A suggestion is that you abolish the 7 day and 48 hour periods and if you wish a log submission for less than the full period, then why not reinstitute a rule requiring one for say 14 or 9 days, being the best consecutive'y. As well as re-introducing the issue of certificates for the highest scorer in each call area, leaving the points scoring system as in the last contest, 1976-77, together with the bonuses.

While it may seem hard on some operators, remember my previous remarks and keep it a hard contest to win, as well as being able "to take the good with the bad".

Sincerely yours,
ALBERT F. BIRCH, VK2ZFB/VK2N—. ■

The Editor,
Dear Sir,
I refer to the letter from C. Whalley VK6KK in July AR where he comments on QSL Bureau changes. I would like to correct him as far as the VK2 Division is concerned.

For some time now this Division has had free handling of cards for members. To those who reside in the country areas, the Bureau posts cards at economical intervals.

Our Bureau reports that this has created a marked increase in use of the facilities, with costs remaining low as a percentage of total membership.

By way of general information our QSL address is C/- P.O. Teralba, NSW, 2284. Would all please note that this is the only address and that GPO Box 1734 is no longer an operational address.

T. MILLS, VK2ZTM (President VK2 Division) ■

The Editor,
Dear Sir,

In my letter published in May AR this year on production of Morse practice tests, I stated that the RFMD possessed a morse keyboard. I have since discovered that this is not so. The examinations in Sydney are prepared using such a keyboard, but it is the property of one of the Radio Inspectors and is used by him in the hope that a degree of uniformity can be obtained so that candidates can know what to expect.

My apologies to those concerned.

Yours faithfully,
Mark Salmon VK2DI.

The Editor,
Dear Sir,

The planning of the 432 MHz band is woefully inefficient according to my way of thinking.

My plan is as follows:

420 -425.5	Ch. 1 TV
426 -431.5	Ch. 2 TV
432 -432.5	All tuneable modes
432.5-434.5	FM Simplex repeater in/out beacons
435 -438	Satellite window, Ch. 2A TV
438 -443.5	Ch. 3 TV
444 -449.5	Ch. 4 TV
449.5-450	Experimental.

There are small guard channels between some of the main segments which I have not allocated.

The TV allocations are based on a vestigial sideband standard. If the commercials have a vestigial sideband standard there is no reason why amateurs cannot.

Right now there is a QRM problem on ATV in VK3. In order to make things no more difficult than necessary for the ATVers, it is desirable that ATV channels be as close together as possible. The main limitation here is antenna bandwidth.

In order to make up for the low sideband power of ATV we have to use high antenna gain. There is no way in getting gain of 20 dB or more on

432 over a 20 MHz bandwidth without going to a very large structure e.g. a 20 foot dish.

Ch. 2A TV is a proposed narrow band vestigial sideband suppressed carried system for satellite (or land use when not required for satellite).

Yours faithfully,

J. F. Berwick VK3ALZ.

P.S.: I propose that a deadline be set for the conversion of ATV to vestigial sideband — prior to this a decision will have to be made which sideband to suppress. ■

The Editor,

Dear Sir,

After reading the letter from the VK5 CW Co-ordinator, AR, July '77, and going back to the May and February '77 and the October '76 editions of AR where related letters have been published, I was prompted to put in my "two bobs worth"

I, for one, see what Rodney VK3UG is pointing out in the leading comment of his letter in AR Oct. '76 issue, co-ordination of morse code practice sessions, and, primarily as far as I am personally concerned, publication of times, frequencies and callsigns of those stations taking part in slow morse practice sessions.

As the co-ordinator of the VK2 division mentions, he believes there is a service originating from VK4 and as far as he knows no service from VK3. Well, as far as I know, there is a service in VK3 on 160m, but where, when, on what specific frequency? We could probably continue.

I think my point is plain enough; one person thinks one division is producing a slow morse session, another person does not know anything about it but thinks his division produces a session, on what frequency or time he does not know least of all the station callsign.

How about all bodies that conduct a slow morse broadcast write to Mr Champness and let him know all the details of your service so that they may be published in AR. I'm sure Mr Champness would not mind sparing a few lines for such information which would help the newcomer, and the not-so-new.

("Newcomers' Notebook" is temporarily in recess. We will be happy to publish details of slow morse transmission not now listed in the AR directory (p3) as and when received . . . Ed.)

I personally am well aware of the fine efforts of the VK2 and VK5 Divisions, but what about everybody else that conducts similar sessions?

In closing I would like to touch on the topic of morse standards. The first time I attempted a P and T Morse Examination, I was surprised to hear the morse being sent the way it was. Being a regular listener to the VK2 and VK5 sessions, the only two I am aware of, I have come to notice the difference between P and T machine morse and hand-sent morse at the required speed.

The difference to somebody who has little trouble coping with morse may well be negligible, but it is of great significance to a person who has difficulty with the code, hence Mr Champness's suggestion of machine morse or pretaped morse sent at a higher speed and slowed down. Even I can send better quality morse at 15 wpm than at 5 wpm and I think a lot of people would be of similar opinions.

This letter is not directed at any party or persons, but is intended to shed a little light on what may have been turning into a dark situation.

How about it, State Co-ordinators, I think we will be all better off for it.

Bruce R. Kendall VK3ZDM. ■

QSP

1977 CALL BOOK

The small note about the new call book on page 6 of August AR was written very early in July whilst details were being finalised. This is the first call book produced in the new series and the number of pages for the call sign listings was underestimated by about 20 per cent. The result is that the weight of the call book, containing more pages than originally estimated, will bring it into the 60 cent postage bracket but the cover price remains unchanged at $2.85. Copies should have become available late in August.

VK/ZL OCEANIA Dx CONTEST RULES

The WIA and NZART, the National Amateur Radio Associations in Australia and New Zealand, invite world wide participation in this year's VK/ZL Oceania DX Contest.

OBJECTS

For amateurs of the world to contact VK, ZL, Oceania stations on all bands, 1.8 through to 28 MHz.

DATES

PHONE — first week-end in October; CW — second week-end in October. Starts 1000 GMT Saturday, ends 1000 GMT Sunday.

TYPE OF COMPETITION

1. (a) Transmitting Phone — Single Operator.
   (b) Multi Operator outside of VK/ZL.
2. (a) Transmitting CW — Single Operator.
   (b) Multi Operator outside of VK/ZL.

NUMBER EXCHANGE

To consist of five or six figures, made up of the RST report, plus three figures which commence at 001 and increase by one for each successive contact.

SCORING

OCEANIA STATIONS

2 points for each QSO on a specific band with VK/ZL, 1 point for each QSO on a specific band with the rest of the world.

WORLD STATIONS

2 points for each QSO on a specific band with VK/ZL, 1 point for each QSO on a specific band with Oceania other than VK/ZL.

FINAL SCORE FOR OCEANIA AND WORLD STATIONS is derived by multiplying total QSO points by the sum of VK/ZL call areas worked on all bands. (The same VK/ZL call area worked on different bands counts as a separate multiplier.)

VK/ZL STATIONS

On EACH band, one point per contact, multiplied by the total number of different prefixes worked. Final score to be the sum of the band scores.

VK/ZL ON 80 METRES

As well as to overseas countries, contacts on this band between VK/ZL counts for points. Each call area of VK and ZL to be considered a scoring area.

VK/ZL ON 160 METRES

As for 80 metres, with the addition that contacts between VK/VK, ZL/ZL count for points.

LOGS

(a) Must show in this order: Date, time in GMT, callsign of station contacted, band, serial number sent, serial received. Make separate log for each band used.

(b) SUMMARY SHEET TO SHOW: Callsign, name and address (use block letters please), details of equipment used and for EACH BAND QSO points for that band and total of prefixes.

Sign a declaration that all rules and regulations have been observed.

AWARDS

FOR OVERSEAS STATIONS: Attractive coloured certificates will be awarded to EACH country (call area in USA, Japan, USSR) on the following basis:

(1) Top scorer for the country.

(2) Other certificates will be awarded; 2nd and 3rd and separate band awards, depending on activity for conditions prevailing.

(3) Where there is a high participation from any call area, a WIA plaque will be awarded to top scorer with separate plaques for Phone and CW.

VK/ZL STATIONS: Certificates will be awarded as follows:—

(1) Top scorer on each band for VK and ZL.

(2) Top scorer in each VK and ZL call area.

NOTE: There are separate awards for Phone and CW.

RETURN OF LOGS posted to reach —
VK/ZL Manager, WIA, GPO, Box N1002,
Perth 6001, Western Australia,
or
N. Penfold VK6NE, 388 Huntriss Road,
Woodlands 6018, Western Australia,
before 1st January, following the contest. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN May 1977

A 14 MHz DDRR Antenna; IC Linear Capacitance Meter; Some Ideas for Home Brewing; OSCAR Orbit Predictions; A Tunable Active CW Filter; The Colour TV Trap; FM Receiver Specifications; The "Long Over" Eliminator; Operating Portable in Fiji.

HAM RADIO HORIZONS March 1977

This is a new publication from the publishers of "Ham Radio". HRH interviews FCC's John Johnston; Riding High with OSCAR Satellites; The Not-so-Rocky Road from CB to Ham; The Golden Years of Radio; A Simple Audio Oscillator; The Far Horizon — An Evening of DX; Taking the Mystery Out of SSB; Get on the Air on a Budget; DX Propagation and Forecasting.

QST May 1977

Keying Waveshape Correction Circuit; Propagation — Past and Prospects; Slant-Wire Feed for Grounded Towers; The 5 x 3 Power Supply; Independant Sideband for Your Drake TR-4C; The Stark Key; A Fully Automatic Morse Code Teaching Machine; An Ultramodern Linear Amplifier; Your First Receiver — How to Choose It.

SHORT WAVE March 1977

Austin Forsyth, OBE, G6FO; Design for a Telescopic Tilt-Over Mast; Notes on Power Supply Design Using Three Terminal Regulators; Beginners' Guide to OSCAR.

SHORT WAVE April 1977

A 40 watt PEP Linear Amplifier for Two Metres; All-FET Transmitter for Top Band; Simple Receive Adaptor; Weatherproofing a Dipole; QRO Power Supply for Transistor Equipment; Calibrating Your Reflectometer; Lecher Lines; Dial Lighting the Trio 2200GX. ■

20 YEARS AGO

Ron Fisher, VK3OM

SEPTEMBER 1957

Amateur Radio of September 1957 contained one of those rare articles that instantly creates a sensation. VK5AX's "All-Band Pre-amplifier without Band-Switching" was immediately being reproduced by amateurs and short wave listeners all over Australia. Designed to cover the range from three to thirty megahertz with an "All-Band Tank Circuit" and provide a large amount of RF gain, it was just the thing to pep up the old AR7 or AR8 that was getting a bit over the hill. Two 6AC7's, one as the RF stage and the second as a cathode follower output, were used. All the bits needed were in every junk box.

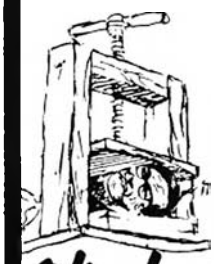
Other technical articles for September included "A Two Metre Long Yagi", by Ian Berwick VK3ALZ. It was indeed long, the boom being nearly ten metres.

Ninety Degree RF Phase Shift Networks, by N. L. Southwell VK2ZF, described quarter-wave co-ax. line networks and delay line type networks. Part five of "Modifying the AR7 Receiver", by Gordon Bowen VK5YU, showed how to obtain full 20 metre band-spread with the Band E coil box. The Editorial page urged a greater use of reference books in Amateur Radio research. They suggested the use of Divisional and Public Library facilities. With the rapid expansion of Municipal Libraries over the last few years, these services are available to us all. However, I have noticed that in general, books on amateur radio are not well selected. Have a word to your local Librarian, they are always pleased to receive suggestions.

What did the Hamads have to offer in September 1957? How about an Eddystone 640 receiver at $54, or a modified 522 transmitter at $30. Perhaps an unwired power supply with 800 volt and filament transformers plus chokes at $50 might be more to your taste. ■

YOU'VE CONVINCED US!

We've realised the error of our ways — now the high-performance Yaesu FRG-7 is back in all our stores (and many of our dealers!)



ok-I give up!

The ultimate in a general coverage receiver — continuous tuning from 550kHz to 30MHz, fully synthesised for ultra stable reception in AM, SSB or CW modes. Sensitivity is better than 0.25uV (SSB) for 10dB S+N/N. Uses the famous 'Wadley Loop' principle ; operates from 240V mains or 12V battery. 52 ohm antenna. A really incredible receiver! Cat D-2850.

YAESU FRG-7 $328.00

LINEAR AMPS: Get one before the pirates grab 'em!

(Left) This one covers 40, 20 & 10 metres, 200W input from just 3W of drive! Also has RF preamp, switching is RF actuated. 240V AC operated.
Cat D-2544 ..... $299.00

(Also available) 10 metre linear, 12V DC, 50W from 3W drive
Cat D-2545 ..... $189.00

KENWOOD QUALITY

TS-820 transceiver — one of the best around	Cat D-2110	$940.00
VFO to suit the TS-820	Cat D-2111	$156.50
Digital display to suit the TS-820	Cat D-2112	$176.00
DC to DC converter for the TS-820	Cat D-2113	$74.28
TS-520S transceiver — for the budget minded	Cat D-2520	$690.00
CW Filter for the TS-520	Cat D-2521	$60.50
TS-700A transceiver — fantastic 2m rig	Cat D-3100	$630.00
TS-600A transceiver — all modes on 6m	Cat D-3106	$699.00
TR-3200 transceiver — UHF hand-held	Cat D-3200	$305.00
TR-7200 transceiver —budget 2 metre rig	Cat D-3215	$260.00
TR-7400 transceiver — 25 watt, 2 metre	Cat D-3400	$429.00
TV-502 transverter — 2 metre to 10 metre t/v	Cat D-3502	$275.00

SPECIALS — SAVE NOW
(ONLY WHILE STOCKS LAST)

Incredible specials on antennas and accessories — if you act now!

Scalar M-22 antennas, fibreglass, suitable for 140–200MHz. Cat D-4030
Cat D-4030 ..... were $10.50 — now only $7.90

Hustler MO-2 mobile masts. Perfect for bumper mounting.
Cat D-4154 ..... were $32 — now only $19.75

Hustler trunk mount, TLM-1. No-hole mounting. Inc. 17' RG58U.
Cat D-4182 ..... Were $24.00 — now only $12.50

RAK 42S antenna, 1/4 wave on 144MHz
Cat D-4610 ..... were $ 8.50 — now only $4.50

RAK 46S antenna, 1/4 wave on 52MHz
Cat D-4614 ..... were $11.50 — now only $5.75

GA-6020 dual band antenna — 1/4 wave on 6 & 5/8 wave on 2 metres.
Cat D-4620 ..... were $22.50 — now $12.50

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80W, 144-148 MHz, FM, SSB LINEAR AMPLIFIER 2M10-80L

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Frequency Range	3-30 MHz
Input Power	10W Nom., 5-20W PEP range
Output Power	100W Nom., ±½ dB across band, 200-250W PEP output
Input Impedance	50 ohm nom., adjustable to match exciter range under 2:1 across band
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- All solid state — microstripline design.
- Broadband — requires no tuning across band.
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- Under 1 dB insertion loss in receive or bypass mode.
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AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	Mt Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
	ZL1VHF, Auckland	433.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Manawatu	52 500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Manawatu	433.250
	ZL2UHF, Wellington	433.000
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

A letter has been received from Graham VK8ZCJ in Darwin which, amongst other things, straightens out a few inaccuracies in the beacon list. It appears HL9WI is no longer operational, and serious doubt exists about the Japanese beacon which he thought had moved to 52.500 but was very doubtful if it was on the air. Both of these stations have been removed from the beacon list for the time being. It appears also to confirm no Hong Kong TV exists on 51.750, but the TV station on 49.750 is a very good pointer to openings to the north, and might well be shown as a beacon!

Graham goes on to say things have been relatively quiet in Darwin throughout June and July, although on 24/6 he worked JA6RJK, JA6RUR and JR6RPQ around S8 at approximately 1350Z. On 27/6 and 28/6 he worked Lyell VS6BE in Hong Kong around 0900Z, peaking to S6 with slow QSB with deep fades. Lyell was on 50.1 and Graham on 52.1 MHz. Lyell is now using a TS600A instead of the FTV650 due to the former being capable of FM. Sufficient interest has been aroused in Hong Kong over TEP to Australia that Lyell has written to the local P. & T. people for an amateur allocation from 52.000 to 52.200!

Brian VK8VV has sighted the VL5SA beacon operating on 48.450 MHz, which is run by WRE, and temporarily located at H.M.A.S. Coonawarra near Darwin, running 100 watts to a four element yagi pointing north! Thanks for the letter, Graham.

George Francis, that doyen of FM operation, has written from his new location, C/- Elcom Training College, P.O. Box 1105, Boroko, Papua New Guinea, with some news of happenings on that big island to our north. He advises already showing an interest by joining the PNG Amateur Radio Society and being elected on the publications Committee. The only novice so far there is Ron P29NRP, who operates 3560 kHz nightly and week-ends. George has been included in the VHF Sub-Committee which is co-ordinating and planning a 2 metre repeater for the Port Moresby area. The 2 metre FM channel mainly used throughout PNG at the moment is Channel 40, and is a 24 hour net. George monitors Channel 50 and 52.050, and sometimes 144.100 SSB. The only high band opening since his arrival was on 28/3 when for two hours he watched Channel 7 TV from Townsville, 800 miles away, and good enough for colour on peaks, but no sign of the Townsville 2 metre repeater located on the same mountain.

George is located on the northern side of a mountain peak which effectively blocks his view of Australia, hence he does not enjoy the Channel 9 and 10 reception from Cairns received by those living on the southern slopes of the same mountain. However, he does have good views to the north-east, including north around to south-east, which will possibly have some compensations as time progresses.

His six metre activity started with a contact on 27/3 with Garry P29GR, who has now returned to Brisbane as VK4AR. The other local six metre operators are Ken P29ZDU, Hugh P29BH and Lea P29LS. Graham P29DJ is also active from the gulf on a timber mill on the Erg River near Berena. Those with 6 metre gear include Tom P29KE Rabaul, P29GA at Lae, P29CM (ex VK2BBU) Rabaul, and possibly others. George's first real DX was on 16/4, when he worked Ross VK4RO, Hal VK4DO, Lyn VK4ALM and Mario VK4MS, plus hearing Channel 0 from Brisbane.

Graham P29DJ, along the gulf, reported 14/4 hearing strong JA's around 51 MHz but nothing on 52 MHz. George finally worked his first JA's on 23/4 with signals to S9+, being JR1AUW and JA1LZK, both in Tokyo. Literally "thousands" of Japanese stations were heard from 50 to 52 MHz but only two above! His general observations so far indicate they have an equinoxial DX season period there to north and mid Queensland, as he worked from Cairns down to Bundaberg on April 16, 17, 24, 26, 27 and 4/5. Nothing for the rest of May, then on 5/6 with Peter VK4ZPR portable west of Bundaberg, and others in Townsville, Ayr, etc. Since then on 4/7 he has only heard Ch. 0 in Brisbane, and makes the observation that possibly the winter minor solarice period Es does not extend to the tropics or Equator, as they heard none of the good openings occurring between VK3-VK5 and VK4 on 2/7. Thanks, George, for your letter, would be pleased to hear from you again some time.

NOW READ THIS

If you have not already established the thought after reading the relevant parts of the above two letters, then let me put you right. I have mentioned the fact before, and I now repeat, we are very severely disadvantaged in VK through the loss of the lower 2 MHz of the 50 to 54 MHz band. Many times we could establish contact with other countries but for the large difference in frequency. How many of you who operate on six metres would be prepared to support a move to try to obtain operation also in the range of 50 to 52 MHz? There are several avenues for thought: (1) Straight-out availability of 50 to 54 MHz; (2) Agreement to allow VK operators to VFO down to 50 MHz to call a station in the range 50 to 52 MHz and ask him to come up into the 52 MHz range; (3) The provision of a segment say between 50.000 and 50.500 MHz for our operation; and (4) Possibly some improvement would be to increase the allocation to allow us to operate down to 51.000 MHz, which is an area used by overseas countries and New Zealand. Each of these arrangements would be on a non-interference basis to existing services. However, that clause is not really any different from the present situation, no operation even on 52 MHz is tolerated if it causes any interference to other services, viz., Channel 0 TV, etc.

If you are sufficiently interested would you please write to me straight away (don't put it off until tomorrow, you may forget) and set out any thoughts you may have on the above four suggestions, and any others you yourself may think of at the time. If we can get enough people to show sufficient interest to write, it may be possible to present a case for non-interference operation. What do you think? Is it worth a try? Just remember, during the past few days prior to preparing these notes, we had the use of the 27 MHz band withdrawn from our usage as from 26/7/77 to make it available for the CB service. Perhaps we could look at the above suggestions in the light of some compensation for the loss of that band. It's over to you.

Ron Mould VK6FM, ex VK3AGK, of Derby, the land of the Baob trees, writes with some news of happenings in that area since moving there a while back. He is operational on 144 MHz SSB, using a 15 element 28 foot boom yagi and looking for skeds. Ron was unable to take his 23 cm equipment with him and this is stored in Melbourne. After a 16 months stint in Derby he still will be going to Perth and hopes to retire there, from where there are plans to build a 20 foot dish for 23 cm.

Ron operates on 3592 kHz each night on the WICEN net, and also on 14106 kHz at 0300Z each week-end, and on every second Tuesday. He supports the suggestions already made re an HF net for VHF operators and would favour 14 MHz.

Like the rest of us, Ron was greatly grieved at the passing of Ron Wilkinson VK3AKC, and in recognition of the great amount of work Ron did for amateur radio and VHF/UHF in particular, he suggests something be done to recognize this work, and suggests either re-naming the summer VHF contest to be the Ross Hull-Ron Wilkinson Award, or that a trophy be made available each year to the outstanding VHF/UHF feat by an Australian amateur operator. To assist in any suggested thoughts he is prepared to donate $100 to start such an award. That's a generous offer, Ron, and I will see what can be arranged. In the meantime, those of you who are prepared to write to me re the suggested band-changes to six metres might like to comment on the above suggestions re a memorial to Ron Wilkinson. Let me know soon, please, so it may be passed on to the appropriate people at Federal level. And would anyone else like to add to the 100 already promised?

MOONBOUNCE REPORT

From Lyle VK2ALU via "The Propagator". The EME 432 MHz tests for VK2AMW on 25/6 resulted in a contact with W7GBI, with M reports both ways. XE1RY and JA6CZD were called as scheduled but neither was heard. Our echoes were up to 7 dB over noise.

Half an hour of the test period was lost while fractured bolts were replaced in the bottom bearing of the main drive shaft. These will now be replaced with high tensile bolts.

Arrangements have now been finalised and material received for the construction of the new wave guide feed system.

Evidence was found on 25/6 of break and entry into the moonbounce site buildings by vandals. Windows were broken and material strewn over floors, cupboards and doors were opened and contents removed. Fortunately the locked equipment cubicles were intact. All items of easily removed equipment are now being taken away between tests and this will lengthen the setting up time prior to the carrying out of tests. (Seems nothing is safe these days . . . 5LP.)

GENERAL NEWS

The South East Radio Group at Mt. Gambier again held a very successful convention over the June holiday week-end. Once again the weather was kind to the 70 or so amateurs and their families and friends who attended. The SERG trophy was snatched from the VK5's this time by the team of VK3AWY and VK3AMZ, and we congratulate them.

The time of the year is with us as these notes are written during which activity on the bands generally sinks to a rather low state, no doubt hastened by the coldness of the weather and the fewer contacts available. I, too, have been on leave and hence not so much on the air, but looking around since returning to work indicates I have not missed much.

I will close now, and leave a little extra space for someone else, but please write to me on the two matters mentioned in these notes. Closing with the thought for the month: "A bore is someone who persists in holding his own views after we have enlightened him with ours."

The Voice in the Hills. ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

September

10/11	European Phone Contest
10/11	Albatross SSTV Contest
14/16	YLRL "Howdy Days"
17/18	Scandinavian CW Contest
24/25	Scandinavian Phone Contest

October

1/2	VK/ZL/OCEANIA PHONE CONTEST
8/9	VK/ZL/OCEANIA CW CONTEST
14/16	Jamboree of the Air
15/16	Manitoba QSO Party
15/16	RSGB 7 MHz Phone
29/30	CO WW DX Phone Contest

November

5/6	RSGB 7 MHz CW
12/13	European RTTY Contest
19/20	WWDXA CW Contest
26/27	CQ WW DX CW Contest

SCANDINAVIAN CONTEST—CW SEPTEMBER 17-18, PHONE SEPTEMBER 24-25

Starts 1500 GMT Saturday, ends 1800 GMT Sunday. This is the world working the Scandinavians in this contest. The same station may be worked on each band 3.5 to 28 MHz for QSO and multiplier credit. Phone and CW are separate contests.

There are classes for single and multi-operator, single and multi-transmitter. Multi-transmitter stations must use a separate serial number series for each band. Club stations are considered multi-operator.

Exchange RS(T) and QSO number starting at 001.

Points: For European stations 1 point for each QSO on any band; for non-Europeans, 1 point per contact on 14, 21 and 28 MHz and 3 points if it is on 3.5 or 7 MHz.

Multiplier: Each Scandinavian call area from the following list worked on each band. (LA1, LB1, LJ1 are in same call area as are SM3, SK3, SL3.) Portable stations in Denmark or Norway count as the 10th area. OH0 is the 10th area for Finland with OJ0 as a separate area.

Prefixes used in Scandinavia are: LA/LB/LG/LJ, Norway; JW, Svalbard; JX, Jan Mayen; OF/OG/OH/OI, Finland; OH0, Alan Is.; OJ0, Market Reef; OX, Greenland; OY, Faroe Is.; OZ, Denmark; SJ/SK/SL/SM, Sweden.

Final score is the sum of QSO points from all bands times the sum of multipliers from each band.

Certificates will be awarded to the highest scoring station in each class, both phone and CW, in each country. Use a separate log for each band. Include a summary sheet showing scoring, your name and address in block letters, and a signed declaration. Send logs to the NRRL Contest Committe, P.O. Box 21, Refstad. Oslo 5, Norway, by October 15th.

CLASSIC RADIO EXCHANGE

Starts 1800 GMT Sunday, September 25th, and ends 0100 GMT Monday, September 26th. The object of this activity is to restore, operate and enjoy older equipment with like minded amateurs. A Classic Radio is any piece of equipment built since 1945, but at least 10 years old. (An advantage, but not required to enter.) The same station may be worked on each band and mode and with different equipment combinations, but no AM phone below 21 MHz.

Exchange name, RS(T), State, province or DX country, receiver and transmitter type (i.e. home brew, 807 final, etc.). and any other interesting information.

Scoring: Add the number of different transmitters and receivers, States, provinces and DX countries worked on each band. Multiply by the sum of QSO's made. Multiply that total by the Classic multiplier. (Total years old of all transmitters and receivers used. Minimum of 3 QSO's per unit.) Multiply years by 2 if it's a transceiver. Frequencies are CW 60 kHz from bottom of each band, phone 3910, 7280, 14280, 21380, 28580 kHz.

Awards for highest scorers, longest DX, most equipment combinations, oldest equipment, and "unusual achievement".

Send logs with comments, pictures, anecdotes, etc., to Stu Stephens K8SJ/W8KAJ, 2386 Queenston Road, Cleveland Heights, OH4418. ■

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC

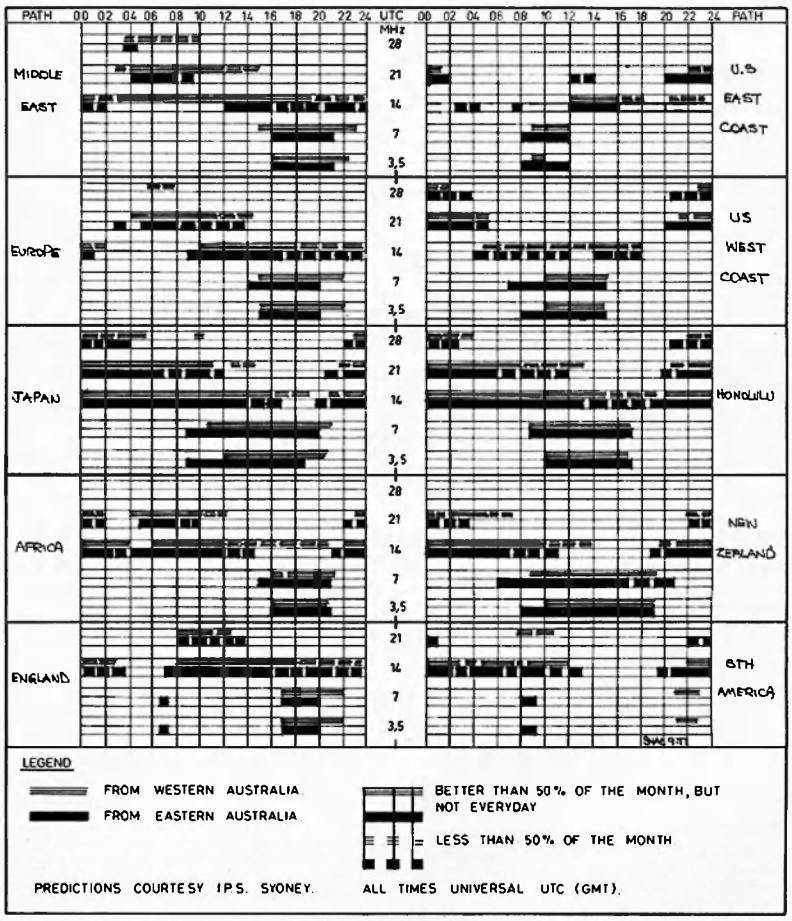
There are now encouraging signs that the new angle is showing signs of life. June produced an upwards surge in solar activity producing a mean of 38.4. The last week in June produced some of the highest daily counts for some months. However, July did not follow suit and conditions reverted to average for the period.

The interesting period now appears to be the September-December season, when path openings should attain a higher degree of reliability and regularity. Looking at the September charts, there is ample evidence of some forthcoming 28 MHz openings other than North-South. When conditions are better than those that these charts are based on there is ample scope for exploration on 28 MHz. In spite of only a poorly ionised region in existence, the influx of Novices will nevertheless have an impact on this band. Certainly the Novices will be able to enjoy some real DX on their new allocation of 28.1-21.6 MHz. Many already have succeeded in working both JA and W stations.

Once again listen to WWV at 18 minutes past each hour for the solar indices. Solar flux figures in excess of 100 and A index lower than 12 and a quiet geomagnetic field should indicate above average conditions. The chart looks good for 75-85 per cent of the month for the solid bars/lines.

Forward predictions for the running smoothed numbers are Sept. 24, Oct. 26, Nov. 28, Dec. 30, with the running smoothed number for Dec. 1976 being 14.7.

Good DX. 73's de VK3NAC. ■



INTRUDER WATCH

Alf Chandler, VK3LC

Some members have indicated that they do not feel inclined to submit regular reports unless we tell them what successes have been achievd recently. Success in this game is very hard to define, and still harder to come by. All that can be done by our administration, or any other administration for that matter, is issue complaints (a sample of which was promulgated in my column last month) to the countries concerned. International compliance is the only answer. If countries, and I am not referring particularly to Western countries, will not take notice and act upon complaints, nothing else can be done, and such a case can be seen by the fact that the Russian Pulse transmission still persists although having been often complained about by many countries.

A momentary success was achieved by our Telecom representative who went to the Broadcasters' Conference and, by representation "off-the cuff" to the Indonesian representative, managed to get a respite from the 7070 kHz Republic of Indonesia broadcast. However, I believe that station is now back on the air again.

Our Region 1 Co-ordinator is doing work of importance. He is taking out a computerised summary of all complaints, world-wide, submitted from 1969 until the present time, for consumption at WARC 79. This, I can tell you, will be an enormous document, and should carry great weight at the Conference.

While in England I will be staying at the QTH of Colin G3PSM, the Region 1 Co-ordinator, and I shall be viewing this summary. I hope to report fully on my return. ■

PROJECT AUSTRALIS

Bob Arnold

VK3ZBB

Persistent rumours would indicate that a Russian OSCAR is in orbit and will be opened for communication on October 4 — the 20th Anniversary of the launching of Sputnik 1. No details of orbital path or frequency of operation are known. If information comes to hand, it will be relayed to Federal Office for inclusion in Divisional broadcasts.

Are you preparing for future satellite activity?

The first AMSAT Phase 3 spacecraft is scheduled for operation in 1979. Its elliptical orbit will provide contacts for hours at a time with countries never before reached from Australia by VHF — and with no skip zones!

Oscar 6 is showing real signs of old age, having completed over 22,000 orbits which is well over four times its design life.

Oscar 7 is nearing its design life span of three years and it is therefore considered prudent to build a further low-orbit satellite which will be known as Oscar D until its launch later this year.

Oscar D and the first of the Phase 3 spacecraft will each carry transponders for Mode A (145.9/29.5) and for the new Mode J (145.9 Up/435.15 Down). Phase 3 spacecraft will be accessible with full quieting SSB or CW signals by any amateur station using an output power of 50 mW and small rooftop style antennas. In fact, it is estimated that the performance of this equipment will be superior to a kilowatt/quad combination on the HF bands. Furthermore, tracking of Phase 3 spacecraft will require less expertise and QSOs will be open for much longer times than with Oscar 6 and 7.

Unfortunately, none of these revolutionary facilities can be provided without cost and we need the ssistance of all who have used Oscars 6 and 7, or of those who wish to be to the fore in this new era of amateur radio.

How can you help?

There are several ways:

— Become a member of AMSAT, the world-wide organisation of radio amateurs and national bodies (including WIA) formed to co-ordinate amateur satellite activities.

— Membership of AMSAT is only $US10 per year — a donation of $US100 will make you a life member.

— For this you receive the quarterly AMSAT Newsletter and information on future spacecraft, operating news etc. (It also saves a hassle if your editor or I forget to include the monthly tracking data).

— Persuade your Radio Club to become a member of AMSAT ($US12 p.a.).

— Or you can specifically help the Phase 3 programme by sponsoring part of the satellite: solar cells $6 each, battery cells $120 each, transponders $3000, rocket motor $6000, etc.

Your help will be appreciated — if you require further information write to Dave Hull VK3ZDH or myself, or route a note through your Division.

New stations heard on Oscar 7 include:

— **Mode A** FK8BB.

— **Mode B** VK4ZRQ, ZL4BM, ZL4PG.

Finally information from Charlie VK3ACR indicates that the QUAGI Antennae described in QST April 77 are first-class for satellite work as well as for terrestrial contacts.

ORBITAL DATA — SEPTEMBER 1977

	OSCAR 6			OSCAR 7			
	Orbit	Time		Orbit		Time	
Date	No.	Z	°W	No.	Mode	Z	°W
1				12783	B	0123	75
2				12795	A	0022	60
3	22332	0127	85	12808	B	0116	73
4				12820	A	0016	58
5				12833	B	0110	72
6				12845	A	0009	57
7				12585	B	0103	70
8				12870	A	0003	55
9				12883	B	0057	69
10	22419	0011	66	12896	A	0151	82
11				12908	B	0051	67
12				12921	A	0145	81
13				12933	B	0044	65
14				12946	A	0139	79
15				12958	B	0038	64
16				12971	A	0132	77
17	22507	0051	76	12983	B	0032	62
18				12996	A	0126	76
19				13008	B	0025	61
20				13021	A	0120	74
21				13033	B	0019	59
22				13046	A	0114	73
23				13058	B	0012	58
24	22595	0130	86	13071	A	0107	71
25				13081	B	0006	56
26				13096	A	0100	70
27				13109	B	0155	83
28				13121	A	0054	68
29				13134	B	0148	82
30				13146	A	0048	66

As it is unlikely Oscar 6 will be on for any length of time, only weekly predictions are given.

To extrapolate: Orbit Period is 114.994 min. Longitudinal Increment is 28.7° per orbit. ■

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- **QTHR means address correct in 1975 edition of Call Book (might also be correct in 1977 edition). Next month onwards means correct in 1977 Call Book.**

FOR SALE

Yaesu FRG7 comm. Rx, exc., cond., 3 months old, manuals, etc. $300. Also Hallicrafters SX100 Rx, good cond., $200 or nearest offer. Ph. (053) 31 1138.

Robot Slow Scan TV model 70 monitor, as new, $225. Unique antenna tuner (USA) $75. VK1BH, QTHR. Ph. (062) 88 6062 or (062) 65 5347 bus.

Collins KWM2 transceiver, perfect order, complete with power supply, $1500. VK7AZ, QTHR. Ph. (002) 44 1165.

Kyokutu Synthesised 2m Transceiver, 12W, as new, plus 5/8 wave magnetic antenna, fully regulated power supply and full Ringo base antenna, $300 the lot. Eric Bierre VK2BEK. Ph. (02) 476 5096 evenings.

AWA MR20B on 52 525 MHz, FM transistor PSU, 6146 final 25W, compact dashmount control unit with S meter, etc. and log cable, absolutely P/C, any test, $60. Lafayette HA800 communic. Rx, 80, 40, 20, 15, 10 and 6m, as new, in carton, cost $205, sell $95. Power supply, NIDAC, 10V-15V at 1 amp, precision regulated (723 and 2N3055), $18. 4 x 6146s, unused, $8 each. 12V cradle relays, D/CO contacts, $2 each. VK4ZFM, 3 Belbora Road, Shailer Park, Qld. 4128. Ph. (07) 209 8105.

Transceiver Pye No. 62 Mark 2, 5W AM or CW, VFO or plug in xtl operation 1.6 to 10.0 MHz, runs from 12V, solid state DC/DC converter built-in, also built-in aerial tuning unit, comprehensive metering, circuits and service info. included, works well, $60 ONO. VK2HS, 23 Brisbane St., Bondi Junction 2022. Ph. (02) 387 2492.

Drake TR4C Transceiver with AC4 240 P/S (both as the current model), 10-80m, SSB, AM, CW, 300W PEP input, with handbook, also complete set of new tubes and transistors to suit (spares), no microphone. VK2ZWG (full call arriving soon). Going solid state. $450 ONO. Ph. Geoff (069) 42 1392.

FT220 2m Transceiver, very little use, just 3 years old, new condition, AC and DC powered, FM, CW and SSB modes, reason for sale: unable to find time to use it. $400 ONO. VK3ATR, QTHR. Ph. (03) 336 1054.

Scully record cutting lathe, incomplete, with recording amplifiers but no cutting head, some parts damaged or missing. $150.00. VK2AUI, QTHR.

One Philips type SVC/100L manufactured for US Navy, freq. 1.9 MHz to 21 MHz continuous. All units plug in from front. Ideal for RTTY or to use 813 final with its Z match as linear ceramic insulation and high Q circuits; very stable VFO; auto X former, 90 V to 260 AC. $220. Also over 200 tubes. VK5LC, QTHR. Ph. (08) 71 6841.

IC202 with all xt's, new in carton $195. Full kit of parts for solid state linear 80W PEP for above $50. Complete RTTY terminal TTL-2 as per ARRL handbook $100. Creed 7B teleprinter, teletype Tx distributer, teletype tape-punch and printer, $100 or will separate. Full kit of parts for solid state RTTY demod. $30. Hi-mound morse keyer $50, as new. Peter Milne VK3BEJ, QTHR, or Ph. (050) 24 5814.

Heathkit HR-10B Rx — 80 to 10 m, built-in 100 kHz xtal cal, AM/SSB, perfect condition, ideal for SWL or as a standby Rx for the shack, $100. Creed 7B Teleprinter, complete with sound cover in good condition $45. D. Hides L60142, 32 Thorpe Street, Morley, W.A., 6062. Ph. (092) 75 2698.

SSTV fast/slow digital converter W6 MXV design, full, half, quarter frame, video invert, grey scale $200. Stan VK3BHZ. Ph. (060) 71 6211.

Xt's for TR7200 Kenwood Txcvr; transmitting 144.48, 144.56, 144.60, 144.72 145.00, 145.15, 145.32; receiving 144.25, -.48, -.56, -.60, -.72, -.80, 145.00, -.15, -.32, -.75, -.80, -.85. Best offer or swap 10-80 m vertical antenna. C. T. Somerville, Ph. (03) 795 4638 after 6 p.m.

FT200, mint cond., complete with manual, $425. VK3EB, QTHR. Ph. (03) 41 5037 Bus.

FT200 with DC and AC power supply. All 10 m xt's. Black matt cabinet, with manual's $350. FTV 650 with manual $150. IC202 with Oscar crystal $150. Going mobile. VK5ZBH, Mike Admams, Ph. 295 Ceduna between 8 a.m. and 4 p.m.

2 El-20 m Monoband Beam $37.50. VK3PR, 6 View Court, Leongatha, 3953. Ph. (056) 62 2711.

Philips cathode ray oscilloscope model GM5653 and electronic switch GM4580/02 $35 pair. Philips 1676 6 m AM complete $30. VK3SM, QTHR. Ph. (03) 386 4406.

Hy Gain vertical antenna type 14 AVQ, fitted with 80 m base loading coil and relay giving 10-80 m covrage, $50. VK2AQW, QTHR. Ph. (02) 449 3538.

Toroid cores for transmit baluns e.c., similar to p. 581 of 1977 ARRL handbook. Take legal power 3-30 MHz, $7.55 ea. plus postage. VK3AGF. Ph. (03) 379 6524. 74 Hillsyde Pde., Strathmore, 3041.

Yaesu FL50 Transmitter and FR50 Rx, with manuals. Excellent condition, combine as transceiver $320. VK3BMJ, QTHR. Ph. (03) 879 3209.

TS820 Digital readout. Must sell as buying a Collins S-line. $950 or near offer. VK2XU, 8 Lake Road, Port Macquarie, 2444. Ph. (065) 83 2175 A.H.; (065) 83 2127 Bus.

Drake R4C Rx, **T4XB** Tx, **TC2** 2 m transmit converter, CC1 converter console, power supplies to suit. Hygain 215, 15 el., 2 m Yagi, Geloso 432 MHz converter and Geloso power supply. Home brew transistorised transmit converter and power supply. 3 el 20 m beam. 160 m linear 400 W. VK5AS, QTHR. Ph. (086) 82 2899.

IC22A, repeaters 2, 3, 4, 6, 7, 8. Simplex 40, 50, good condition, no mods., mic., manual, original carton, $175. VK3UJ, QTHR. Ph. (03) 874 5632.

8 only 2 mfd. 3000V w filter capacitors, $120 the lot plus delivery. Set of matched crystals for Kenwood 2 FM simplex channels 49, 51, 53 and repeater channels 3, 5, 7 all brand new imported, $10 per pair. VK3ML, QTHR. Ph. (03) 20 7780.

1 IGL 2 metre FM Txcvr. with chs. 37, 40 and repeaters 2 and 8. Provision for 6 channels. 600 milliwatt output, supplied with a tested but unused 3 watt amplifier. Circuits supplied, set fitted into professionally made case, $65. Rodney Champness VK3UG, 31 Helms Court, Benalla, 3672.

Yaesu FT2F. 2 m FM transceiver with Ch. 37, 40, 50, R2, R4, R8 with mic., mobile mount and instr. book, $110. VK3OM, QTHR. Ph. (03) 560 9215.

Barlow Wadley receiver .5 to 30 MHz, late model, in very good order $190. VK3OM, QTHR. Ph. (03) 560 9215.

VHF gear, tubes new QQVO3-20A $10 each. QQVO6-40 $12. QVO4-7 $3. 2E26 $4. 5763 $3. EC91, ECC91, EF91, EF95, 6AK5, Z77 $2 each. Eddystone split stator caps type 583 15 x 15 PF or 25 x 25 PF $4. Power transistors for LV regulators 2N1490 or 2N1514 $5 each. Xtals B7G base 7027, 7066 or 7083 kHz $4 ach. 14080, 32500, 34000 kHz $4 each. Field strength meter Eagle type RF-45 ideal Novice/CB user $8. Joystick antenna 1.5 to 30 MHz CW type 5 ATU and feeder $20. VK2BFJ, 90 Wyong Road, Killarney Vale, 2261. Ph. (043) 32 5758.

DX 160 Communications Rx, 140 kHz to 30 MHz, solid state, excellent condition $155. KW Electronics LP filter, 5 section, 1 KW, as new, $35. Ringo ARX2, gamma loop matched vertical, 6 dB gain, excellent 2 m antenna, excellent condition, $25. VK3LJ, QTHR. Ph. (03) 32 3412.

Kenwood TS 520 plus ext. HF oscillator, complete with mobile leads and matching microphone, as new condition, very little use, never used mobile. The two units for less than new price of Tx alone. Sell for $550, no offers. Contact G. Matheson, VK4WU, QTHR. Ph. (07) 375 5629 anytime.

Yaesu FT-DX400 transceiver, 10 m through 80 m, with cooling fan attached, good condition, handbook $350, VK2AGS, QTHR. Ph. (02) 93 4170 A.H.; (02) 438 9281 Bus.

AX 190 communications Rx, 15 months old, as new condition $170. Dx 160 general coverage Rx $100. Graham VK2ACT/NFW. Ph. (02) 871 2651 A.H.; (02) 240 7391 Bus.

Atlas 215 solid state transceiver, also Atlas AC power console, spare set IC's, handbook, Asahi set of centre loaded whips 80-10 m, excellent condition $685. M. Glover VK7MG, 2/292 Sandy Bay Road, Sandy Bay, Tas., 7005.

Two new dual beam CRO tubes, Philips type DHM 10-93, kept as spare for BWD420 CRO, $50 each, pack frt. ins. free. VK2ZKV. K. J. Cox, 31 Pell Street, Howlong, 2640, N.S.W.

Alpha 374 80-11-10 m self contained desk top bandpass linear power amplifier, no tune up, Inelmac 8874 ceramic triodes, 3 kW PEP SSB voice, stant band change or manual tune up, uses three 1.2 kW carrir continuous duty, brand new in factory carton $2100. James Goodger, VK2JO. Ph. (02) 36 2981.

Brand new Atlas 210X solid state SSB transceiver with noise blanker, Atlas 240 V deluxe AC console speaker, Atlas deluxe mobile mount, Atlas 10X xtl. osc., Shure 404 mic., Mark anixer helical mobile antennas for 80-40-20 m with mobile base. All equipment brand new in factory sealed cartons, $1250. James Goodger, VK2JO. Ph. (02) 36 2981.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. V. BARNES	**ex VK3OT**
Mr. J. I. KELLEHER	**VK3AIJ**
Mr. A. D. KERR	**VK3JO**
Mr. G. W. REID	**VK2OW**
SID. C. BAKER	**VK3BK**

Sadly our good friend Sid. passed away on 14th July, 1977.

Amateur Radio was Sid's life, and he enjoyed the many QSOs with his Amateur friends to the full

Sid was licensed in 1925 and came on the air with a UV201 and Heising modulation. Bands used were 80 Mx and 200 Mx, with entertainment on Sudey mornings with Pianola and Vocals by local friends.

Many of the early radio tests from aircraft were one of Sid's involvements. He kept up with new developments and applied them to his Amateur projects.

Sid., we will all miss you.

VK3AN

Hills TM13S/450-470 Yagis, stainless steel, 12 el trigonal reflectors, fwd gain 15.3 dB at 460 MHz FNT/BK ratio 31 dB; VSWR 1.3:1; type N. termination; weight 21.5 lbs.; windloading at 120 mph lbs.; as new $165 o.n.o. VK4M1, QTHR. Ph. (07) 44 7044 Bus.

WANTED

30L1 Collins Linear, any condition. VK4LN, QTHR.

Want to update from Spark to Silicon? Will swap approx. 500 TTL ICs for a Vibroplex keyer (bug). VK5EM (QTHR as VK5ZCP).

FT 401, 560, 570, 101, 200 type transceiver. Please send all particulars to A. J. Smith VK4ZFM, 3 Belbora Rd., Shailers Park, Qld. 4128. Ph. (07) 209 8105.

Hy-gain "Hy-Tower" Model 18HT, 80 through 10m vertical antenna. VK2BFJ, 90 Wyong Road, Killarney Vale, NSW 2261. Ph. (043) 32 5758 all hours.

Mini-Products Hybrid Quad Antenna 6-10-15-20m. Details and price to Ken VK6ZA, Box 768, Carnarvon 6701. Ph. (099) 41 1001.

HF Transceiver FV50, FT200 etc., also crystals to suit Vinten MTR13. Ph. (03) 541 3535.

Kokusai mechanical filter type MF-455-10K or suitable alternative. Advise cost or a distributor. J. Brinkman VK2IS, 61 Gundagai St., Coffs Harbour 2450.

HF/VHF, AM/FM modulation meter. Please advise price and details to Peter Birrell VK5ZTT, Box 261, Mt. Gambier, 5290.

Schematic and xtal data for CPRC26 50 MHz tunable, used formerly by AIF, RAAF. Manufactured by Rogers Majestic in Canada, circa 1955. Duane VK2VE. Ph. (02) 665 9206, QTHR.

FT101B in good cond., complete. VK3EB, QTHR. Ph. (03) 41 5037 Bus.

FL1000 linear amplifier and TH33 jr. beam. VK3AHG. Ph. (03) 288 2024.

Some kind amateur in Perth willing to coach a keen SWL (with some knowledge) to obtain his call sign, willing to pay. Ring Don 74 1175.

To complete 108 Tcr. Microphone, H'set, No. 9 and 10 plugs, manual or circuit. To complete type 3 Mk. II, key, H'set, any other of spares. C. Gracie, Caverdish P.O. 3408.

430-530 MHz or better signal gen. preferably in good working condition. Replies VK3AH, QTHR.

DV21 or DV21A for use with Icom IC21A. VK3ARZ, 769 High St. Road, Glen Waverley, 3150. Ph. (03) 232 9492.

Hire or buy ZL repeater crystals for Ken KP202. VK6JP, 14 Henley Road, Mt. Pleasant, W.A., 6153. Ph. (092) 64 1779.

BFO for Trio 9R59D and help in installing it by someone in my area. Am also collector 78 r.p.m. records, willing purchase, good prices, suit my collection. Please write Barrie Boyce, L30425, 146 Abbott Street, Sandringham, 3191.

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see "CD"		LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.90	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA3090Q	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	**MISC**	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028 CA3028		SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458 LM1458		TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488 LM1488		UAA170	3.25		
CD4025	.55	CD4720	12.60								

In some cases pin for pin substitutes will be supplied.

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7400	.48	7483	2.30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.95
7401	.48	7485	2.95	74S196	7.50	74LS175	2.70	BD437	2.80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
7408	1.09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5.95
7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	**SEMICONDS**		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457 MPF103	
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458 MPF104	
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459 MPF105	
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485 MPF106	
7432	.66	74154	3.20	74LS32	.70	AT1138 2N301		MPF603	6.90	2N5590 MPF603	
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	.90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800 2N4037		5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440 2N3731	
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301 2N2869		40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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TOROIDS, etc.

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T-37	.80
T-50	.85
T-68	.95
T-80	1.10
T-94	1.50

Free Data on request.

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5200/8PLB	.25
7300CAN	.25
F16 or F29	.12

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7360	P.O.A.
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*4-250A	71.90
*6JS6	P.O.A.

* Indent only.

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PLENTY OF PARKING AT REAR

STD 02

FT-301D

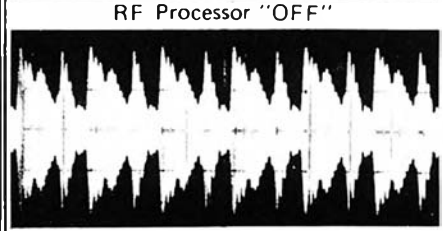
All Solid State Digital Readout HF Multi-Mode Transceiver

The FT-301D is an advanced fully solid state Digital Readout SSB, AM, FSK and CW transceiver covering 160mx thru 10mx including one auxiliary band and WWV. It has all the outstanding features of Yaesu's top performance FT-101E (inc. RF Processor) plus many more additions (Digital Readout, I.F. Rejection filter, & switchable AGC time constant).

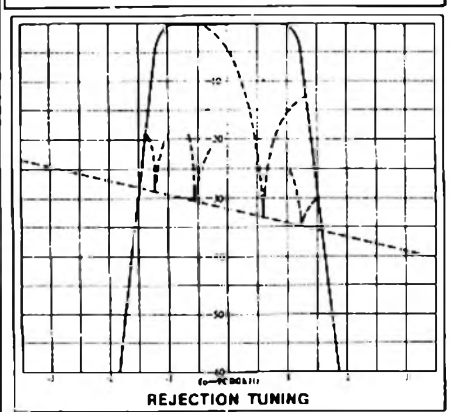
RF PROCESSOR

The RF Processor increases talk power to cut through the pile-ups without addition of a linear amplifier.

RF Processor "OFF"



RF Processor "ON"



REJECTION TUNING

FEATURES

- ALL Solid State — 27 IC, 47 TR, 24 FET and 94 diode.
- ALL Band — 160 through 10 meter plus receive only for WWV/JJY.
- ALL Modes — SSB (USB/LSB selectable) CW, AM and FSK.
- Digital Dial Readout — by large LED diode.
- 200 Watts PEP INPUT for SSB, CW and 50 Watts for AM, FSK.
- RF Feedback — for clean signal.
- Rejection Tuning — tunable crystal filter rejection.
- Effective Noise Blanker — for elimination of noise spikes.
- RF Speech Processor — for increased talk power.
- Built-in fully adjustable VOX.
- Automatic break-in CW operation with sidetone.
- Selectable 25 kHz/100 kHz calibrator, ± 5 kHz TX/RX or RX clarifier with separate ON-OFF switch.
- Selectable, amplified AGC system — SLOW, MEDIUM and FAST.
- Built-in internal crystal control (11 channels) provision and dual VFO adaptor.
- Adjustable carrier level for tune-up and novice operation.
- Triple protection circuits for PA stage and warning system.
- 8-pole SSB filter for unparalleled selectivity.
- Built-in speaker.
- Compact size, light weight.
- Complete line of compatible accessories for flexible station design.

TECHNICAL DATA

GENERAL

Frequency Range: 1.8—2.0 MHz, 3.5—4.0 MHz, 7.0—7.5 MHz, 14.0—14.5 MHz, 21.0—21.5 MHz, 27.0—27.5 MHz, 28.0—29.9 MHz, WWV 5 MHz (receive only).
Mode: SSB (selectable USB or LSB), CW, AM or FSK.
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.
Calibration Accuracy: 2 kHz maximum after 100 kHz calibration.
Backlash: Not more than 50 Hz.
Antenna Impedance: 50 ohm unbalanced nominal.
Circuitry: 24 FETs, 47 Transistors, 27 Integrated Circuits and 94 Diodes.
Power Requirements: 13.5 V DC nominal, 1.1 A (digital type) and 0.9 A (dial type) for receive and 21 A for transmit.
Size: 280(W) x 125(H) x 270(D) m/m
Weight: Approx. 9 kg.

TRANSMITTER

Input Power: 200 Watts PEP on SSB, 200 Watts on CW at 50% duty cycle and 50 Watts on AM and FSK. (Slightly lower on 10 meter and 160 meter bands.)
Microphone: 500 ohm dynamic type.
Carrier Suppression: —40 dB.
Sideband Suppression: —50 dB.
Spurious Radiation: —40 dB.
Distortion Products: —31 dB.
Frequency Response: 300 to 2700 Hz ± 3 dB.
Final Transistor: S2535 x 2.

RECEIVER

Sensitivity: 0.25 μ V for 10 dB Noise plus Signal to Noise Ratio on 14 MHz.
Selectivity: 2.4 kHz nominal bandwidth at 6 dB down, 4.0 kHz at 60 dB down on SSB. CW and AM 600 Hz nominal bandwidth at 6 dB down, 1.2 kHz at 60 dB down with optional CW filter, 6 kHz nominal bandwidth at 6 dB down, 12 kHz at 60 dB down with optional AM filter.
Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μ V equivalent to antenna input.
Automatic Gain Control: AGC threshold nominal 3 μ V. Attack time is 8 milli-seconds and release time is selected from 3500, 1500 and 200 milli-second on front panel.
Audio Noise Level: Not less than 40 dB below 1 Watt.
Audio Output: 3 Watts to internal or external speaker at 4 ohm impedance.
Audio Distortion: Less than 10% at 3 Watts output.

FT-301D Accessories everything you want in a complete home station design.

YAESU's years of experience in the radio amateur field are exemplified in the FT-301D series. The FT-301D can be interconnected to its matching power supply and external VFO unit. This feature provides you with a completely integrated home station with transceive operation on either VFO split frequency, or, crystal controlled operation with a flip of the switch. The FP-301D with built-in speaker is a complete AC power supply and can be used for any of the following supply voltages: 100/110/117/200/220/234 Volts, 50/60 Hz. A digital clock and automatic call sign identifier are an integral part of the power supply. The time display can be selected for either a 24-hour or 12-hour system with a flip of the switch on the front panel. A programmable identifier transmits your call sign in morse code automatically every ten minutes.

- **AC Power Supply FP-301D**
- **AC Power Supply FP-301**
- **External VFO FV-301**
- **Monitor Scope YO-301**

TUNABLE REJECTION TUNING

The tunable IF rejection filter utilizes sharp resonance characteristics of a crystal filter. The resonance frequency is tunable over the entire IF range to reject any interferences close to or inside the IF pass-band.

PRICES	
FT-301D inc. AM Filter	$1147
FP-301	$169
FP-301D	$289
FV-301	$149
YO-301	$345

Above prices include S.T. Freight and Insurance is extra.
90 day warranty. Prices and specifications subject to change.

amateur radio

VOL. 45, No. 10 OCTOBER 1977

CONTENTS

COVER PHOTO

Members of the Summerland Radio Club, Lismore, NSW, adjust a 2 metre beam in the club's recent WICEN exercise. (See article on page 19.) Members from left to right are Harold Wright VK2AWH (Secretary), Eric Speeding, Wayne Everingham, Fred Herron VK2BHE (President and WICEN Co-ordinator).

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

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The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

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QSP: CB — WHAT NOW?

Legal CB is a fact of life.

Amateurs have "temporarily" lost the 11 metre band. We say "temporarily" not because we do not accept the sincerity of the Minister and his advisers (we do), but because we doubt the practicability of clearing that band when the time comes.

The Institute believes that there are grounds for legitimate criticism of the way the issue has been handled and also that there are some very valuable potential advantages for the Amateur Service arising from the introduction of CB.

Let's make our criticism clear. Quite apart from the loss of the 11 metre band, bad enough in itself, there are features that make that loss worse.

The Institute argued that Novices should be allowed to use the 10 metre band. The Department insisted on allocating the 11 metre band. So Novices set themselves up on 11 metres, only to be told to shift back to the very band the Institute had proposed all along. Many Amateurs have expressed concern that "might" seems to have become "right". Meanwhile, the law-abiding Amateur sees legitimate request after request piling up in some bottomless Departmental "pending" tray.

The Institute does not criticize CB as such. It does, however, see recent history as a sorry story of Departmental procrastination, bungling and ineptitude.

In fact, the Institute sees the introduction of CB as an important phase in the growth of Amateur Radio in Australia. Most CBers want to be law-abiding. There are a few that have shown themselves to be irresponsible, to say the least, but the same criticism could be levelled at some (though very few) Amateurs.

For many CB is the first introduction to radio communication. Many have found quickly how much more the Amateur can do. They aspire to become Amateurs, first Novices and then Full licensees. That's no new discovery on our part. ARRL has embarked on a program of seeking to attract CBers to Amateur ranks. Many individuals and clubs in Australia have already started to do that, too.

The numbers of amateurs in the USA and the membership of ARRL has grown thanks, in part, to CB. We say "in part" because the other part has been the active encouragement of converts by ARRL and US amateurs. The message for us is clear. We are not at war with CB radio. We want CBers to upgrade to Amateur Radio.

We should make one point very clear. It was suggested that CB could be introduced in Australia as a fourth kind of Amateur licence, without code, and with no more proficiency than the ability to know which knob to turn. The Institute rejects that flatly. That is pulling the Amateur Service the wrong way — we hope that CBers want to become Amateurs. If Amateurs become CBers, the whole foundation for the Amateur Service is lost. We have privileges, yes, but that is privilege that has been earned, individually and collectively.

So let's sum up what the Institute says about CB and the wider implications of recent history. We have made our point about the manner in which CB has been introduced. We take that point further. With the introduction of CB we have seen a significant area of de-regulation. The Institute has, we believe, acted with responsibility and restraint. We urge Amateurs individually to do the same. But that should not be the basis for the Department to pretend that Amateurs can be ignored. It is now up to the Department to show that it can be responsive to the highly disciplined and law-abiding group constituting the Amateurs of this country.

Our next point is this. There is a law governing the use of radio frequency. We have seen that law not enforced, but ignored. The Institute sees a real need for new legislation, capable of proper enforcement, dealing, for example, harshly with hoax distress calls and the like. That law should be enforced. Curbs in government spending are not a matter on which the Institute makes any general comment. It does make the specific comment that law enforcement should not be curtailed for reasons of economy. The law must be a law that does not inhibit the legitimate use of radio frequency by pettifogging regulation, but does enable easier control of illegitimate use of radio frequency. There is a distinction between necessary regulation and unnecessary regulation. Unnecessary regulation imposes a cost burden on the administrator and the licensee, and may be self defeating in that restriction without reason will never achieve acceptance.

Our final point is this. We welcome the introduction of CB radio as a vast reservoir of potential Amateurs. Many, we know, will be content to use what they now have. Others will, for the very reasons that led them into CB, seek to widen their horizons by becoming Amateurs.

We will be very foolish indeed if we do anything less than offering these people the fullest encouragement to "upgrade to Amateur Radio".

M. J. OWEN, VK3KI,
On behalf of the Executive. ■

QSP

HISTORY OF RAAF ORGANISATION

A letter received from Group Captain E. R. (Bon) Hall advises he has written a book entitled "A Saga of Achievement" due to become available early next year.

In a very warm and faithful history, the book traces the RAAF radio story through more than 350 pages and over 130 photographs from the 1st Wireless Section of the AFC in 1916, to the space age of the 1960s. It is a veritable treasure house of names, interest, humour, accounts of achievement, and stories of escape and bravery.

The RAAF Wireless reserve was conducted for many years under the auspices of the WIA, and its members went on to make an outstanding contribution to the RAAF radio success during World War II.

This book will be of limited publication and will not be sold in bookshops. Order your copy now by sending $12.50 plus postage and packing (Vic. $1, NSW, SA, Tas $2.20, Qld, WA, NT $2.50) to Bonali Publishing, 17 Orchard Cres., Box Hill North, Vic. 3129.

EDITOR'S DESK

By BRUCE BATHOLS
VK3UV

HAMADS CONTROVERSY??

I have often heard the comment that many items of equipment offered for sale in the Hamads column of this magazine have been sold before the particular issue containing the advertisement has been published.

If one considers the facts in a little more depth, then the following possibilities come to mind.

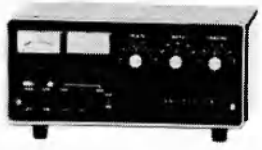
Most important to consider is the person who has the goods for sale, he obviously is not concerned to whom the item is sold to — he just wants to sell it, and as quickly as possible.

In several instances we have observed that an advertiser has sold goods by word of mouth, or simultaneously advertised the item in other publications to obtain the widest market possible, and

continued P.5

SIDEBAND ELECTRONICS SALES

The worlds first digitally tuned 80M-10M SSB transceiver
with over 40,000 frequency synthesized channels.

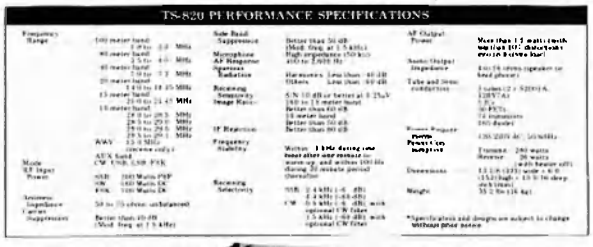


● 1200 Watt Linear Amplifier
FL-2100B

The FL 2100B is a conservatively rated matching amplifier for the FT-101E. This amplifier features two rugged 572B carbon plate tubes in a class B grounded grid circuit with individually tuned input coils for each band. The FL 2100B operates on 80 thru 10 Meters with dual cooling fan and a solid state power supply with an effective 28 uF filter system, providing resistive ratings and linear operation. Dual

Features

- Conservative, 1200 Watts PEP input on 80 10 Meters
- Easy primary voltage change from 117 234 VAC
- Dual front panel meters provide continuous monitoring of plate current and voltage



TS-820 PERFORMANCE SPECIFICATIONS

TS-820 SERIES
TS-820/
VFO-820

KENWOOD

NEW MODEL
T.S. – 520s

T R – 7500 144MHz F.M.

2 METER TRANSCEIVER
TR-2200A

KENWOOW

The TR-2200A is a compact FM tranceiver designed for use in the 2 meter amateur band. The TR-2200A is engineered with the latest techniques in all solid state construction.
The small and light weight design of the TR-2200A offers you a versatile use.

TR-7400A

The hottest 2-meter mobile rig on the market. Features a brand new and unique squelch system with continuous tone coded squelch, tone burst, or carrier squelch. Full 4 MHz band coverage and 25 watt output. It's phase-locked loop (PLL) frequency synthesizer provides operation on 800 channels. The TR-7400A's list of features goes on and on, but even more important is its superb performance and dependability ... and all at a surprisingly low price.

PORTABLE TRANSCEIVER
TR-3200

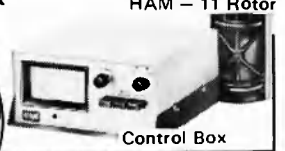
KENWOOD

The Model TR-3200 is a handy transceiver designed for use in 430 MHz amateur radio band. It is small and light weight, and is equipped with 12 crystal controlled channels for transmission and reception on F3.
The RF output power is sw tchable in 2 steps, either 2 watts or 0.4 watt.

General Coverage Communications Receiver FRG-7

World Clock
QTR-24

HAM – 11 Rotor



Control Box

INDICATOR CONTROL UNITS
KR-500 KR-400

ELEVATION
180 DEGREE

HORIZONTAL
360 DEGREE

HORIZONTAL ROTATOR

KR-400

HY GAIN ANTENNAS
18AVT-WB 10 80 M. temporarily out of stock
TH3MK3 10 15 20 senior 3 el Yag 14' boom
14BDXX 10 15 20 senior 6 el Yagi 24' boom
HY QUAD 10 15 20 cubical quad Yag 8' boom
TIGER ARRAY 204BA 20M 4 el Yagi 26' boom
BA 86 balun for beam purchases only

MARK MOBILE ANTENNAS
HW 80, 6' long for 80 M
HW 40, 6' long for 40 M
HW 20, 6' long for 20 M
Swivel mounts & chrome plated springs for all

CUSH CRAFT ANTENNAS
A144 11 11 Element 2M Yag
A147 11 11 Element 2 M Yag
A147 20 combination horizontal vertical 2 M

ANTENNA ROTATORS
Model CDR Ham 11 for all ht beams except 40 M
Model CDR AR 22 L junior rotator for small beams
KEN model KR 400 for all medium size ht beams with internal disc brake
All models rotators come complete with 230 volt AC indicator control units
8 conductor cable for
KR 400 500 65 cents per metre

Deluxe Mobile/Base Station
FT-101E

● Solid State 160 thru 10 Meter Transceiver

E MODEL WITH R.F.PROCESSOR

"computer type" modules for unparalleled reliability and service. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere ideal for todays active amateur. Just add an antenna and 12 VDC or 100 234 VAC for instant operation on 160 thru 10 meters. The FT 101E/EE is another st to for amateur communications from the world's leader communications equipment YAESU The Radio Company.

The world's number one transceiver now offe s even more value and performance in one compact, thirty pound package. An effective RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile-ups without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E/EE features the latest in solid state technology, incorporating tin e proven, plug-in

Kenwood has opened the 6-meter band to the amateur who wants to go first class without paying an arm and a leg. Behind its pretty face is a ruggedly built, versatile performer offering full 4 MHz coverage (50-54) all modes (SSB, FM, CW, and AM), and 10 watts out.

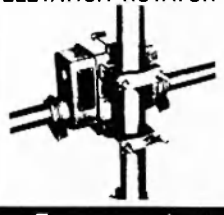
ICOM
VHF TRANSCEIVERS SSB
ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz $215
ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz. $215
ICOM IC-22-S synthesized 22 channel 2 M transceiver 10 channel pre programmed. Supplied with 50 extra diodes for the programming. $269
ICOM model IC-245 $479
ICOM model IC-211 $785

COAX CABLE
RG - 8 - U foam filled per metre $1.20

AUSTRALIA'S SOLE DIST. OF KLM PRODUCTS
KLM SOLID STATE POWER AMPLIFIERS
(MHz) 144-148 PA10– 80BL 80 OUTPUT (watts)
" PA10–140BL 140 "
" PA10–160BL 160 "
" PA 2– 70BL 70 "
400-470 PA10– 70CL 70 "
PA 2– 12-B 12 Watts
PA 2– 25BL 25 Watts P.O.A

SWR METER
Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality $ 28
DRAKE TV - 3300 TVI lowpass filter $ 31
SSR-1 Receivers $270
CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals.
APOLLO 3 position co-ax switches $ 15

KR-500 MODEL
ELEVATION ROTATOR



500MHz Frequency Counter

● YC-500S and YC-500J are available at lower prices.

For personal attention: 24 KURRI STREET, LOFTUS.
P.O. BOX 184, SUTHERLAND. N.S.W. 2232
OPEN SATURDAY TILL 12 NOON
TELEPHONE: (02) 521-7573 Peter Schulz, VK2XL

WIANEWS

Three Postal Motions were issued during August for voting by Federal Council.

The first dealt with the additional two metre repeater frequencies to form the basis of application to the P. and T. Department. The input/output channel frequencies are to be — 147.65/147.05, 147.70/147.10, 147.75/147.15, 147.80/147.20, 147.85/147.25, 147.90/147.30 and 147.95/147.35 MHz.

Arising from the foregoing, the second Postal Motion proposed the adoption of additional national 2m FM simplex channels as follows — Ch. 68 — 147.400, 69 — 147.450, 70 — 147.500 (secondary national FM calling frequency), 71 — 147.550 and 72 — 147.600 MHz.

The third Postal Motion recommended frequencies in the 10m band for converting 11m "CB" equipment for Novice amateur use. The channel frequencies are recommended to be translated upwards by 1.335 MHz so that the six USB and AM primary frequencies become 28.3, 28.35, 28.4, 28.45, 28.5 and 28.55 MHz in the following configuration —

28.3	28.35	28.4	28.45	28.5	28.55
28.31	28.36	28.41	28.46	28.51	28.56
28.32	28.37	28.42	28.47	28.52	(28.57)
28.34	28.39	28.44	28.49	28.54	28.59

This is NOT a band plan; it is a standard set of recommended frequencies to assist in achieving uniformity where channelised equipment is to be converted.

There are reasonable grounds for believing these three postal motions will be passed.

During August a circular was sent to all known importers of 70cm equipment advising them the exact details of the WIA 70cm band plan in respect of FM simplex and repeater frequencies/channels.

Clarification from the P. and T. Department confirmed that the Novice examinations brought forward to 25th October included the Novice morse exam also.

Further details came forward relating to the FM "induction system" hearing aid developed for short range (e.g. classroom distances) use up to about 27 metres in the part of the spectrum between 3 and 4 MHz.

Publication Committee discussions about the special issue of Amateur Radio for December crystallised into this being put out as a book which will be designed for sale by book shops in a similar manner to the 1977 WIA Call Book. ■

EDITOR'S DESK — continued

subsequently has neglected to advise the AR office so that the advertisement may be cancelled.

Delays in mail distribution are also a factor and one which we have no control over, as some items advertised are disposed of in one State before another State even receives the magazine. (AR is posted to all States at the same time at the GPO, Melbourne.)

To meet printing deadlines, copy is required by the third day of the month prior to publication, therefore the Hamad is at least one month old before it appears in AR. The seller has an opportunity to sell the goods via other means in the interim.

The Hamads column is a free service to members for those who desire to let others know they have an item for sale, or wish to purchase, exchange, etc.

If you are selling an item through Hamads and it is sold prior to publication of the advertisement, please endeavour to contact the office.

If the item is sold as a result of the AR Hamad, then the column has done its job for you. ■

A MORSE TO ASCII CONVERTER

H. L. HEPBURN
VK3AFQ

The recent appearance on the amateur scene of the Visual Display Unit (or VDU), and the ready availability of modern keyboards, has provided a fresh field of interest. So far, applications have tended to be in the area of radio-teletype (or RTTY) where the new hardware can replace the noisy mechanical contraptions of the past. Some attention has been given to the use of keyboards for the transmission of the much more prevalent morse code, but articles dealing with the reception and display of morse code are quite rare — a notable exception being one by Tom Riley WA1BYM in the October to December 1975 issues of QST. The article now presented describes a unit that accepts morse code from the audio section of the station receiver and converts it to the ASCII coding accepted by VDU's, microprocessors and computers.

It borrows much from the Riley design but considerable operating improvements and reductions in complexity have been made. The result is the ability to tune into a morse transmission and read what is being sent in plain English on a small TV screen.

Morse code as received is in serial form — that is, dots, dashes and spaces follow one after the other. The specific sequence of dots, dashes and spaces determine the individual letter or figure required.

Thus to decode morse it is first necessary to recognise the dot/dash/space relationships making up letters and words, and then to transform whatever intermediate indicators are produced into ASCII coding in its parallel form, i.e. all the bits representing the particular letter or figure presented to the VDU at the same time and not sequentially.

The converter now described can be split into four main functional steps:

1. The input processor which accepts audio morse from the station receiver, filters it to reduce noise and then turns it into TTL compatible highs and lows. A high represents a mark (i.e. a dot or a dash) and a low a space.
2. The counting stages which determine the lengths of marks and spaces and transforms them into mutually exclusive outputs which show whether the element was a dot or a dash or a space between letters or a space between words.
3. The control stages which accept the output from the space counters and determine whether they are spaces within a character or spaces between letters, or spaces between words and, having so determined, cause the storage and conversion stages to output the right thing at the right time.
4. The storage and conversion stages which accept the outputs from the mark counters, store them as required and then turn them into a six bit ASCII code.

These sections will now be described in some detail. The complete circuit diagram of the converter is given in Figure 1, while the physical layout of the component on the 6 in. x 7 in. single sided circuit board is given in Figure 2. Figure 3 gives the set up required for programming the PRIM and Figure 4 shows the wave forms at various points.

1. THE INPUT PROCESSOR

The input processor consists of an (optional) preamplifier and band pass filter constructed round a LM3900 Norton quad op-amp, two NE555s as detectors, a 2N3565 switch and, finally, two sections of a 7414 Hex Shmitt trigger to ensure fast rise and fall times. A LED indicator is also provided which echoes the signal being received.

Whilst it is relatively simple to take audio from the speaker terminals of the station receiver, it should be noted that changes made to the audio level of the Rx will react back on the sensitivity control of the converter. If possible the best place to obtain audio is from a point within the Rx prior to the audio level control. This is usually the "hot" end of the audio level potentiometer.

The first section of the LM3900 is used as an (optional) audio amplifier with a fixed gain of 10. Should the audio available from the fixed source within the Rx give more than 200 mV RMS this amplifier is not needed and may be omitted.

Sections 2 and 3 of the LM3900 act as a band pass filter centred on 1000 Hz. It has a Q of around 14 (and thus a bandwidth at the —3 dB points of some 70 Hz) and a gain of 10-11. These specifications make the filter adequate for code speeds up to 60 w.p.m. The two 0.1 capacitors should be of the greencap or styroseal type and be matched to within 2-3 per cent of each other. Note that the absolute value of these capacitors is less important than their matching. The resistors should be normal 5 per cent tolerance items.

Table 1 gives the values required for R1 to R8 for a selection of bandwidths and gain. If code speeds in excess of 60 w.p.m. are visualised then a filter having a lower Q should be used to prevent ringing.

Whilst the converter can be used without the BPF, its omission will certainly lead to greater readout errors caused by static spikes or by interference from adjacent signals.

The first NE555 acts as an adjustable threshold detector giving a logic 1 output when the audio input is above a certain level. An RC filter consisting of the 56K resistor and 0.1 mFd capacitor averages the output and applies it to a second NE555 used as a fixed threshold detector having hysterisis. The output of the FTD goes from 0 to 1 when the input rises through 1.6V but does not change from 1 back to 0 until the input descends through 0.8V. This hysterisis prevents multiple output pulses which would occur if a single threshold were employed.

The 2N3565 and the 7414 are used to ensure the output of the detectors have fast rise and fall times. They were added to the original Riley circuitry to prevent false readouts caused by the relatively slow rise and fall times on the output of the NE555s.

The final output of the processor is thus a TTL compatible "high" (or 1) during a mark and a TTL compatible "low" (or 0) during spaces.

Provision is made for a LED which is on during a mark and off during a space. The LED thus echoes the received signal. If mounted near the Rx it provides a very valuable tuning aid.

2. THE COUNTER AND CONTROL STAGES

The basic time unit of the morse code is the lot and all other character lengths are related to this. For perfect morse a dash has a length equal to 3 dots. The spaces between dots and dashes within any individual letter or figure (the character space) should be one dot long, the space between letters or figures within a word should be three dots long, while the space between words should be seven dots long.

The actual time duration of the various elements does, of course, depend on the speed at which the code is sent. At 20 w.p.m. the dot is about 60 mS long, twice as long at 10 w.p.m. and only half as long at 40 w.p.m. So, even for perfect morse, we have to provide for speed variations. Since perfectly formed morse code cannot be assumed, the decoding logic must also show as much tolerance as possible towards imperfectly formed characters.

Consider first the marks. If a 20 w.p.m. dot is fed to one input of a simple gate and a clock input of 100 Hz fed to the other input of the gate, then the output of the gate should — for perfect morse code — be 1000 Hz x 60 mS = 60 pulses. Had the mark been a dash, the gate would have put on three times this, or 180 impulses. If the number of pulses passed by the gate are now connected in a simple binary counter, then the number of pulses indicated at the end of the mark should determine whether the mark was a dot or a dash. However, a little thought will show that we can simplify things a lot by picking some single intermediate pulse

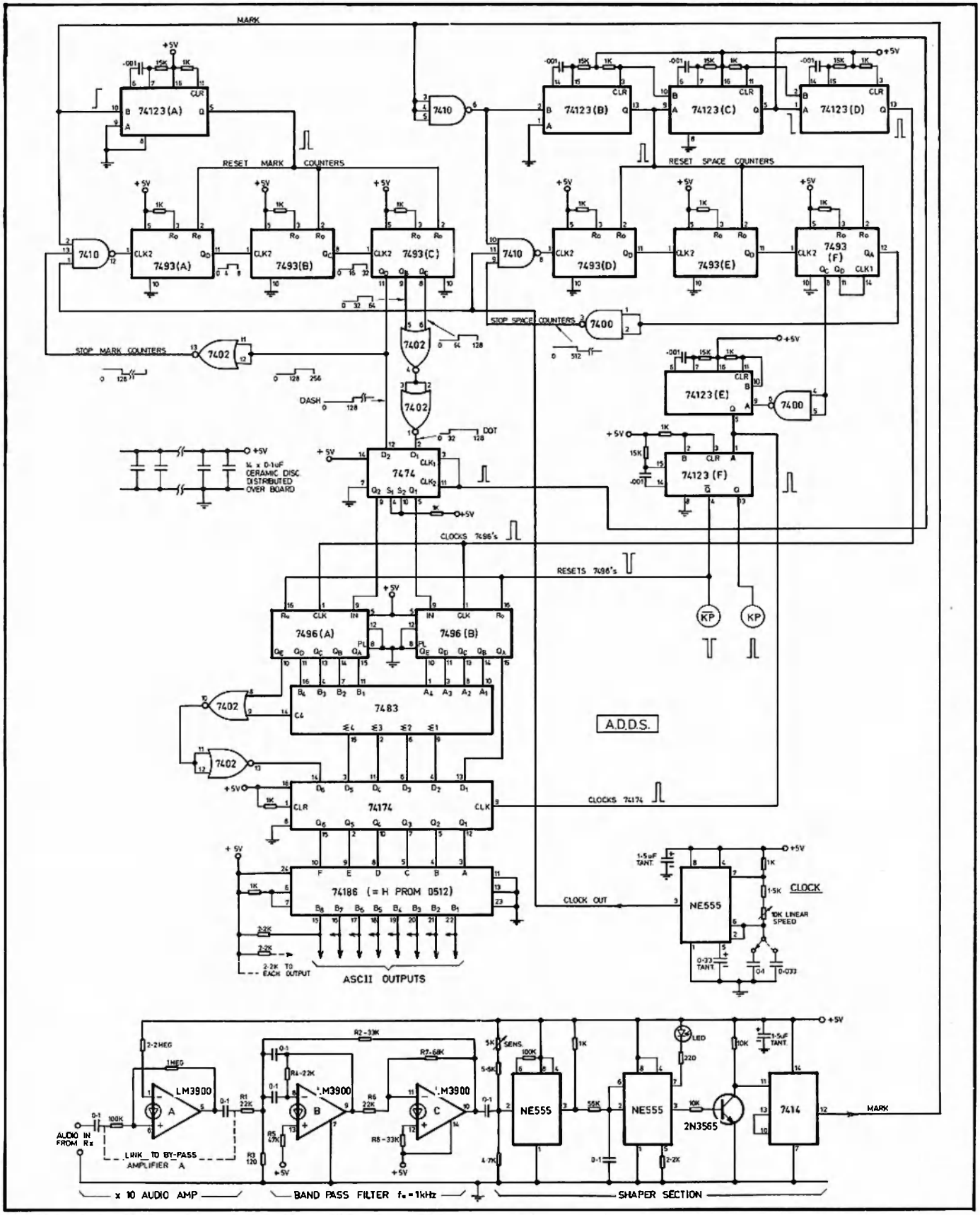


FIG. 1: Morse Code to ASCII Converter.

VICOM

HEAD OFFICE & MAIL ORDERS:
139 AUBURN RD, AUBURN, VIC. Ph (03) 813-2355, 82-5398
Telex AA30566 Cables & Telegrams: "IZYCOM" Melbourne

Dealers in all States and Territories

Direction: Russell J. Kelly
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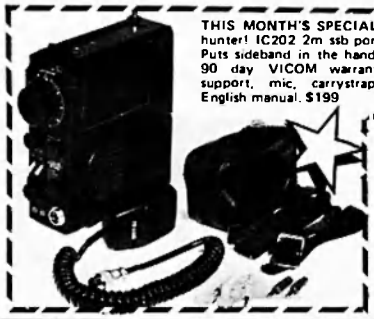
- Synthesiser with programmable 25KHz frequencies 146-148 MHz. Units come pre-wired for R1-8, 40, 50 and 51.
- Lends itself to experimentation in digital logic-scanners, external programmers, etc.
- ICOM quality and reliability backed by VICOM technical support including 90 day warranty.
- Price – well a real bargain at $279!

FOR FULL DETAILS WRITE FOR OUR ICOM CATALOG.



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BC-20 nicad pack	$57
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DAIWA RF SPEECH PROCESSORS

Daiwa have introduced a new range of RF speech processors which are simply attached into the microphone line. Two new models are available, model RF440 which features a phase shift network and model RF550 which utilises a crystal filter. The processors are a suitable alternative to a linear amplifier – up to 6dB gain (4 times) improvement on the signal can be expected! Both models feature 240vac/13.9vdc operation and include compression level monitoring via a front panel meter. Impedance is switchable 50K/600ohms with distortion better than 3%.

Model RF440 (phase shift)	$112
Model RF550 (crystal Filter)	$14[illegible]
Model MC330 (audio compressor)	$

YAESU

Yaesu FT101E
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You can maintain the cleanest sounding signal on the band with the YAESU YO301 Monitorscope. Compatible with virtually all transmitters and receivers, the YD310 features all-mode monitoring including RTTY. Complete with comprehensive instruction manual. Price $339.

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WARNING
Prospective purchasers may be asked to provide evidence that he/she is a legally licenced novice or amateur operator.

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The popular VICOM VC2 swr and power meter is specially designed for the serious communicator looking for accurate readings. The bridge operates from 3 thru 150MHz with power measurement either 12 or 120 watts. Will handle up to 1000 watts. Individually calibrated power chart for all Australian Amateur bands and 27MHz CB. A real bargain at this price!

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MORSE KEYS	
Economy model KH708	$19
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Deluxe model HK702	$35
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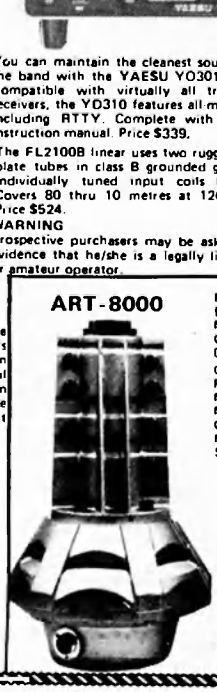

MODEL NO.	ART-8000	ART-3000C
Rotating Torque	2,500kg/cm	850kg/cm
Braking Torque	10,000kg/cm	1,700 kg/cm
Maximum Vertical Load	2,500 kg	250 kg
Control Accuracy	± 5°	± 5°
Drive Type	Gear	Gear
Operation Temperature	−40°– +80°C	−40°– +80°C
Forward/Reverse Delay	3 seconds	3 seconds
Maximum Continued OP.	20 minutes	3 minutes
Mast Clamp	48 ϕ – 78 ϕ	34 ϕ – 55 ϕ
Cable Requirement	9 conductor	8 conductor
Net Weight	27.5kg	6.5kg
Shipping Weight	30.5kg	8.7kg

ART-3000C

ART8000 $478

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AS210BN 10el 2m 18dB gain	$119

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HWM–1 base assembly	$18		

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Model	5Y/2M	8Y/2M	10Y/2M	10XY/2M	18/70	48/70	88/70	D8/70
Type	yagi	yagi	yagi	X yagi	yagi	yagi	yagi	twin
Band	2m	2m	2m	2m	70cm	70cm	70cm	70cm
Gain dBd	7.8	9.5	11.4	11.3	14.9	15.7	18.5	12.3
No. of el	5	8	10	10	18	48	88	2x8
Horiz beam width	58°	47°	37°	38°	28°	26°	19°	45°
Max power	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw
length metres	1.6	2.8	4.4	3.6	2.8	1.83	3.98	1.1
Mass Kg	1.8	3.8	4.5	5.9	3.4	2.7	4.7	2.5
Impedance Ohms	50	50	50	50	50	50	50	50
Price	$29	$35	$59	$68	$59	$59	$75	$48

count and saying that below this count it is a dot and above this count it is a dash. Further, once we have passed the intermediate count we don't really need to know how long the dash is. That it is NOT A DOT is sufficient definition.

A few other practical points must not be ignored. Firstly, the counter must be made to start at zero each time a new mark is signalled. Then it must be arranged that when the "THIS IS NOT A DOT THEREFORE IT MUST BE A DASH" point has been passed the counter is stopped. This prevents a really long dash causing the counter to cycle round and, at the end of that long dash, stop at a count which falsely indicates a dot. Finally (and perhaps optionally) it is preferable to have the counter ignore VERY short marks not made by the key at the sending end or by noise pulses.

Refer now to Figure 1. The mark counter gate is one section of a 7410 triple three input NAND device. One of the inputs accepts the mark signal from the processor, a second input is fed by NE555 clock pulse generator and the third input is the counter inhibit signal (explained a little later). The pulse chain output of the 7410 goes to a simple binary counter consisting of 7493 A, B and C. The 2^7 output of this counter (pin 11 of 7493C) is low until 127 pulses have been counted through and high thereafter. If this 2^7 counter output is inverted (in one section of a 7402) it will be high from 0-127 pulses and low thereafter. We can use this inverted 2^7 output to enable the input gate from 0-128 pulses received. The 2^5 and 2^6 outputs of the counter are also processed in two more sections of the 7402 so that there is no output at pin 1 of the 7402 for counts between 0 and 31 pulses.

Thus for a clock speed of 1000 Hz and a 20 w.p.m. input dot (or 60 pulses) the following happens:

(i) The rising side of the mark causes 74123(A) to output a short (3-5 micro seconds) positive going pulse which sets the 7493s to a zero count.

(ii) The low on pin 11 of 7493C is inverted and enables the 7410 gate.

(iii) The high of the dot mark also enables the 7410 gate. (Note that (ii) and (iii) must BOTH happen to enable the gate.)

(iv) The counters count pulses but pin 1 of the 7402 stays low until 31 pulses have been counted.

(v) Pin 1 of the 7402 goes high when 32 pulses have been counted and stays high until the 60 pulses representing the dot have been counted.

(vi) Everything stops in this state so that pin 1 of the 7402 is high indicating a dot, but since the count did not go over 60, pin 11 of 7493(C) remains low indicating that the mark was NOT A DASH.

For a dash (equal to 180 pulses at 20 w.p.m. and a 1000 Hz clock) the sequence

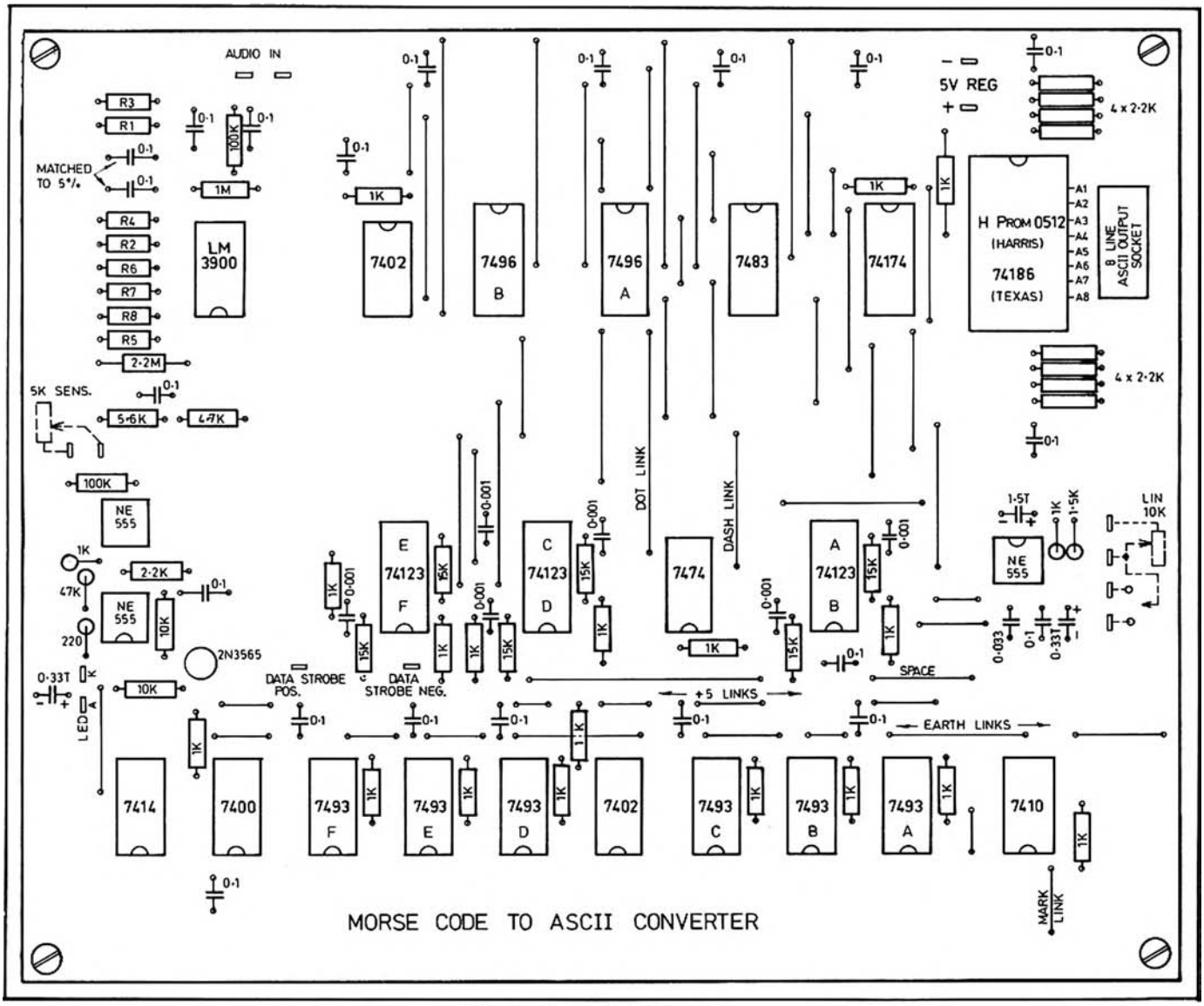

FIG. 2: Circuit Board Layout.

is different. Steps (i) to (iv) occur as for a dot but steps (v) onward change.

(v) Pin 1 of the 7402 is high for 32-127 pulses.

(vi) At the 128th pulse pin 1 of the 7402 goes low.

(vii) At the 128th pulse pin 11 of 7493(C) goes high. This high is inverted and shuts down the input gate.

From this point until the end of the dash (no matter how long that dash is) pin 1 of the 7402 will be low indicating THIS WAS NOT A DOT and pin 11 of 7493(C) will be high indicating THIS WAS A DASH.

Note that without changing the clock speed, the ideal 20 w.p.m. dot can more than halve its speed (double its length) up to the equivalent of 127 clock pulses, or nearly double its speed (halve its length) down to the equivalent of 32 clock pulses, before a false indication occurs.

In practice the clock speed control is adjusted to give a sensible readout and thereafter the speed of the code received can vary within wide limits and/or the formation of the characters can vary before there is lack of differentiation between dots and dashes.

At the end of the mark, therefore, EITHER pin 1 of the 7402 indicates a dot OR pin 11 of 7493(C) indicates a dash. BOTH outputs cannot be high at the same time. However, if the space following the mark is greater than a letter space they can both be low at the same time. These indications are presented to the D inputs of the 7474 dot/dash store.

Consider now the spaces. These are represented by lows from the audio processor. If the output of the processor is inverted (which is done by one 7410 section) then, so far as the space counters are concerned, spaces will now be seen as highs and can be counted in the same way as marks.

There are three sorts of spaces (rather than the two sorts of marks) and these have to be sorted out. The same general thinking can be applied as with marks.

A character space between elements of a letter or figure is one dot long (or 60 pulses at 20 w.p.m. and a 1000 Hz clock) while the space between letters is 3 dots or 180 pulses long. A space between words is 7 dots or 420 pulses long.

Just as with marks we can take the 2^7 output from a binary counter and say that any count under 127 pulses is a character space. However, above 128 pulses counted it might be EITHER a letter space or a word space. Simply to differentiate between LS and WS, the first rise on the 2^7 output can be used to generate a letter space pulse and the second rise on the same output can be used to generate a second letter space pulse. These two pulses will occur at 128 counts and 384 counts. This 384 count is a little short of the ideal 420 count but the shortage has no significant effect.

Whereas the first letter space pulse will clock out a finite letter from the dot/dash registers (see section 4), by the time the

TABLE 1. BANDPASS FILTER CONSTANTS

Bandwidth in Hz at —3 dB Pts.	Q	Voltage Gain	R1/R4 /R6	R2	R3	R7	R5	R8
194	5	7	8.2k	13.62k Use 15k	330 ohms	24.6k Use 22k	16.4k Use 15k	24.6k Use 22k
106	9	9	15k	23.7k Use 22k	172 ohms Use 180 ohms	45k Use 47k	30k Use 33k	22.5k Use 22k
72	14	11	22k	34.2k Use 33k	116 ohms Use 120 ohms	66k Use 68k	44k Use 47k	33k
48	21	14	33k	50.7k Use 51k	77 ohms Use 82 ohms	100k	66k Use 68k	49.5k Use 51k
41	25	15	39k	59.7k Use 62k	65 ohms Use 62 ohms	117k Use 120k	78k Use 82k	58.5k Use 62k

CENTRE FREQUENCY = APPROXIMATELY 1000 Hz.
C1 = C2 = 0.1 mfd polyester or styroseal (NOT CERAMIC) matched to within 2-3%.

TABLE 2.

	MORSE CODE Dot Register	MORSE CODE Dash Register	INTERMEDIATE CODE F E D C B A		ASCII CODE Y5 Y4 Y3 Y2 Y1 Y0
A	0 0 0 1 0	0 0 0 0 1	0 0 0 1 0 1	A	0 0 0 0 0 1
B	0 0 1 1 1	0 1 0 0 0	0 1 0 1 1 0	B	0 0 0 0 1 0
C	0 0 1 0 1	0 1 0 1 0	0 1 0 1 0 0	C	0 0 0 0 1 1
D	0 0 0 1 1	0 0 1 0 0	0 0 1 0 1 0	D	0 0 0 1 0 0
E	0 0 0 0 1	0 0 0 0 0	0 0 0 0 1 0	E	0 0 0 1 0 1
F	0 1 1 0 1	0 0 0 1 0	0 1 1 1 0 0	F	0 0 0 1 1 0
G	0 0 0 0 1	0 0 1 1 0	0 0 1 0 0 0	G	0 0 0 1 1 1
H	0 1 1 1 1	0 0 0 0 0	0 1 1 1 1 0	H	0 0 1 0 0 0
I	0 0 0 1 1	0 0 0 0 0	0 0 0 1 1 0	I	0 0 1 0 0 1
J	0 1 0 0 0	0 0 1 1 1	0 1 0 1 1 1	J	0 0 1 0 1 0
K	0 0 0 1 0	0 0 1 0 1	0 0 1 0 0 1	K	0 0 1 0 1 1
L	0 1 0 1 1	0 0 1 0 0	0 1 1 0 1 0	L	0 0 1 1 0 0
M	0 0 0 0 0	0 0 0 1 1	0 0 0 0 1 1	M	0 0 1 1 0 1
N	0 0 0 0 1	0 0 0 1 0	0 0 0 1 0 0	N	0 0 1 1 1 0
O	0 0 0 0 0	0 0 1 1 1	0 0 0 1 1 1	O	0 0 1 1 1 1
P	0 1 0 0 1	0 0 1 1 0	0 1 1 0 0 0	P	0 1 0 0 0 0
Q	0 0 0 1 0	0 1 1 0 1	0 1 0 0 0 1	Q	0 1 0 0 0 1
R	0 0 1 0 1	0 0 0 1 0	0 0 1 1 0 0	R	0 1 0 0 1 0
S	0 0 1 1 1	0 0 0 0 0	0 0 1 1 1 0	S	0 1 0 0 1 1
T	0 0 0 0 0	0 0 0 0 1	0 0 0 0 0 1	T	0 1 0 1 0 0
U	0 0 1 1 0	0 0 0 0 1	0 0 1 1 0 1	U	0 1 0 1 0 1
V	0 1 1 1 0	0 0 0 0 1	0 1 1 1 0 1	V	0 1 0 1 1 0
W	0 0 1 0 0	0 0 0 1 1	0 0 1 0 1 1	W	0 1 0 1 1 1
X	0 0 1 1 0	0 1 0 0 1	0 1 0 1 0 1	X	0 1 1 0 0 0
Y	0 0 1 0 0	0 1 0 1 1	0 1 0 0 1 1	Y	0 1 1 0 0 1
Z	0 0 0 1 1	0 1 1 0 0	0 1 0 0 1 0	Z	0 1 1 0 1 0
0	0 0 0 0 0	1 1 1 1 1	0 1 1 1 1 1	0	1 1 0 0 0 1
1	1 0 0 0 0	0 1 1 1 1	1 0 1 1 1 1	1	1 1 0 0 0 1
2	1 1 0 0 0	0 0 1 1 1	1 1 0 1 1 1	2	1 1 0 0 1 0
3	1 1 1 0 0	0 0 0 1 1	1 1 1 0 1 1	3	1 1 0 0 1 1
4	1 1 1 1 0	0 0 0 0 1	1 1 1 1 0 1	4	1 1 0 1 0 0
5	1 1 1 1 1	0 0 0 0 0	1 1 1 1 1 0	5	1 1 0 1 0 1
6	0 1 1 1 1	1 0 0 0 0	1 0 1 1 1 0	6	1 1 0 1 1 0
7	0 0 1 1 1	1 1 0 0 0	1 0 0 1 1 0	7	1 1 0 1 1 1
8	0 0 0 1 1	1 1 1 0 0	1 0 0 0 1 0	8	1 1 1 0 0 0
9	0 0 0 0 1	1 1 1 1 0	1 0 0 0 0 0	9	1 1 1 0 0 1
.	0 1 0 1 0	1 0 1 0 1	1 0 1 0 0 1	.	1 0 1 1 1 0
,	0 1 1 0 0	1 0 0 1 1	1 0 1 0 1 1	,	1 0 1 1 0 0
?	1 0 0 1 1	0 1 1 0 0	1 1 0 0 1 0	?	1 1 1 1 1 1
/	0 1 1 0 1	1 0 0 1 0	1 0 1 1 0 0	/	1 0 1 1 1 1
( )	1 0 0 1 0	0 1 1 0 1	1 1 0 0 0 1	,,	1 0 0 0 1 0
BT	0 1 1 1 0	1 0 0 0 1	1 0 1 1 0 1	-	1 0 1 1 0 1
AS	1 0 1 1 1	0 1 0 0 0	1 1 0 1 1 0	≠	1 0 0 0 1 1
KN	0 1 0 0 1	1 0 1 1 0	1 0 1 0 0 0	►	1 1 1 1 1 0
SK	1 1 0 1 0	0 0 1 0 1	1 1 1 0 0 1	1	0 1 1 1 1 1
AA	0 1 0 1 0	0 0 1 0 1	0 1 1 0 0 1	:	1 1 1 0 1 0
AR	1 0 1 0 1	0 1 0 1 0	1 1 0 1 0 0	*	1 0 1 0 1 0
SP	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0	SP	1 0 0 0 0 0

Table 2 — *Binary code information for the Intermediate steps of the conversion from Morse-to-ASCII.*

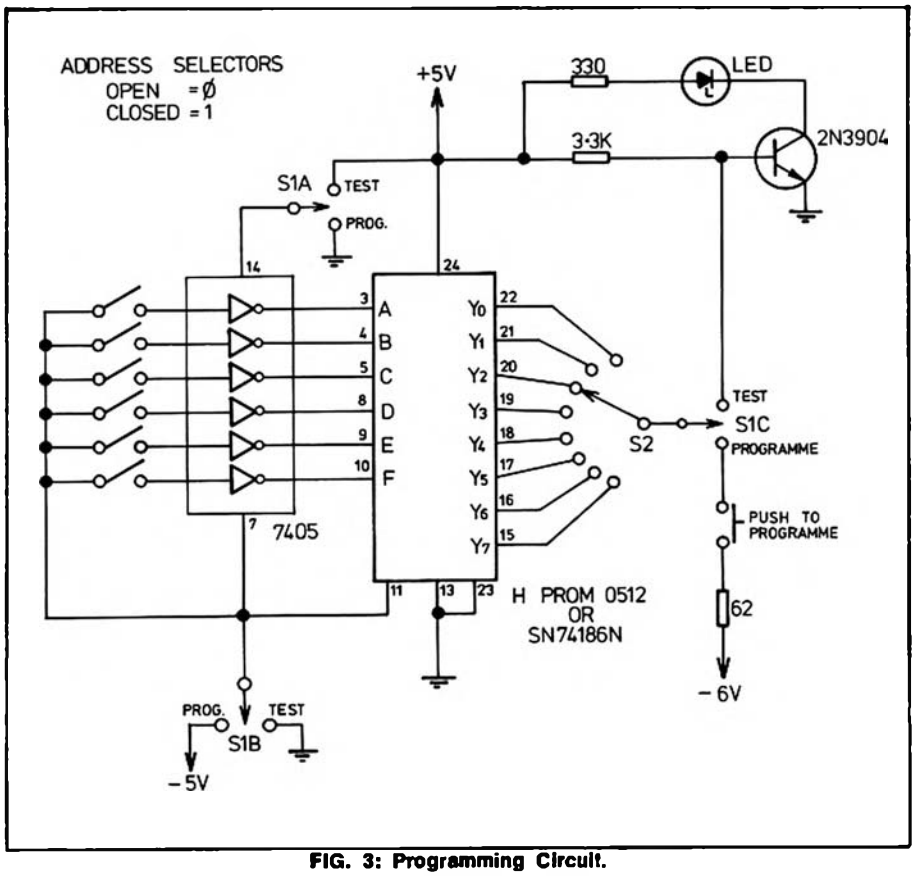

FIG. 3: Programming Circuit.

second pulse comes along these registers will have had their outputs cleared to zero and an "all zero" character, equal to an extra space, will be clocked out.

Provision must be made to stop the space counters recycling if the space is in excess of a WS. To do this the 2^6 output from pin 12 of 7493(F) is inverted and used to disable the 7410 space gate after 511 pulses have been counted.

The character space indication appears to have been ignored. In fact it is generated by 74123(C). Just as with the mark counters we need to zero the space counters at the start of a space. But since the end of a mark is the same point in time as the start of a space, the space counter rest pulse can be used to indicate that a mark character has finished and that the element that is in the 7474 mark store can be clocked out into the dot/dash registers. In practice 74123(B) zeros the space counter and 74123(C) is triggered by this zeroing pulse so that clocking through the mark information on the 7474 is delayed by 3-5 micro seconds.

Returning to the generation of LS and WS, the 2^7 output (pin 8 of 7493F) is inverted. This inverted line will now be high from 0-127, low from 128-255, high again from 256-383 and low from 384 until the counter is stopped at 511.

The two high to low transitions at 128 and 384 are used to trigger 74123(E) whose positive going output pulse is used to clock the dot/dash registers and also

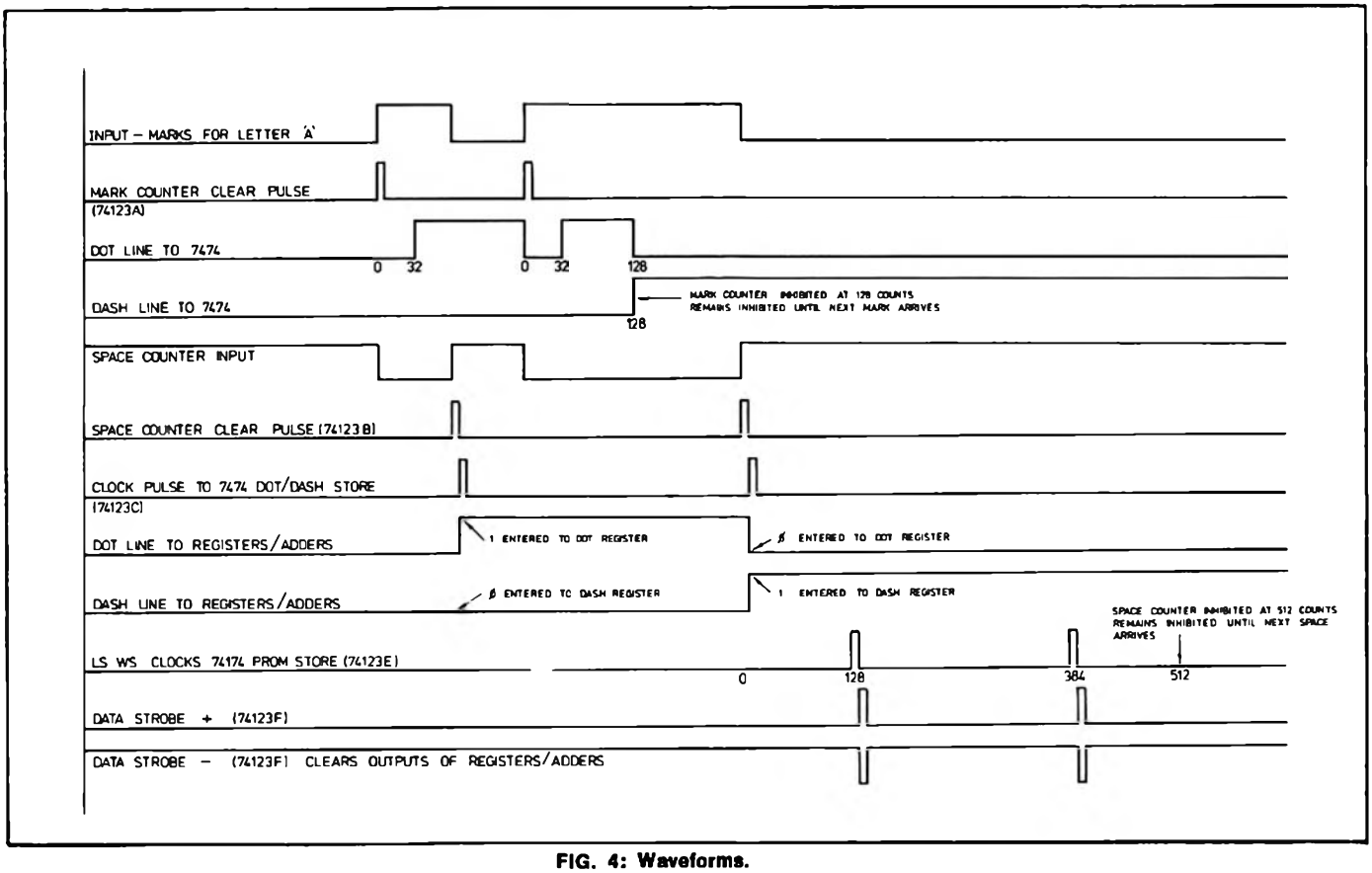

FIG. 4: Waveforms.

to trigger 74123(F) some 3-5 micro seconds later.

The negative going pulse from pin 4 74123(F) is used (a) to clear the dot/dash registers and (b) to provide a negative going data stroke or KP. Pin 13 of 74123(F) generates an alternate positive going data stroke or KP (key pressed). This provision is made because some VDUs require a negative going key press (or character valid) signal while others require a positive going key press signal.

3. STORAGE AND CONVERSION

At the end of every mark there remains on the inputs of the 7474 dot/dash store EITHER a dot indication OR a dash indication. Section 2 showed how, as soon as the mark finished, and the space started, this information was clocked through the 7474 by a pulse from 74123(C).

If the mark was a dot it is presented to 7496(A) and if a dash to 7496(B). These two devices are 5 bit shift registers. Once the information has been presented to these registers a short positive going pulse on their clock inputs causes the data to shift over one place. The pulse used for clocking comes from 74123(D) which section 2 showed was generated slightly after a mark was finished. Note that if a 1 is clocked into the dot register then a 0 must be clocked into the dash register and vice versa. If the letter Z is received the first element (a dash) is clocked into the dash register as a 1, while a 0 is clocked into the dot register. The second dash of the Z clocks another 1 into the dash register and another 0 into the dot register. The first and second dots of the Z clocks 1s into the dot register and 0s into the dash register. When the letter has been completed the dot register will contain (for a R to L shift) 00011 while the dash register will contain 01100. At this point the two registers contain a unique 10 bit representation of the letter Z.

If we had a 10 bit code changing device we could use this 10 bit code directly and have the capability to generate 1024 different and unique characters. Since in normal use we only require 26 letters, 10 figures and a few "specials" such as AR, SK, full stop, quotation mark, etc., we would be paying for a lot of unused capacity. Reduction of the 10 bit intermediate code to a 6 bit intermediate code allows the use of 2^6 or 64 character capacity — much more in keeping with the 40-45 character capacity really needed. It is also much less expensive.

The 10 bit to 6 bit reduction is done using a 7483 four bit adder and two sections of a 7402 NOR gate. In effect, the contents of the dot register are multiplied by two and added to the contents of the dash register to give a 6 bit code which is still unique for the intended range of characters.

The 6 bit code is presented to the inputs of a 74174 memory store. When a letter or figure is completed the outputs of the registers and adders (which now contains the intermediate six bit code for the character received) are clocked through to the 74186 PROM by the LS pulse emanating from 74123(E). Having presented this information to the PROM, the dot/dash registers are cleared to zero. The inputs of the 74174 also become zero at this point. However, the 74174 outputs retain the information representing the last character while the previous part of the circuitry is occupied detecting the next one. This output information will not change until the next character is signalled as complete.

It may now be more readily understood how the second LS pulse can cause an "all zero" or "word space" to be put out to the code changing device.

The final step in the conversion process is to change the intermediate 6 bit code to the ASCII code which will be recognised by the VDU logic. To do this a PROM is used. In brief, a PROM is a Programmed Read Only Memory. It consists of a device having several inputs and several outputs. The number of inputs represents the number of unique binary codes that can be presented to the device. The 74186 (or H PROM 0512) used in this design has 6 input lines which can represent $2^6 = 64$ different combinations of 1s and 0s from 000000 through to 111111. Each of these 64 binary numbers is known as a word address.

The 74186 also has eight output lines so that each unique input address can generate a separate — and also unique — output of 8 bits. Each 8 bit output is known as an 8 bit word.

As manufactured, the 74186 comes unprogrammed and whatever the input address all the outputs remains as 0s. Programming consists of blowing small nichrome fuses in the PROM so that 1s appear on the output lines where required.

To decide where output 1s are required a truth table must be constructed. The inputs to this truth table are the patterns of 1s and 0s generated by the converter logic while the outputs are those required by the ASCII code.

Table 2 summarises all this data giving the letter, figure or group, the dot and dash register contents at the end of each character, the 6 bit intermediate code corresponding to each character and the ASCII output from the PROM needed for each character. The last two columns represent the truth table required to programme the PROM.

Programming must be done external to the converter. The circuitry required is shown in Figure 3. Once used this circuit will no longer be required. Three voltage levels are required, +5.0 volts regulated, —5.0 volts regulated and —6 volts. This latter supply can conveniently be a dry cell.

Programming is done as follows:

1. For each word, the input code from the truth table is set up on the six input address switches. A closed switch is equal to a 1 and an open switch is equal to a 0.
2. The output selector switch is set to the least significant of the outputs requiring a 1 (starting at the Yo end).
3. The test/programme switch is set to programme.
4. The programme push button is depressed and released.
5. The test/programme switch is set to test. If a 1 has been programmed the LED will light.

This procedure is repeated at each output position where a 1 is required by the word being programmed.

The input address is then changed to the next word and each of the output lines programmed where a 1 is required.

The process is not difficult but does require complete concentration. If a mistake is made IT CANNOT BE UNDONE. To make an error in the 40th of 50 words does not make anyone's day!

In this particular design there is a *little* latitude for mistake making since only output lines 1-6 are used. If an error is made on one of output lines 1-5 then output line 7 or 8 can be programmed instead and suitable changes made in the connecting cable to the VDU. Six from eight leaves 2, which is the total number of mistakes allowed!

CONSTRUCTION AND TESTING

Given a proven circuit board, construction consists simply of putting the components and links in place as indicated by the layout diagram.

The usual care should be exercised to ensure that the ICs are properly oriented and that no small solder bridges remain between pins or tracks. These two sources of error cover 90 per cent of the reasons for incorrect operation.

A 24 pin socket is used for the PROM but (unless the extra cost of sockets and the higher probability of poor contacts is not considered a problem) it is recommended that all other ICs be soldered directly into the board.

With +5 volts applied the unit should draw around 650 mA. Significantly greater current than this indicates a fault (IC wrong way round and/or solder bridges again the most likely reasons). If the current drawn is in the right area the unit may be connected to a VDU and audio applied from the station Rx.

In the absence of any signal, back off the sensitivity control until the LED just stops blinking with background noise. Then tune into a morse signal when the LED should light on dots and dashes. Some care in tuning will be called for since the filter is only around 70 Hz wide. At this stage there should be some indication of activity on the VDU screen. Now adjust the speed control until sensible text appears on the screen.

One point to watch is in the VDU logic itself. Most designs assume that a carriage return and a line feed will be sent along with the text proper. This is indeed the case with RTTY but is not so with morse. Provision will, therefore, have to be made

within the VDU logic to return the text to the LHS of the screen (carriage return) and to start on the next line down (line feed) when copying morse. Just how this can be done depends on the VDU logic being used but, in general, gating must be added which allow EITHER internally generated LF/CR pulses OR manually generated external LF/CR pulses to be used.

The author will be pleased to answer queries, either technical or with respect to parts procurement. For written queries the inclusion of a stamped, self-addressed envelope will ensure a reply. Arrangements are being made to provide a source of PCBs and to organise a programming service for the PROM.

AX4HRH ON AIR

Alex McDonald VK4TE
35 Salford St., Salisbury, Qld. 4107

It was late last year that the first thoughts on a Special Commemorative Amateur Radio Station during the March 1977 Royal Visit to Brisbane, came to mind. We had previously been advised that all VK amateur stations would be allowed the use of the AX prefix on the occasion of the Royal Visit to Australia, and what better way to use the prefix than to establish a special station to be in operation during the visit to Brisbane.

The idea was placed before the January meeting of the VK4 Council, and after discussion on the matter including the possibility of applying for the distinctive call sign AX4HRH, I was empowered to investigate the feasibility of the suggested project.

The next day I spoke to the Under Secretary of the Premier's Department. He seemed quite receptive to the idea and suggested we put our ideas on paper so they could be considered.

At this stage, the plan was to set up a station in a quiet corner of one of the permanent buildings on the site of the Nathan Sports Centre. This seemed the ideal location as the complex is high, on the side of a hill and in a quiet location.

A secondary schools sports day was planned for the 10th of March, and the Royal Party was due to arrive in the early afternoon and, after naming the complex "The Queen Elizabeth II Jubilee Sports Centre", final track events were to be run and the winners presented their prizes by the Royal Couple.

Plans proceeded quite smoothly. Federal Executive was asked to approach the P. and T. Department regarding the allocation of AX4HRH for the station, and it was suggested that other divisions could also be interested in the call sign for their States' use.

Unfortunately, it was found that there were very few permanent buildings at the complex and none with quiet corners where we could establish a station. However, after a site inspection with the complex manager, we were allocated an area handy to a power pole and given approval to erect a tower to support a beam.

The State Emergency Service offered every assistance, and the decision was made to set up the station utilizing both HF and VHF in the back of a 3-ton covered S.E.S. truck.

Calls for operators and equipment were broadcast over VK4WIA Sunday news service and as the day approached, everything was progressing smoothly. We had sufficient equipment and operators and plans were made to be operational from about 0000Z to 0530Z on the 10th March 1977. News of the special station was spread around, and I understand it was also broadcast over the other divisions' news services.

Installation at AX4HRH.

The only delay in the final planning was the uncertainty of the allocation of the special call sign and rules under which the station could operate. However, approval was received, the call sign AX?HRH reserved for all States, and rules released.

At this point of time, it was almost decided to forget the whole scheme. The rules, as explained to me, meant it would be a waste of time and effort to establish the station. However, after several more phone calls, the rules were clarified and the operation proceeded again.

Unfortunately the weather on the 10th was not in our favour. Whilst setting up the aerials, we found a few problems (which always happens), the SO-239 in the balun for the tri-band yagi would not tighten, the SWR on the 40 metre inverted vee wouldn't come down, and the PL 259 on the VHF cable fell off. (MURPHY'S LAW?—Ed.) ■

Alex VK4TE (l.) and Bob VK4RN (r.) prepare the beam.

Consequently it all took time to fix, and by the time we were almost ready to go, we were soaked to the skin as it had been raining steadily since about 6.00 a.m. Final adjustments to the inverted vee were made about 10.30 a.m. and the weather started to clear.

Our first contact was logged at 0108Z on VHF, and we soon followed on HF. We had planned to operate on 40 and 20 at the same time, as well as on 2, but soon found only one HF set could operate at a time, so HF operating time was shared between 40 and 20.

Activity on 2 was a bit light on, but it was an excellent site with easy access to several repeaters. 40 and 20 were both in great shape, and Mervyn VK4SO operating on 40 was very pleased with the reports he was receiving.

Operations continued during the day and by lunch time quite a number of contacts had been made. It was decided to operate 40 and 20 alternately for periods of about 15 minutes.

By the time the Royal Party was due to arrive, it had started to sprinkle, but the sports events continued.

The Royal Party arrived in a closed car but changed to a Land Rover for the circuit of the oval.

By 0530Z, the rain had set in and we were in for another soaking during dismantling operations. However, it did not take as long to dismantle AX4HRH as it had to set up. The last contact, a CW contact, was made at 0620Z.

AX4HRH was a great success. Several DX contacts were made including Norfolk Island, New Zealand and Japan. All States except VK6 and VK8 were worked.

Bands operated: 40, 20, 15, 2.

Modes: CW, SSB, FM.

Contacts: 98.

Special thanks are due to VK4QN, VK4ZSH, AWA and SES for loans of equipment.

VK4SO, VK4ZLP — Operators.

VK4SO, VK4ZPF — Camera work. ■

YOUR BEAM: WILL IT STAY UP?

Reprinted from
Geelong Amateur Radio Club
July 1977 Newsletter

Quite often we hear of a beam antenna that withstands several severe storms and then tumbles down in a comparatively light breeze. This generally baffles the builder, but a close examination will disclose that some of the fundamental rules in the use of metals have been violated.

Nearly everyone is familiar with the fact that iron and steel will rust readily on exposure to the weather, so proper steps are usually taken to prevent corrosion either by painting or applying a protective coating of some metal. Few however realise that under certain conditions other metals, for instance aluminium, may become badly corroded.

In the case of our broken down beam, we find that the tubular aluminium elements have been bolted together with steel or brass crews and nuts, brass being used to prevent the formation of rust. Amateurs are not alone in this. Commercial TV antennas, including rotators, fall into the same error and may be expected to give trouble. At each of these joints the aluminium has been badly corroded and finally weakened to such an extent that the light breeze caused failure.

Why is this condition bad and what can be done to overcome it? Let's go back to our school chemistry or maybe the days when we used wet batteries to operate a doorbell or buzzer. Those wet batteries used two dissimilar metals, usually zinc and copper, immersed in a conducting solution or electrolyte, such as one containing copper sulphate. The combination gave an EMF of something over one volt and as we used the battery the zinc was gradually used up or corroded while the copper was unattacked. The zinc was the negative terminal and the copper positive.

The same thing happens in the dry cells and in this case the carbon rod is unaffected. In like manner, any two dissimilar metals in contact with each other in the presence of an electrolyte will form a small galvanic cell and the more negative metal will be attacked or corroded. All metals can be arranged in a series according to the individual potential attributed to each. The EMF developed by any particular couple or combination is the sum of the potentials of the two metals. The greater this EMF the greater the tendency toward corrosion. The table shows the electrochemical series for the more common metals and the potential of each. In outdoor exposure, the required electrolyte is supplied by atmospheric humidity or rain. Industrial and urban atmospheres contain small amounts of sulphur dioxide from fuel combustion which will slightly acidify the moisture. Marine atmosphere contains salts which will provide the necessary conducting electrolyte.

Reference to the table shows that aluminium and copper (brass is an alloy of copper) are far apart, and considerable galvanic corrosion can take place in moist atmospheres when these metals are in contact with one another. The combination will show that aluminium is the most negative of the combination and will be attacked with resulting loss of strength. The table will suggest other poor combinations but aluminium and copper is one of the worst offenders. What can be done to guard against this condition? If you live near the coast all possible protective measures should be used. For a dry inland climate, the danger is not as great and less stringent measures will be satisfactory.

The screws, bolts and nuts can be made of steel with a more protective coating such as zinc plate, or galvanized coating. Cadmium or nickel plate can also be used as can stainless steel hardware. All of these are much better than brass, but still not entirely preventive.

As a final precaution the joint should be painted to keep out moisture and the electrolyte required for corrosion. Here again the degree of protection required dictates the materials used. For highest protection a first coat of zinc chromate primer should be used followed by one or more coats of good outside paint.

The zinc chromate, besides serving as a prime coat, also provides a "passivating" action to aid further in corrosion protection. For less severe climates the outside paint alone may be used. Another fact not generally known is that stainless steel is not corrosion resistant unless it had a good polished surface. If dirt or scale is present electrolytes can go to work and readily start destructive corrosion

It is hoped that these few simple rules of the materials engineer may help to keep more antennas in the air and more amateurs on the ground. ■

TABLE OF CORROSION POTENTIAL

Magnesium	+2.34V	Nickel	+0.25V
Aluminium	+1.67V	Tin	+0.14V
Zinc	+0.76V	Lead	+0.13V
Chromium	+0.71V	Copper	—0.34V
Iron	+0.44V	Silver	—0.80V
Cadmium	+0.40V	Gold	—1.68V

QSP

USA BUDGET SQUEEZE

The editorial in June '77 CQ has a familiar ring to it. "The number of U.S. amateurs", is says, "is increasing at a tremendous rate with a record growth predicted. The downward slump has been eradicated with a monumental surge of interest shown in amateur radio. The bad news is that due to this great surge of interest the FCC is seriously considering phasing out the Novice class licence and thereby, in our opinion, sounding the death knell for amateur radio. The FCC claims that it is squeezed in a budget crunch and one of the 'expendables' or things 'they can afford to eliminate' is the Novice". The editorial points out that if this did eventuate there would be a corresponding surge of interest in the next grade up the scale, and so on.

JOTA

A reminder about the 20th Jamboree-on-the-air over the week-end 15-16 October 1977.

FT-200 FIVE BAND TRANSCEIVER

ECONOMICAL SSB! from YAESU

GENERAL DESCRIPTION

A superb quality, low cost, versatile Khz transceiver. Covers 80-10 mx, tuning range 500 Khz each band. On 10 mx, crystal supplied for 28.5-29 Mhz. (Crystals available optional extra for full 10 mx coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator, 16 valves, 12 diodes, 6 transistors. PA two 6JS6C pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning ±5 Khz. Uses a 9 Mhz crystal filter with bandwidth of 2.3 Khz at —6 db. Selectable sidebands.

Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 234 volt 50 Hz AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet and panel finished in black.
If required for novice use, the power can be easily reduced. If a separate external crystal oscillator (not supplied) is used then fixed C.C. transmit operation would be possible, with tunable reception.

Hand Held or Desk Mic. Optional Extra.

TECHNICAL DATA

Mode of Operation:	**SSB (A3J), Phone (A3H), CW.**
Frequency Range:	**3.5 ~ 4.0, 7.0 ~ 7.5, 14.0 ~ 14.5, 21.0 ~ 21.5, (28.0 ~ 28.5), 28.5 ~ 29.0, (29.0 ~ 29.5), (29.5 ~ 30.0 Mhz).**
Frequency Stability:	**After Warm-up, 100 CPS/30 Min.**
Spurious Response:	**Better than — 40 db.**
Antenna Impedence:	**50 ~ 100 Ω Unbalanced.**
Carrier Suppression:	**Better than —40 db.**
Side Band Suppression:	**—50 db at 1000 CPS.**
3 RD Harmonic Inter-modulation Distortion:	**—30 db (P.E.P.)**
Transmission Bandwidth:	**3 Khz.**
Receive Sensitivity:	**0.5 μV S/N 10 db.**
Filter Selectivity:	**2.3 Khz (—6 db) 4 Khz (—60 db).**
I.F. Mixing Beats:	**50 db Down.**
Image Interference:	**50 db Down.**
AGC Characteristic:	**Amplified AGC.**
Receiver Output Power:	**1W (at 10% Distortion).**
Weight:	**17.6 lbs.**
Dimensions:	**13¼" Wide, 5½" High, 11" Deep.**

Price, including sales tax, excluding freight:
FT-200, including FP-200 Power Supply — $588.00
FV-200 — $139.00
Prices and specifications subject to change.

JAS7778-17

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.60	CD4026	3.30	CD4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	6.75	UA723C	LM723
CA3018	3.50	CD4028	1.80	CD40098	1.80	LM382N	2.60	MC14553	12.50	UA757	3.80
CA3023	6.80	CD4029	2.65	CD40174	2.90	LM387N	2.75	MC1648P	4.90	ULN2208	2.45
CA3028A	2.60	CD4030	.95	CD40175	2.90	LM395K	6.90	MC4044P	4.90	ULN2209	2.45
CA3035	5.20	CD4031	4.70	CD40192	2.90	LM555CN	1.20	OM802	3.20	ULN2111	2.10
CA3039	2.10	CD4035	2.35	CD40194	2.90	LM555H	1.95	SAJ110	2.50	74C00	.55
CA3046	LM3046	CD4040	2.50	CD40195	2.90	LM556N	2.95	SAK140	2.50	74C02	.80
CA3053	1.70	CD4041	2.50	DM8097	1.90	LM562B	10.90	SD305DE	1.30	74C04	.55
CA3059	8.40	CD4042	1.95	HEF see	"CD"	LM565N	3.50	SD306DE	1.50	74C10	.65
CA3060	8.40	CD4043	2.25	LH0070	6.20	LM566CN	2.50	SL415A	2.70	74C14	2.80
CA3079	4.40	CD4044	2.25	LM114H	4.90	LM567CN	3.50	SD425A	1.80	74C20	.75
CA3080	2.10	CD4045	3.20	LM301AN	.95	LM709N	.95	SL437D	3.60	74C85	3.90
CA3081	2.70	CD4046	3.20	LM301CN	.95	LM710CN	1.25	SL440	1.90	74C86	2.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM710CH		SL442	2.90	74C90	2.50
CA3083	2.90	CD4049	.90	LM305AH	3.80	LM723H	1.70	SL447	4.90	74C154	5.70
CA3086	LM3086	CD4050	.90	LM307N	1.60	LM723N	1.25	SL449	1.60	74C160	3.60
CA3089E	2.90	CD4051	2.25	LM308V	2.20	LM725N	5.90	SL610C	7.25	74C162	4.50
CA3090Q	6.90	CD4052	2.25	LM309K	2.60	LM733CH	2.70	SL612C	7.25	74C174	2.50
CA3091	18.00	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	12.50	74C192	2.80
CA3120E	4.50	CD4066	1.45	LM311A	3.60	LM741CH	1.20	SL620C	9.50	74C901	1.95
CA3127E	4.50	CD4068	.55	LM311H	3.60	LM741CN	.75	SL621C	9.50	74C925	16.70
CA3128E	9.90	CD4069	.60	LM312H	4.90	LM747CH	2.70	SL623C	17.40	80C95	2.20
CA3130T	2.25	CD4070	.55	LM317K	6.90	LM747CN	2.50	SL622C	26.90	**MISC**	
CA3140T	2.25	CD4071	.55	LM318N	5.90	LM748CN	1.20	SL624C	8.80	AL5352	1.50
CA3600	3.30	CD4072	.55	LM319H	7.25	LM1303N	2.60	SL630C	6.90	GL4484	1.80
CD4000	.55	CD4075	.55	LM319N	5.90	LM1310N	3.50	SL640C	10.60	GL5253	.90
CD4001	.55	CD4076	1.25	LM320K	6.90	LM1458N	2.50	SL641C	10.60	OL31	.90
CD4002	.55	CD4078	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.39
CD4006	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	7.90	LM1496N	1.90	SL917B	6.50	FND357	3.50
CD4008	2.35	CD4085	1.65	LM324N	4.50	LM1808N	3.90	SL1310	1.60	FND500	3.50
CD4009	1.50	CD4086	1.65	LM325N	4.50	LM3028	CA3028	SL3046	1.20	9001	1.80
CD4010	1.50	CD4093	1.80	LM326H	4.50	LM3046	3.60	SP8505	8.60	9368	3.85
CD4011	.55	CD4502	2.70	LM339N	3.70	LM3086	3.75	SP8515	12.90	9601	2.90
CD4012	.55	CD4503	1.40	LM340K	4.95	LM3900	1.75	TAA300	2.90	NSN71	2.90
CD4013	.90	CD4510	3.20	LM340T	2.70	LM3905	3.90	TBA570	2.90	NSN74	2.90
CD4014	2.40	CD4511	3.30	LM349N	4.50	LM3909	1.50	TBA700	4.90	TIL306A	
CD4015	2.40	CD4514	6.50	LM358N	3.20	MC1035P	2.90	TBA810A	4.90	11C90	18.50
CD4016	.90	CD4515	6.50	LM370H	4.95	MC1312P	4.80	TB1750A	3.90	95H90	14.50
CD4017	2.25	CD4516	3.20	LM371N	3.90	MC1314P	6.90	TCA220	2.25	2102-2	3.75
CD4018	2.25	CD4518	2.85	LM372H	7.50	MC1315P	10.75	TCA290A	4.90	2513N	17.50
CD4019	2.25	CD4519	1.35	LM372N	4.50	MC1350P	1.95	TCA420A	4.90	S1883	
CD4020	2.50	CD4520	2.55	LM373N	4.70	MC1351P	3.60	TCA580	6.50	S50242	15.00
CD4021	2.25	CD4528	1.80	LM374N	4.90	MC1454G	5.40	TCA730	6.90	MA1002	13.50
CD4022	2.15	CD4539	1.98	LM375N	4.90	MC1458	LM1458	TCA740	6.80	7805CP	2.90
CD4023	.55	CD4555	1.80	LM377N	3.50	MC1468L	6.50	TDA1005	5.50	7824CP	
CD4024	1.75	CD4556	1.80	LM379	7.50	MC1488	LM1488	UAA170	3.25		
CD4025	.55	CD4720	12.60			In some cases pin for pin substitutes will be supplied.					

POPULAR SEMI-CONDUCTORS STOCKED

7400	.48	7483	2.30	74S258	4.75	74LS174	2.70	BD238	1.80	2N3566	.95
7401	.48	7485	2.95	74S196	7.50	74LS175	2.70	BD437	2.80	2N3568	.95
7402	.48	7486	.85	82S23	6.95	74LS181	6.50	BD438	2.80	2N3569	.50
7403	.48	7489	4.50	8281A	3.90	74LS191	4.50	BF173	1.25	2N3638	.55
7404	.48	7490	.90	82S90	7.50	74LS192	4.50	BF180	1.20	2N3638A	.60
7405	.48	7491	1.90	74LS00	.55	74LS193	4.50	BF194	.85	2N3642	.55
7406	1.09	7492	1.20	74LS01	.55	74LS194	2.60	BF200	1.30	2N3643	.55
7407	1.09	7493	1.20	74LS02	.55	74LS195	2.60	BFY50	1.20	2N3694	.65
7408	1.09	7494	2.20	74LS03	.55	74LS196	2.60	BFY51	1.50	2N3731	5.95
7409	.48	7495	1.65	74LS04	.65	74LS221	2.50	BPX25	4.90	2N3819	1.35
7410	.48	7496	2.15	74LS08	.55	74LS253	2.75	BSX19	.75	2N3866	2.75
7411	.54	74100	3.65	74LS09	.55	**SEMICONDS**		BU126	3.85	2N4037	1.25
7413	1.15	74107	.95	74LS10	.60	AC125	1.80	MFE131	1.95	2N4249	.65
7414	2.70	74121	1.20	74LS11	.55	AC126	1.80	MJ802	8.90	2N4250	.65
7416	1.00	74122	1.20	74LS13	1.20	AC127	1.80	MJ2955	2.60	2N4355	.65
7417	1.15	74123	1.40	74LS14	2.95	AC128	1.80	MJ4502	8.90	2N4356	.65
7420	.48	74132	1.90	74LS20	.55	AC132	1.50	MPF102	.65	2N4360	.95
7422	1.95	74141	2.75	74LS21	.55	AC187	1.50	MPF103	.85	2N5245	.75
7425	.95	74145	2.95	74LS22		AC188	1.50	MPF104	1.10	2N5457	MPF103
7426	.70	74150	3.25	74LS27	.60	AD149	2.60	MPF105	.65	2N5458	MPF104
7427	.66	74151	2.20	74LS28	.60	AD161/62	4.50	MPF106	1.15	2N5459	MPF105
7430	.48	74153	1.95	74LS30	.55	AS322	.18	MPF121	1.60	2N5485	MPF106
7432	.66	74154	3.20	74LS32	.70	AT1138	2N301	MPF603	6.90	2N5590	MPF603
7437	.90	74157	2.20	74LS37	.70	ASY17	2.65	TIP31C	1.20	2N5591	11.30
7438	.90	74160	2.75	74LS38	.70	BC107	.35	TIP32C	1.30	2N6027	1.35
7440	.48	74164	2.90	74LS40	.65	BC108	.35	TIP120	3.20	2N6084	21.00
7441	2.80	74165	2.90	74LS42	2.20	BC109	.35	TIP125	3.30	BA102	.80
7442	2.60	74174	2.90	74LS73	.75	BC177	.40	TIP141	4.70	OA47	.60
7445	2.60	74180	2.90	74LS74	.90	BC178	.40	TIP2955	1.70	OA90	.35
7446	2.60	74181	5.95	74LS75	1.20	BC179	.40	TIP3055	1.70	OA91	.35
7447	2.60	74185	4.90	74LS78	.75	BC182	.40	TT800	2N4037	5082-2800	3.20
7448	2.60	74190	3.20	74LS86	.95	BC212	.50	TT801	1.20	40440	2N3731
7450	.48	74177	2.90	74LS90	1.95	BC327	.55	2N301	2N2869	40637A	2.85
7451	.48	74191	2.90	74LS92	1.95	BC337	.55	2N706A	1.20	40673	1.95
7453	.48	74192	2.75	74LS93	1.95	BC547	.55	2N918	1.60	40822	2.90
7454	.48	74193	2.75	74LS95	2.60	BC548	.55	2N2222A	1.20	40841	1.90
7460	.48	74194	2.50	74LS109	.85	BC549C	.55	2N2646	2.50	BZX61	.75
7470	.85	74195	1.90	74LS113	.85	BC559	.55	2N2869	2.70	BZX79	.42
7472	.75	74196	2.90	74LS114	.85	BC639	1.20	2N2904A	1.50	BZX70	1.50
7473	.80	74S00	1.50	74LS151	2.60	BC640	1.20	2N2905	1.20	BZY93	2.60
7474	.95	74S10	1.75	74LS153		BD131	1.20	2N3053	1.20	BZY91	12.50
7475	1.35	74S20	1.75	74LS157	2.40	BD132	1.60	2N3054	1.70	PA40	5.85
7476	.90	74S74	3.50	74LS163	3.95	BD139	1.20	2N3055	1.35	PB60	6.50
7480	1.60	74S112	3.20	74LS163	3.95	BD140	1.20	2N3564	.65	MEL12	1.40
7482	2.30	74S251	5.30	75LS164	2.90	BD237	1.80	2N3565	.55	FCD820	1.90

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PLENTY OF PARKING AT REAR

STD 02

A 20 WATT LINEAR AMPLIFIER FOR THE IC202

Ian Berwick VK3ALZ.

The popular IC202 lacks one thing. Sufficient power to make very long haul contacts from the home location. Ian presents a circuit to give the 3 watt signal a real boost.

In June 1972 Hamish VK3ZMV published an article in the now defunct Victorian VHFer. The article described a 25W 2 metre class C amplifier. It used a 2N3866/2N4427 followed by a BLY87A and a BLY89/BLY89A. For an input of 70-100 mW an output of 25-35W was obtained. The circuit presented here is based on the above design.

The IC202 provides more than a 2N3866 is capable of so the amplifier was reduced to two stages. The 2N5590 transistors and 2N5991 transistors were more readily available to the author than the original types and so were pressed into service. The same board layout was retained. In the original VK3ZMV article construction featured a double-sided PCB with one side as a ground plane, through connections being made with eyelets. In the amplifier described here the earth pads are connected by small bolts to the lid of the enclosing diecast box. A single-sided board is used.

The circuit is shown in Fig. 1. Minor changes were made to the matching networks. A stiff bias supply is provided for Q1 and Q2. The bias is removed to disable the amplifier during reception although the collector supply remains connected as can be seen in Fig. 2.

To provide a means of controlling the two relays used in the amplifier a wire is run from the 9V transmit rail in the IC202. If you do not wish to add an extra wire then the centre conductor of the aerial coax may be used.

The general layout may be seen from the photograph. The bias network is on the separate board.

No difficulties have been encountered with the amplifier in service and signal reports have been excellent. ■

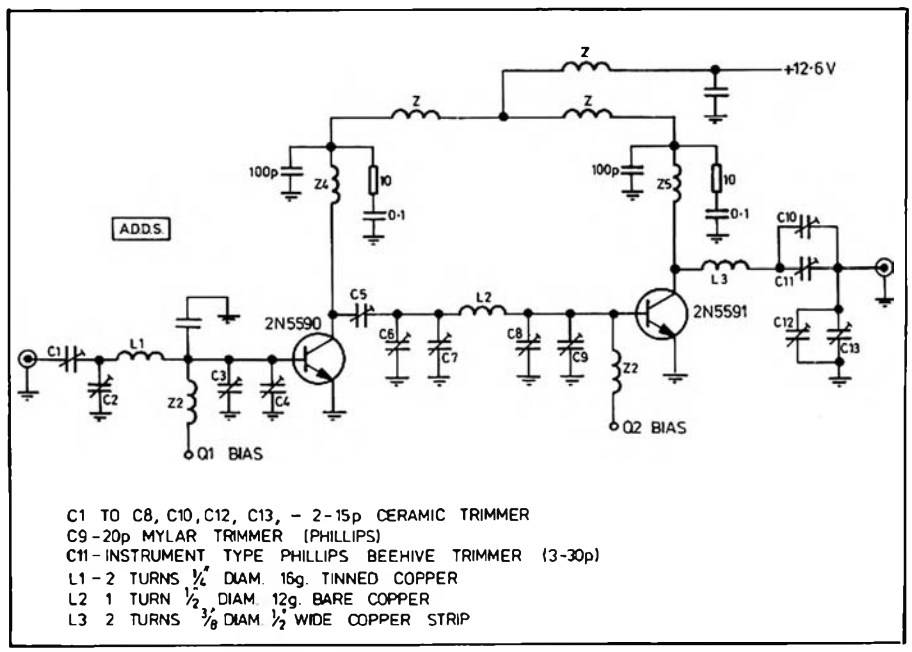


FIG. 1. Schematic of 20 watt linear amplifier.

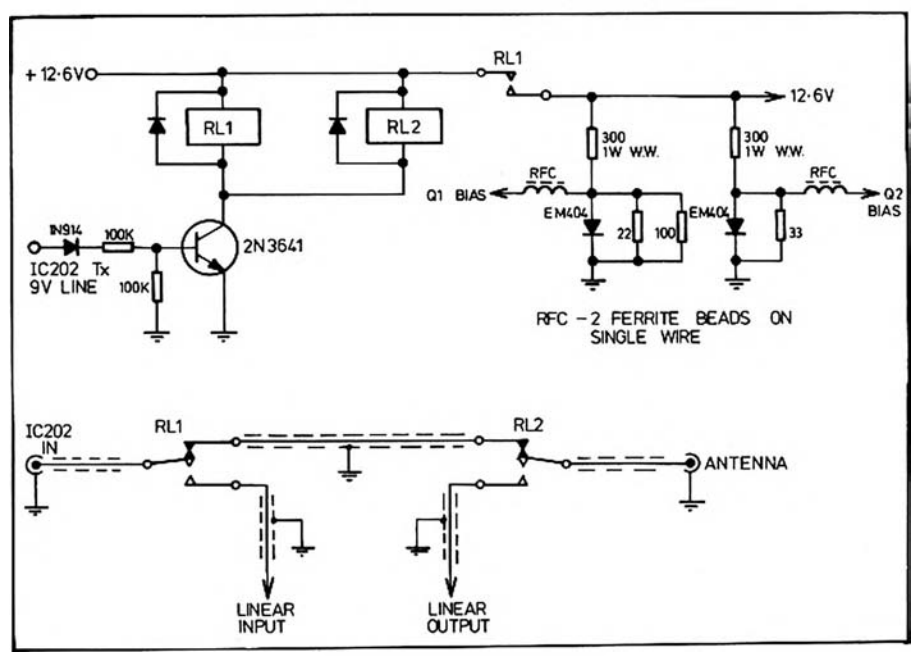


FIG. 2. Antenna changeover relay for IC202.

SUMMERLAND RADIO CLUB AIDS HANDICAPPED CHILDREN

Fred Herron VK2BHE,
President and WICEN Co-ordinator,
Summerland Radio Club

Summerland Radio Club, VK2AGH, Lismore, achieved a major breakthrough in operating approval when, on 19 June, 1977, it was given permission to transmit, during the course of a WICEN exercise for Club members, information relating to a Telethon Appeal conducted for the benefit of a very worthy charity, the Sub-normal Children's Welfare Association.

The initial approach to the Club was made by State Emergency Services Headquarters at Lismore in the manner of a request that the Club provide an emergency radio link between Bonalbo and Lismore for the purpose of transmitting pledges to the Telethon Appeal. Club Secretary, Harold Wright VK2AWH, discussed the problem with Club WICEN Co-ordinator and President, Fred Herron VK2BHE, and it was decided to inform SES that we would willingly conduct the operation, provided official approval could be obtained.

Harold, noted for his expertise in getting his way with Authorities of all kinds, prepared a very persuasive submission seeking approval of the operation, although he was not very hopeful of success, particularly having in mind the responses received to similar requests made in other areas on prior occasions. Little did he realise the impact his efforts would have on the future of WICEN exercises of this type.

Perhaps it was the very strong support given by SES which brought about the change in the Official attitude to this type of operation! Or perhaps it was the very charitable nature of the appeal involved! We like to think it was "our man Harold" who did the trick.

Whatever the reason, about seven days after the date we had fixed as the deadline to enable us to organize the operation, for which time we had given up hope, Harold received notification that official approval of the operation had been granted. The grant of approval was made subject to certain conditions, namely:

1. The exercise must be an official WICEN exercise.
2. The exercise must be conducted under the conditions of a controlled net.
3. The exercise must be logged throughout.
4. The District Radio Inspector must be given prior notice of the exercise.
5. The information transmitted must be non-commercial in nature.

Furthermore, we have been informed that this approval granted to the Summerland Radio Club is to form the basis of a general approval for this type of operation in the future.

After the initial flush of success had subsided, we had the rude awakening of having to organize and carry out the task ahead of us. Club WICEN activities were well organized, so there was no lack of volunteers. As to the operation itself, VHF seemed the desirable medium. However, Lismore and Bonalbo are separated by about 120 km geographically, and in between we have the Mallanganee Ranges rising to about 450 metres AMSL. The obvious solution was a link on the top of the ranges, so a preliminary task force of amateurs was sent out for preliminary tests.

It would take far too long to give a fully detailed account of the testing and organisational procedures leading up to the day of the operation. It is sufficient to say that when the day dawned on 19 June, 1977, Summerland Radio Club was ready.

Net Control was established at the highest crest of the Mallanganee Ranges on a windswept hill. We were fortunate in having access to a small building, otherwise we would never have held the equipment down in the gale force wind conditions which prevailed on that day. The erection of antennae was a major task in itself, and it was necessary to pay constant attention to beams which suffered from heavy wind blasts. Whenever it was necessary to swing a beam back on to a correct heading, straws were drawn, and as the luckless loser, heavily rugged against the wind and cold, exited from the building, those remaining said a short prayer for his safe return.

Portable 1 was established at Bonalbo in the school building run by the Sub-Normal Children's Welfare Association, and Portable 2 was established in the SES Headquarters at Lismore.

Two VHF channels and one HF channel were operated throughout the period of the Telethon Appeal. VHF channel 1 was used to transmit specified information one way only from Bonalbo to Lismore — this was by way of 144.250 MHz from Bonalbo up to Mallanganee, where the signal was switched electronically from one rig to another, and re-radiated from Mallanganee to Lismore on 147.750 MHz. Channel 2 was operated simplex, both ways, on 146.150 MHz, with a stand-by frequency for this channel on 146.500 MHz. For the HF link we used 28.010 MHz. On VHF we used a number of KYOKUTO rigs, as well as a MULTI 7, an FT221R, and a TS700A. On HF we used FT101B's. We had an adequate number of back-up rigs for all channels. The antennae were mainly horizontally polarised beams, with 5/8 verticals also at each site.

Apart from some minor teething problems when establishing the net at the commencement of the operation, the only difficulty we encountered was that of gradual power loss in the busy KYOKUTOs due to overheating over long periods of operation. We overcame this by running on low power which, in the end result, did not degrade the net in any way.

The Club members really came through with flying colours. Space does not permit mentioning them all by name, but they really deserved the accolade they received in the local press, and in the press and TV and radio media throughout the whole of the north-eastern area of N.S.W. We had a very full PR coverage, including large press photographs and TV coverage, and quite apart from the advancement of the local image of the Summerland Radio Club, Amateur Radio generally, benefited tremendously.

Last, but by no means least, the operation was especially beneficial as a WICEN exercise, by giving our members invaluable experience in the field of a type which, in this area in which civil emergencies are by no means uncommon, will certainly be of great benefit in the future.

As a postscript: This Summerland Radio Club WICEN exercise transmitted donations to the Sub-Normal Children's Welfare Association totalling $1,755.35. ■

TRY THIS

WITH THE TECHNICAL EDITORS

SOME PCB ETCHING TIPS

Solvent for "DALO" pen.
Ordinary Mineral Turpentine will remove Dalo ink much better than the resist remover supplied by DSE.

Using the "DALO" pen.
When drawing a board with this pen small bubbles can appear, also sometimes during etching the ink will part company with the copper it is supposed to be protecting.

Both these problems can be largely obviated by thoroughly cleaning the copper and then lightly etching the entire surface of the board before drawing the tracks. This slightly etched surface will hold the ink much better than the shiny copper.

Preparing pads for IC's.
Where integrated circuits are to be mounted on a PCB it is difficult to draw individual pads. Use as a template a piece of commercially made IC mounting, carefully prick through the holes with a sharp scriber then apply a solid bar of resist ink along the marks. When the ink is dry carefully scratch it away from between the pads, leaving them nicely square.

Uses for small scraps and laminate.
When making PC boards we often finish up with small offcuts of no use for the original purpose. These can be used to make nameplates. Just carefully letter them as required, etch in the usual way and attach to the equipment. With care, these etched nameplates can be made to look quite professional.

Bruce L. McCubbin VK3SO. ■

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTT, Mt. Mowbullan	144 400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Manawatu	52 500
	ZL2VHF, Wellington	145.200
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

The beacon list has been shortened somewhat this month with the removal of the New Zealand 432 MHz beacons. These will be included from time to time as a reminder they are there, but I cannot help forming the opinion that their listing serves little purpose for VK operations because I have never yet received any reports from anyone to the effect that they have heard a 145 MHz beacon from across the Tasman, let alone one on 432 MHz! This is not to say someone has not heard a 2 metre New Zealand beacon, but generally such news filters to me eventually, and I cannot recall ever being told. The New Zealand beacons being about 1 MHz higher in frequency than most Australian beacons tends to preclude VK operators thinking about them, let alone listening for them. Additionally, some beacons in New Zealand operate with directional antennae, etc., which probably does not favour VK. Anyway, those are just a few reasons why they will not be included each month as in the past.

The overseas six metre beacons I believe are in a different situation. Six metres is capable of opening with good signals at ANY time; it is the unpredictability of the band which makes it interesting and when conditions are right many thousands of kilometres between stations is not a real problem. Now the gradual rise in the sunspot cycle may well see more contacts with distant stations on six metres across the equator. News of any other similar beacons in the Pacific area which are definitely operating would be appreciated.

A letter has arrived from Tony VK2BAM ex VK2ZCT in the Newcastle area which says he has been active on 2 metres since 1952 and 6 metres since 1964 when he worked me for the first time on 26/12/64! Being self employed, Tony mentions he has opportunities to be at home more than some people, consequently monitors the bands quite a bit. This paid off on 17/4 when he heard weak CW on 52.050, which ended in making contacts with JA1TTS, JE1BOT and heard JH1ECU, thus giving him his first JA contacts. Further monitoring of six metres has resulted in hearing several stations for short periods as the band either opens or operators at the other end come on! John VK4ZJP in Townsville and John VK5ZBU in Adelaide, during July and August respectively, indicate the considerable distances over which stations were worked. Tony uses an FT620B on six. Other stations in the Newcastle area currently on six metres include Bill VK2BMX, Barry VK2AHE, Gus VK2ZGJ, Ray VK2AVR, Bob VK2ZJP. In Raymond Terrace, Mac VK2ZMO is off the air temporarily due to antenna damage; also there is Glen VK2YAU, in Kurri Kurri, Des VK2ZDN, with an IC502, and south of Newcastle Jack VK2AJY.

Tony mentions also some strange conditions existing on 29/5 when a large pool of very cold air was located over N.S.W. brought in the Channel 2 repeater at Orange. The extent of the coverage from there is interesting and I include details. Tony worked Robert VK2ZRJ in Orange, Kerry VK2BXD Moree, Ted VK3TG and Noel VK3ANW in Kyabram, Dave VK2SB Sydney, Bob VK3AJN Wangaratta, John VK1FT Canberra, Nev VK2DR Bathurst and Norman VK2BNC in Young. At 2117Z he worked Warrane VK2ASM in Sydney and Bill VK1BH/M in Canberra through Channel 7 repeater near Canberra. Neither repeater had been audible before or since!

Thanks for writing, Tony, at least some news trickles through from VK2 at times.

A letter, which was obviously mislaid somewhere as it is dated 3/6/77, comes from Col VK7LZ, but the information it contains is still relatively current. Sorry for the lateness, Col.

"KC4AAA has been on Oscar 6 and 7 mode A since the beginning of March this year. Whilst having a yarn to Jerry and Lloyd at the South Pole station yesterday, they complained to me about the lack of activity by VK stations, and seeing that their aerial rotators won't work at minus 80 to 100 degrees C (they have their cross yagis beaming on VK, and locked with ice!), they have asked me to appeal for help. They also said they would get on Mode B if they thought it worthwhile.

"I don't know what activity is like these days, as I haven't been on Oscar or VHF for several weeks due to a spell in hospital. If anyone does work KC4AAA they will be sure of a QSL. Send your card to W6MAB, 2305 Panorama Drive, La Crescenta, California, 91214, U.S.A. No I.R.C.s are required but you must send an addressed envelope for the card."

So there is a plaintive cry from the cold wastes of the Antarctic. Can any of you respond by keeping an ear open for these lonely operators?

I have also received a letter from the Secretary of the Hong Kong Amateur Radio Transmitting Society, John Sweeney VS6GG, advising in writing what I had already received previously, that the Hong Kong TV operates in the UHF band, so was not providing TV audio on 51.750 MHz. He affirms that a request has been made to the Licensing Authority for a "window" centred on 52.1 MHz for TEP experiments; so far no reply. The principal activist on 6 metres in Hong Kong is still Lyell VS6BE, who is ideally located on top of Victoria Peak, and keeps a lookout for VK six metre operators. Anyone who would like to attempt a QSO should transmit on 52.1 MHz and listen on 50.1 MHz. Thanks for writing, John.

That last paragraph once again outlines the unfortunate position we are in in VK with our 2 MHz offset from the main centres of the world's 6 metre activity. Apart from all other factors efficient six metre beams rarely work well over a 2 MHz band-width, so one end of the QSO must suffer some degradation of signals.

Of course you all know what this is leading up to — especially as I hope you will have read closely my comments on six metres and band allocations in the last issue of Amateur Radio. I doubt very much if anyone could possibly disagree with the general basis of the words so written, so have you done anything about writing to me setting out your views and support, I hope, for an attempt to get something done to overcome the obstacle of the 2 MHz separation? If you intend writing why put it off any longer? If I am to do anything worthwhile, let me get started now. I need your support, and plenty of it, so get cracking. And what about some comments on a proposed HF net once a week to discuss VHF and UHF matters? So far, a few operators have indicated they are in favour, but surely more of you could indicate some interest! Go to it, get those letters rolling, it would give me great pleasure to be able to write next month and say I had already received 200 letters! My mail box will hold in excess of 1000 letters at one depositing—anything over could be put in my neighbour's!.

I notice a little tit-bit in "O.R.M." inserted by Col VK7LZ re Sunspots and the Amateur. He reports: "In an informative article in the May 1977 issue of QST, possibly America's foremost authority on VHF and the Sun, Ed Tilton W1HDQ reports that in retrospect mid-year 1976 saw the end of the sunspot cycle 20.

"Late in June last year a cycle 21 group of sunspots lasted an entire orbit of the solar disc, the first new cycle activity that has been seen to do this, and as Ed goes on to say, and I quote, 'If you sort out the sources of what little July activity there was and draw curves of both cycles, the old cycle curve drops to almost zero while cycle 21 curves cross it on the way up. Though activity has been mostly low the rise since has been all new cycle orientated.' "

What all this means is that sunspot numbers will gradually increase until they reach another peak of the 11 year cycle around 1979 to 1980, which in turn generally indicates increased activity from distant areas, including overseas countries, on the six metre band, with probably a decrease in the total coverage of 144 MHz. This latter point probably has not been sufficiently investigated, but there seems to be some indication that 144 MHz improves during the low parts of the cycle. This may be due to decreased interest in 52 MHz with a possible increase in interest in 144 MHz! Now if you have sorted that out, let's all see what happens during the next few years. Prior indications have pointed to a faster rise in 52 MHz activity from the low part of the cycle, compared to a relatively long drop off after the peak of the cycle.

Probably the most interesting points to observe will be that the next peak of the 11 year cycle will occur when almost every station of any note will be operating with at least SSB or CW capability, of good quality, and with a reasonable antenna system. Such a situation has not existed before. During the last peak around 1968/69 there were still many stations still on AM. Since then the total state of the art has shown considerable improvement. Hence, even if the peak is not as great as that of 1957/58, which was the highest since records have been kept, and indications are that it will not be anywhere near as high, the better overall equipment could conceivably assist in making up the leeway.

Personally, I look forward with immense interest to the next peak, and particularly from next year onwards, just to see what our present good equipment can turn up. If we can only get something done to overcome our 2 MHz disability on six metres so much more could be done in the manner of very long distance experiments. If we are not able to get down on 50 MHz we are going to be at a greater disability this time than we have ever been before, and the missed opportunities will be great. So it's up to you, the readers, who operate VHF to get on the band wagon and try and get something done. I am prepared to lead you!

REPEATER USAGE

I am sure this Editorial from the Gold Coast Radio Club Newsletter of July 1977 bears reprinting as it highlights a very common problem which exists everywhere. I quote:

"During the past several months it has been noticed; and people have been told repeatedly . . . to allow the repeater to drop out in between overs.

"This was brought to a head on Saturday, 16th July, by TWO emergencies where it took up to FIVE MINUTES to get an urgent request for help acknowledged and acted upon.

"The extremely prevalent practice of coming straight back when the other operator signs over, WITHOUT A PAUSE, is not only Selfish, Rude, but downright Self-centred and Inconsiderate, and could mean the difference between Life and Death!!!!

"In such a case, due to the 'capture effect', a weak or more distant signal from the repeater — needing it for an emergency — CANNOT override a stronger or more local signal with CATASTROPHIC and possibly LETHAL results!!!!

"Further to this, it was also noticed repeatedly that when the emergency traffic was passed to an operator within reach of a phone, other operators will persist in throwing in their 2c worth, with the end result being CHAOS, BEDLAM and CONFUSION!

"Let us set an example in repeater etiquette. If there is a Mayday, Pan or even Emergency call,

the only person to answer should be someone within reach of a phone . . . mobiles stay out of it! Once an operator is in contact with the person on the scene, everyone else should B——— well shut up!! At least until the operator has finished with contacting the authorities.

"REPEATER USAGE: 1. No overs longer than two minutes. 2. ALWAYS leave a pause between overs. 3. When repeater is on emergency power, signified by short, regular tone pips, remember that every single word said on the repeater consumes precious power, which could be needed to save YOUR life. 4. Shift off repeater for local QSOs. 5. Shift off repeater for QSOs between base stations with rotatable aerial farms capable of simplex working. 6. Remember, repeaters are primarily intended for mobile usage. FINAL: Pertinent, Poignant Point: ALWAYS leave a PREGNANT PAUSE."

O.K. Let all repeater users study what has been written in very strong terms, and act upon all the good points so stated. However, it would be a fair bet to say that those who could be classed as some of the worst offenders, and they are here in VK5 too, are probably not WIA members and therefore do not have an opportunity to read these notes. Perhaps they should be told politely by someone else who does care. Think about it!

MOONBOUNCE REPORT

The VK2AMW EME tests or July were made on 28/7 with WA2VWL, YV5ZZ, W5FF and XE1RY. We were hearing our echoes at 6 to 7 dB over noise, but none of the scheduled stations appeared to be on.

K3NSS was heard on 432.015 MHz and later on 432.010 with signal strength up to 15 dB over noise. This big signal comes from a 94 foot dish at the U.S. Naval Communications Station in Washington, D.C., according to their QSL card which was received recently for our contact with them on 28/5/77.

The hardware has now been made up for the new feed system for the dish. It is being initially set up at the QTH of VK2ALU to determine its effect on the resonant frequency of a 432 MHz dipole and reflector, as a guide to the modifications needed to the crossed dipoles at present used as the dish feed.

Repair work is continuing on the dish surface and the high tensile bolts will be installed in place of bolts which have failed as main shaft bearing holding down bolts. All this work should be completed soon if the recent strong winds abate for a few days. The new feed system will then be installed.

The next scheduled monthly tests are to be put back one week according to K2UYH. This will give VK2AMW a more favourable window with the European station . . . from the "Propagator".

THE LOCAL SCENE

1296 MHz has shown an upsurge in interest in VK5 with Keith VK5SV and David VK5KK both with foot dishes and suitable equipment to drive them, and have been getting quite spectacular results into Adelaide with a few milliwatts output. Peter VK5ZPW has a 5 foot dish and has been running tests using the third harmonic from 432 MHz.

Still in the limelight, Keith and David have completed the erection of a new 144 MHz antenna system consisting of a pair of vertically stacked home built 16 element yagis, which look very nice and perform extremely well. They have increased their signal strength here quite dramatically. I hope to have my own two similar antennae up in the air by the time you read this, with some signal improvements for me also.

Recently David VK5KK and I conducted some tests on 432 MHz following the erection by David of a new home brew 16 element yagi for that band. In an effort to see how good the antenna was I suggested coupling my transistorised marker generator on 432 MHz to the 13 element yagi I use. The path distance is 35 miles over hills but the signal was just audible. Power output of the order of no more than 1 milliwatt! The path between us is rather unique as it is quite easy to conduct two way SSB contacts with about 20 milliwatts of power on 432, 144 and 52 MHz. Our standard signals used for crossband contacts are rarely more than 3 watts at either end irrespective of what band is in use. This is the intriguing thing with VHF/UHF, the unknown which pops up.

Ed VK8NER/6 received a pleasant surprise on 20/8 when he heard the VK5VF 144 MHz beacon at Giles weather station in W.A. just over the Northern Territory border. Eddie VK5NXP was in contact with VK8NER/6 on 10 metres, and heard the 2 metre signals being relayed on 10 metres by Ed, who was furiously calling on 144 and 432 MHz. This was on the Saturday afternoon local time. The next day, 21/8, the signals were still there. Ron VK5ZJG heard the signals too whilst in VK5NXP's car, and the news was sent via John VK5NJP on 80 metres. Unfortunately, none of the gentlemen concerned thought to contact anyone well set up for 2 metre and 432 contacts, which meant a lost opportunity and disappointment for VK8NER/6. The best suggestion I can make no matter where this sort of thing is happening, if you haven't the equipment capability to respond to the VHF signals of the other operator, please immediately pass the news on to someone who has, either by telephone, repeater or some other means. Lost opportunities sometimes mean operators of the more distant stations can become disenchanted and give away their whole interest in VHF and will turn to the ease of HF operating.

There seems nothing else at this stage to acquaint you with — apparently no one has been doing anything very spectacular. There have been a number of 144 MHz openings across the southern States during the month, which is normal for the time of year. Before I go I must remind you to watch 6 metres during the early part of October for TEP and other across the equator openings, which ultimately then leads you into an increasing number of better openings to other VK areas. If you can monitor 49.750 MHz for TV audio from the north you could be rewarded with contacts to Japan and elsewhere. Above all however, whenever you are in the shack and not actually operating, do monitor some frequency, whether it be 49.750 or 51.750 for Channel 0, 52.050 for calls from anywhere, and/or 144.100, particularly at night and early morning. If someone should be heard you are then in a position to give a call back, and with the now rising sunspot numbers you could well be surprised what might be heard, so I repeat, monitor a frequency when in or near the shack.

Closing with the thought for the month: "You can discover more about a person in an hour of play than in a year of conversation."

73. The Voice in the Hills. ■

IARU NEWS

VISITORS TO AUSTRALIA

Once again Australia is receiving blame for allegedly refusing to recognise valid overseas licences. The examples now quoted are Fiji and West Germany. In respect of Fiji a correspondent goes so far as to say he has been given to understand no Fijian licence will be issued to any Australian.

The reciprocal licensing conditions were published in AR for August 1972, page 17. From these it will be observed that two different situations are catered for, namely, (a) the visitor to Australia (up to 12 months) and (b) the intending resident.

Any amateur visiting Australia for a short period (up to 12 months) can obtain a VK licence by asking for it and producing proof of his overseas licence. The Department confirmed this quite recently, especially in relation to Fiji.

All the visitor has to do is to prove he is in Australia on a temporary visit. The situation for intending residents is different. Here the rules of reciprocal licensing apply only with administrations recognised by the Australian administration — as set out in AR quoted above. Anyone from any other country must pass the requisite Australian amateur examinations if he intends to settle in Australia.

These arrangements for visitors were negotiated by the WIA and are in fact well in advance of almost every other country in the world. ■

CORRECTION TO SEPTEMBER AR

Please alter 8th para. in the centre column P.22, September '77 AR — Replace "plenipotentiary" by "administrative". ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

October		
	1/2	VK/ZL/OCEANIA PHONE CONTEST
	8/9	VK/ZL/OCEANIA CW CONTEST
	8/10	ARCI QRP Contest
	12/13	YLRL Anniversary CW Party
	14/16	Scouts' Jamboree of the Air
	15/16	Manitoba QSO Party
	15/16	RSGB 7 MHz Phone
	29/30	CQ WW DX Phone Contest
November		
	3/4	YLRL Anniversary Phone Party
	5/6	RSGB 7 MHz CW
	12/13	European RTTY Contest
	19/20	WWDXA CW Contest
	26/27	CQ WW DX CW Contest
December		
	3/4	Spanish Phone Contest
	10/11	Spanish CW Contest

CQ WW DX CONTEST

Phone October 29-30, CW November 26-27. Starts 0000 GMT Saturday; ends 2400 GMT Sunday.

Objective is for amateurs to contact other amateurs in as many zones and countries as possible. All bands 1.8 to 28 MHz may be used.

There are three categories.

1. Single operator (single and all band). Single operators must have no assistance in operating, logging or spotting. Any assistance places the station in the multi-op. category.

2. Multi-operator (all band only): (a) Single transmitter only, one transmitter and one band permitted during the same time period (defined as 10 minutes). Exception: One, and only one, other band may be used during the same time period if the station worked is a new multiplier.

2. (b) Multi-transmitter (no limit to transmitters but only one signal per band permitted at a time).

Exchange RS(T) and zone (i.e. 5705, 57905).

Multipliers: There are two types of multipliers. Each different zone contacted on each band, and each different country contacted on each band count as a multiplier of 1. Stations are permitted to contact their own country and zone for multiplier credit.

Points: 1. Contact between stations on different continents are worth 3 points.

2. Contacts between stations on the same continent but different countries 1 point.

3. Contacts between stations in the same country are permitted for zone and country multiplier but have no QSO point value.

Score: The final score is the result of the total QSO points multiplied by the sum of multipliers. (i.e. 1000 QSO points x 100 multipliers (30 zones and 70 countries) = 1000,000 final score).

Awards: First place certificates will be awarded in each category, in each participating country and in each call area of the US, Canada, Australia and Asiatic USSR. To be eligible for an award, single operators must show at least 12 hours operation, and multi-operators at least 24. A single band log is eligible for single band awards only.

Log Instructions: All times in GMT. Indicate zone and country multiplier only the first time it is worked on each band. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Use a separate sheet for each band. Each entry must be accompanied by a summary sheet showing scoring information, category, name and address in block letters, and a signed declaration. All entrants are required to submit cross check sheets for each band on which 200 or more QSOs were made.

Deadline: All entries must be post marked no later than December 1, 1977,, for the phone section, and January 15, 1978, for the CW section. Indicate phone or CW on envelope.

Logs go to —

CQ WW Contest Committee,
14 Vanderventer Avenue,
Port Washington, LI, NY, USA 11050. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Craters SA, 5152

AUSTRALIAN DXCC TOP LISTINGS AS AT 24/8/77

PHONE		CW	
VK6RU	322/354	VK3XB	280/300
VK4KS	320/339	VK3NC	268/297
VK5MS	313/343	VK6RU	267/296
VK6MK	311/338	VK4KX	261/286
VK3AHO	304/326	VK3YD	258/281
VK4UC	301/306	VK4RF	254/271
VK2APK	300/313		
VK4FJ	297/324	OPEN	
VK4PX	297/304	VK6RU	322/354
VK3JW	294/301	VK4KS	321/345
VK5AB	291/314	VK4SD	318/339
VK6LK	290/295	VK2APK	311/329
		VK6MK	310/337
CW		VK4FJ	309/341
VK2EO	317/346	VK4PX	304/315
VK2QL	308/337	VK4UC	304/310
VK3AHQ	308/331	VK2SG	301/311
VK3YL	298/321	VK3JW	295/302
VK4FJ	297/329	VK4RF	289/306
VK2APK	291/304	VK3XB	286/306

DXCC NEW MEMBERS SINCE 23/11/76
VK2AML Tally 179 Phone
VK3GI Tally 103 Phone.

WAB BRITISH COUNTIES AWARD
In this Silver Jubilee Year of H.M. Queen Elizabeth II the WORKED ALL BRITAIN (WAB) Organisation has introduced the "WAB BRITISH COUNTIES AWARD".

Contacts with UK amateurs since 1/5/1974 count for the award. No QSLs required, only a certified list showing date, time (GMT), C/S of UK Stn. Wkd., His RS(T), my RS(T), county.

Class 2 is for any 55 UK counties, Class 1 is for all the UK counties and Scottish Regions, plus one GC/GJ (Jersey) and one GC/GU (one from Guernesy, Alderney or Sark, and one GD).

Cost of award and postage world-wide, £1 or USA$2 or 20 IRCs. Cost of further claim to upgrade Class 2 to Class 1 is £0.50 or USA$1.00 or 10 IRCs. Claims to

G4AVA, Alec Brennend,
76 Deneley Ave.,
Todmorden via Lancs,
England.

The WAB/HAB record book costs £2.60 (USA$5.00) from G4CON (QTHR), nearly 200 pages of information on WAB/HAB and awards WAB/HAB, 3CC, WABBA, WABLS, WABDA, WABEMA.

WAB is all-band, all-mode, world-wide. Every UK QSO will count.

Profits from WAB go to RAIBC (Radio Amateur Invalid and Bedfast Club). ■

BOOK REVIEW

RADIO SERVICING POCKET BOOK
by Vivian Capel

Published by Newnes-Butterworths.
Review copy from Butterworths, Chatswood, NSW.
This book of 230 pages endeavours to cover the very wide field of electronic servicing applied to domestic run-of-the-mill AM and FM radios. Having been in servicing on and off for many years I found the book most interesting. A number of simple descriptions were given to describe complex receiver functions and I must admit Vivian Capel succeeded in this difficult feat, where many others have failed.

Keeping in mind that this is a British book, and making appropriate allowances for the differences between the style of radio equipment used and broadcasting system used, the book should prove useful for anyone contemplating servicing domestic radio receivers. It would also be useful for amateur operators to read as the general service procedures outlined can be followed when servicing amateur receivers.

The chapter covers AM/FM, stereo, car radios, portables, aerials, radio interference, components, and includes a small chapter on valved receivers which are still about, although in diminishing numbers. Several chapters are devoted to setting up the workshop, the equipment needed to do the work, and the general running of a workshop.

Fault diagnosis and receiver alignment occupy two chapters. I can only query the diagnostic method of fault finding when using a signal tracer. The method would not get a servicemen into trouble but is considered to be time wasting. With signal tracing the tracing is commenced at the aerial terminal and then worked through the receiver, not vice versa. In Figure 12.1 I believe the base voltage on the first transistor is incorrect. These problems all appear on page 175.

Other than these two minor problems I consider this book well worth the asking price of around $6, and I believe that any amateur who likes to fault-find his equipment will find this book most useful.

VK3UG.

RADIO COMMUNICATION HANDBOOK — FIFTH EDITION

This edition of the Radio Communication Handbook sees an interesting break with convention. The Handbook has been a standard textbook on amateur radio, with its almost encyclopaedic coverage of theory and practice, since its first publication in 1938. However, the completely revised text for the fifth edition was too big for one book. Hence, publication of this edition is in two separate volumes.

Volume 1 includes chapters entitled (1) Principles, (2) Electronic tubes and valves, (3) Semi-conductors, (4) HF receivers, (5) VHF and UHF receivers, (6) HF transmitters, (7) VHF and UHF transmitters, (8) Keying and break-in, (9) Modulation systems, (10) RTTY.

Volume 2 not only includes a 98 page chapter on HF antennae, but also includes FM repeaters and slow scan television for the first time. Chapter titles are (11) Propagation, (12) HF aerials, (13) VHF and UHF aerials, (15) Mobile and portable equipment, (15) Noise, (16) Power supplies, (17) Interference, (18) Measurements, (19) Operating technique and station layout, (20) Amateur satellite communication, (21) Image communication, (22) The RSGB and the radio amateur, (23) General data.

The text of these excellent volumes is supplemented by hundreds of high quality line drawings, photographs, charts and tables: the paper and print is of a very good standard.

Altogether, the fifth edition of the Radio Communication Handbook is one of the best all-round reference books a radio amateur can possess. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
In an endeavour to assist in raising funds for sponsoring an Australian Delegate to WARC 79, the Illawarra Amateur Radio Society is holding a guessing competition (rahle), the profits of which shall be donated to the fund.

Prizes are of a high standard, being: 1st, A Trio CO-1303D Oscilloscope DC-5MHz; 2nd, a Programmable Calculator SR-56 by Texas Instruments; 3rd, a Digital Watch.

Prizes total to a value of approximately $420, with 1000 tickets at $1 each being issued.

Tickets may be obtained from the Secretary, PO Box 1838, Wollongong 2500, by payment of $1 in advance.

Give your support.

Yours faithfully,
B. BOSELEY, Secretary IARS. ■

LARA

Ladies Amateur Radio Association

Spring has come, and with it the equally celebrated occasion of the change in LARA sked time. It will change from 8 p.m. EAST (10.00 Zulu) to 8.30 p.m. EA Summer Time (09.30 Zulu). To ensure that this momentous event receives the attention it deserves, daylight saving will begin the previous Sunday. The sked will remain on Monday nights on 3.650 MHz. New YLs are always welcome, after the first half hour OMs are usually tolerated.

The VK3 annual general meeting will be held next month. Afternoon tea will be served in order to attract enough members to fill the vacancies. All members should attend as we are not above voting members to office in their absence.

The date of the October meeting has not yet been fixed, if there is an October meeting. The publication schedule of AR is such the September meeting was not held before these notes were submitted.

Our membership is gradually creeping up to around the one hundred mark. This seems extremely small when compared to the total number of licensed amateurs in Australia, far less than 1 per cent. Surely there must be more women than this interested in amateur radio. If you are a woman who is even vaguely interested, don't hesitate to come to one of our meetings or write to us (c/o the Victorian Division of the WIA). There is no need to be daunted by the technical nature of amateur radio; many of our members have started with no technical background at all. With the amount of courses running at the moment it is relatively easy to find someone to teach you the ropes out the trauma that often accompanies being tutored by a member of the family or a close friend.

My thanks to Mavis 3KS for the information on sked times, which I had forgotten. However, Mavis takes no responsibility for their manner of presentation.

88s Heather Mtichell,
Temporary Publicity Officer. ■

PROJECT AUSTRALIS

Bob Arnold
VK3ZBB

If anyone had told you a few years ago that there would be seven or eight Amateur Satellites up at one time, what would you have said? Today, we can forecast this event with confidence — Oscar D should be launched in February, 1978, the Phase 3 satellite is scheduled for December, 1979, and now we have news from AMSAT of an exciting USSR programme in the very near future.

The USSR Administration has informed members of the International Telecommunications Union that the USSR will establish an amateur satellite service system which will be based on three or four satellites on a circular near-polar orbit.

The "RS Oscars" will probably be launched piggyback with the Meteor meteorological satellites from the Plesetsk launch site later this year and in 1978. The Oscars will have an inclination of 82°, an altitude of 950 km and an orbit period of 102 minutes.

The Uplink frequency will be 145.80-145.90 MHz with ¼ wave receiving antenna, circularly polarised. User uplink power 10-15W to 10-12 dB antenna, transponder receiver noise temperature 3000°K.

The Downlink frequency will be 29.30-29.40 MHz, transmitting antenna will be ½ wave circularly polarised and the transponder power 1.5W peak.

The maximum communications distance should be about 6000 km.

Amateurs world wide will welcome this new series of Soviet amateur radio satellites in the spirit of international friendship and co-operation.

I will provide more details of Oscar D next month, meanwhile, here is a summary to enable you to prepare your equipment.

1. Orbital Parameters:—
   Apogee — 929.178 km.
   Perigee — 882.967 km.
   Period — 103 minutes.
   Inclination — 99°.
   Time of descending node 0930 — + 30 min., — 0 min.
2. Transponder Mode J:
   Input — 145.90-146.00 MHz.
   Output — 435.10-435.20 MHz (inverted).
3. Transponder Mode A:
   Input — 145.85-145.95 MHz.
   Output — 29.40-29.50 MHz (NOT Inverted).

Now for some local news:—

To give some indication of the activity on Mode B, I have recorded the stations worked in various call areas during the past two years. These are: VK1—3, VK2—9, VK3—12, VK4—9, VK5—14, VK6—10, VK7—4, ZL1—9, ZL2—9, ZL3—3, ZL4—3, VS6, KG6, JR6.

The most notable absentees are VK8 and VK9, particularly the Z calls who would be able to consistently work into other parts of VK without difficulty. The simple way to get on to Mode B is to acquire a Microwave Module transverter (advertised in AR) for the 432 uplink and a suitable SSB receiver for 145.95 and use ¼ wave groundplanes for the antennae. Hope we will hear you fellows in Darwin, Alice Springs, P.N.G. and the Pacific Islands.

Graham VK5EU has worked Oscar 7 on both modes A and B during his mobile expedition to VK2. On mode A he runs a home brew transmitter running 30W into dipole with a car radio antenna, suitably loaded on the 10m downlink. For Mode B he runs 15W PEP into a ¼ wave groundplane, and uses an IC202 for receiving.

Steve VK5ZIM has also been portable in the Adelaide Hills with fine signals on Mode B and has also used his equipment for demonstrations at VK5LZ, the station of the Elizabeth Radio Club.

Who's new on Oscar 7 in July/August?

VK1FT, VK2ZAZ, VK3ZCB, VK4ZBB, VK5LZ, VK7ZAK, ZL2WJ, ZL1FI, VS6BE.

Notable contact: VK6ZCC - VS6BE. ■

OCTOBER 1977 — ORBITAL DATA

OSCAR 6				OSCAR 7			
Orbit	Date	Time	Lon. °	Orbit	Date	Time	Lon. °
22682	1	00.14	67.40	13159	1	01.41	79.99
22695	2	01.09	81.15	13171	2	00.41	64.87
22707	3	00.09	66.15	13184	3	01.35	78.49
22720	4	01.04	79.90	13196	4	00.34	63.37
22732	5	00.04	64.90	13209	5	01.29	76.99
22745	6	00.59	78.65	13221	6	00.28	61.87
22758	7	01.54	92.40	13234	7	01.22	75.49
22770	8	00.54	77.40	13246	8	00.22	60.37
22783	9	01.49	91.15	13259	9	01.16	73.99
22795	10	00.49	76.15	13271	10	00.15	58.87
22808	11	01.44	89.90	13284	11	01.09	72.49
22820	12	00.44	74.90	13296	12	00.09	57.37
22833	13	01.39	88.65	13309	13	01.03	70.99
22845	14	00.38	73.65	13321	14	00.02	55.87
22858	15	01.33	87.40	13334	15	00.57	69.49
22870	16	00.33	72.40	13347	16	01.51	83.11
22883	17	01.28	86.15	13359	17	00.50	67.99
22895	18	00.28	71.15	13372	18	01.44	81.61
22908	19	01.23	84.90	13384	19	00.44	66.49
22920	20	00.23	69.90	13397	20	01.38	80.11
22933	21	01.18	83.65	13409	21	00.37	64.99
22945	22	00.18	68.65	13422	22	01.32	78.61
22958	23	01.13	82.40	13434	23	00.31	63.49
22970	24	00.13	67.40	13447	24	01.25	77.11
22983	25	01.08	81.15	13459	25	00.25	61.99
22995	26	00.08	66.15	13472	26	01.19	75.61
23008	27	01.02	79.90	13484	27	00.18	60.49
23020	28	00.02	64.90	13497	28	01.12	74.11
23033	29	00.57	78.65	13509	29	00.12	58.99
23046	30	01.52	92.40	13522	30	01.06	72.61
23058	31	00.52	77.40	13534	31	00.05	57.49
NOVEMBER 77							
23071	1	01.47	91.20	13547	1	01.00	69.99
23083	2	00.47	76.20	13560	2	01.54	83.61
23096	3	01.42	89.95	13572	3	00.54	68.49
23108	4	00.42	74.95	13585	4	01.48	82.11
23121	5	01.37	88.70	13597	5	00.47	66.99
23133	6	00.37	73.70	13610	6	01.42	80.61
23146	7	01.32	87.45	13622	7	00.41	65.49
23158	8	00.32	72.45	13635	8	01.35	79.11
23171	9	01.27	86.20	13647	9	00.35	63.99
23183	10	00.27	71.20	13660	10	01.29	77.61
23196	11	01.22	84.95	13672	11	00.28	62.49
23208	12	00.21	69.95	13685	12	01.22	76.11
23221	13	01.16	83.70	13697	13	00.22	60.99
23233	14	00.16	68.70	13710	14	01.16	74.61
23246	15	01.11	82.45	13722	15	00.15	59.49
23258	16	00.11	67.45	13735	16	01.10	73.11
23271	17	01.06	81.20	13747	17	00.09	57.99
23283	18	00.06	66.20	13760	18	01.03	71.61
23296	19	01.01	79.95	13772	19	00.03	56.49
23308	20	00.01	64.95	13785	20	00.57	70.11
23321	21	00.56	78.70	13798	21	01.51	83.73
23334	22	01.51	92.45	13810	22	00.50	68.61
23346	23	00.51	77.45	13823	23	01.45	82.23
23359	24	01.46	91.20	13835	24	00.44	67.11
23371	25	00.45	76.20	13848	25	01.38	80.73
23384	26	01.40	89.95	13860	26	00.38	65.61
23396	27	00.40	74.95	13873	27	01.32	79.23
23409	28	01.35	88.70	13885	28	00.31	64.11
23421	29	00.35	73.70	13898	29	01.26	77.73
23434	30	01.30	87.45	13910	30	00.25	62.61

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC

Following a slight upsurge in activity in June, the months of July and August have been relatively quiet. In the background there has been some better than average breaks and a scan back through the daily indices indicate these improved conditions are occurring just prior to geomagnetic disturbances often associated with unusually "hot" spot groups.

The charts for October are based on relatively better activity than for the same period last year and there is promise if this activity meets the predicted levels.

One point is worth mentioning. Some of the paths are capable of opening either by the long route and short route, one preceding the other. With this type of chart presentation it is difficult to show both separately. One must use one's knowledge of what is happening with respect to the time of day. A noticeable one is the West African path. Long path.

It would appear around the time the band would be open across to South America and further across to Europe. There is a shift upwards and across to Japan with a path also evident across North America before it will open over the short path approximately 1 to 2 hours later. This is often accompanied by Southern Asian and Middle East area with a short break into Central Europe.

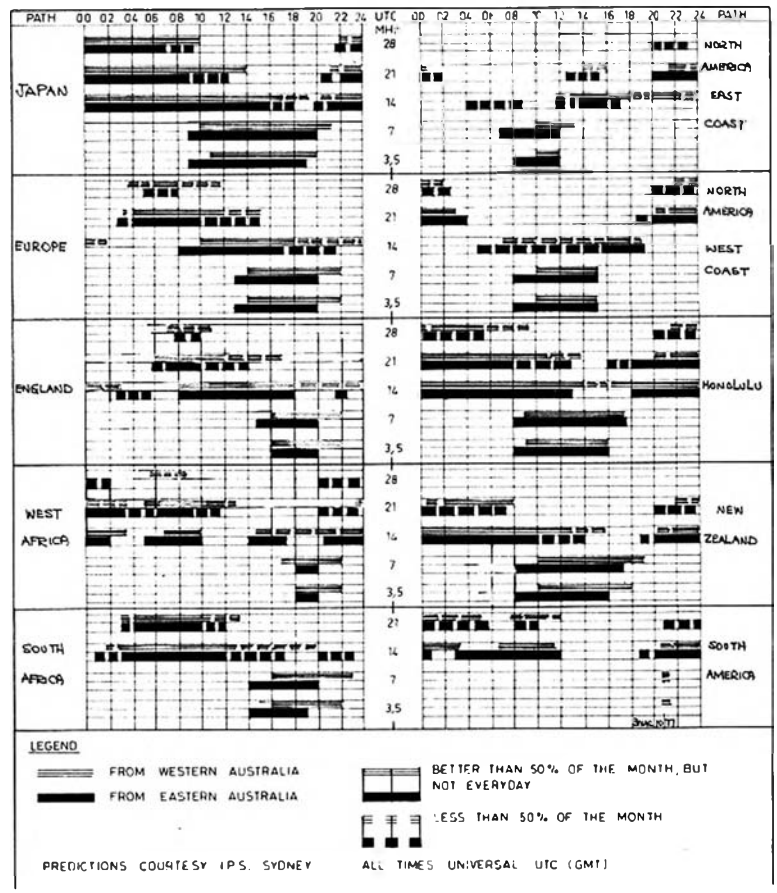
The same occurs on the UK path reversing from long path around 0400Z to short path around 1100Z. The time interval can alter if a path is found over the North Pole in between the route changes. It makes DX all the more interesting and intriguing.

From these references it can be said that generally from sunrise to sunset on the higher HF bands 28, 21, 14 MHz the bands open from the east first (while 7 and 3 MHz are looking backwards across darkness paths).

Coming towards noon, an arc from Central America stretching northwards through Japan to western Asian areas start to come alive. As the day progresses and heads towards late afternoon, the eastern opening (short path) starts to lessen and the long path openings start to appear. All very dependant on the earth's actual position relative to sun, etc. This period can produce some interesting DX on virtually all bands. Then as the sun sweeps further west, illuminating the greater part of Europe, etc., then the activity switches from east to west.

When the solar cycle is well advanced and activity from above is relatively high (often for a week at a time) then the trail of high ionization will allow both openings to remain for long periods, even until the next earth revolution recommences, to add to the good conditions. Some of these signs are already evident on 14 and 21 MHz.

If perchance the predictions for the new cycle reach anywhere near the proportions of the 1958



TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE or ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.
A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output.

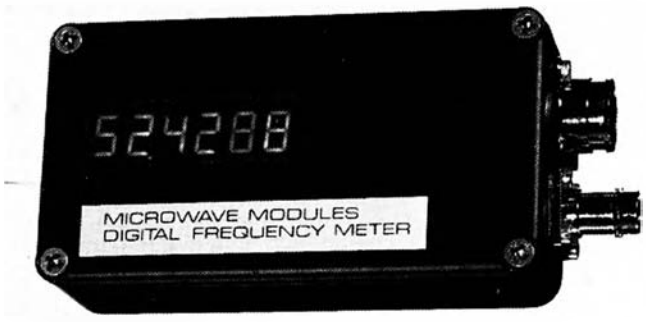
MODEL MMT432/144 — Price $260

NEW RELEASE – TRANSVERTER MODEL MMT432/28S

Features extended coverage for Oscar 8.

Second Crystal Oscillator gives two ranges: Low, 432-434 MHz — High, 434-436 MHz. Programming available to either Transmit/ Receive both Low, both High, or a mixture of the two. Adjustable Drive Level is now provided by an input potentiometer. Optional RF VOX.
Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern microstrip Techniques ★ Power requirements 12 volt nominal at 150 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432/28S — INTRODUCTORY PRICE: $235.



MMT432 TRANSVERTER

500 MHz COUNTER

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD050/500 — 500 MHz Counter, $175

LINEAR AMPLIFIERS

FOR 70 CM — 90-100 WATT

AVAILABLE SHORTLY

New Release — 6 METRE MOSFET CONVERTER

FEATURES 24 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

Input Frequency: 52-54 MHz
I.F. Output Frequency: 28-30 MHz
Typical Gain: 30 dB
Noise Figure: 2.5dB
Typical Image rejection: 65dB
Crystal Oscillator Frequency: 24 MHz
Power requirements: 12 volt ± 25% at 35 mA.

MODEL MMC52/28LO — Price $49.00

2 METRE VERSION — WITH 116 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

MODEL MMC144/28LO — Price $49.00

NEW READY-TO-OPERATE MODULES AVAILABLE IN THE SALES PROGRAM OF VHF COMMUNICATIONS

1296 MHz CONVERTER
Microstripline, Schottky diode mixer.
IF: 28-30 MHz or 144-146 MHz.
Noise figure: typ. 8.5 dB.
Overall gain 25 dB. **Price: $65**

432 MHz CONVERTER
2 silicon pre-amplifier stages. MOSFET mixer. All UHF circuits in microstrip technology.
Noise figure: typ. 3.8 dB
Overall gain: typ. 30 dB.
IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. **Price: $51.**

144 MHz MOSFET CONVERTER
Noise figure: typ. 2.8 dB.
Overall gain: typ. 30 dB.
IF: 28-30 MHz, 9-15 V 20 mA.

Price: $45

VARACTOR TRIPLER 432/1296 MHz
Max. input at 432 MHz: 24 W (FM, CW) - 12 W (AM).
Max. output at 1296 MHz: 14 W.

Price: $74

Pack and Post $1

All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
ONWARDS forwarding. Please add sufficient for freight or postage, excess will be refunded.

Australian Distributors for Microwave Modules Limited:

AMATEUR ELECTRONIC IMPORTS

P.O. BOX 160, KOGARAH 2217, N.S.W. **PHONE: (02) 547 1467**

era, then the bands are going to be really interesting. QRM will in all effect be like the CB type QRM evident on 27 MHz. Even a small improvement on last year's conditions will certainly increase the Novice DXers' expectations, not forgetting the others up the top end of 21 MHz.

I cannot see any really significant upward trend in solar activity as yet. Though the 2800 MHz Solar Flux figures are steadily rising, they still remain in the mid 80s. When it rises to a consistently 100 plus, then we will feel its effects quite dramatically. Take the time to listen to WWV at 18 minutes past the hour for solar indices for the previous GMT day. Solar Flux and A index are first. Low A index figure will reflect on the geomagnetic field — Quiet, Unsettled or Disturbed. The K index for Boulder at 6 hourly intervals give a reasonably good picture of geomagnetic activity. K0 — 3 = Quiet, K3 — 5 = Unsettled, K5 plus = Disturbed (storm conditions). A falling A index over a few days and a rising Solar Flux are very good indicators of forthcoming good conditions. Around 0618, 0718, 0818Z in East Australia on 10 MHz appear to provide good signals. Have a listen and familiarise yourself with this valuable information.

Hope to have more interesting news next month. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN June 1977
A Common Useful Frequency Standard Usable by Amateurs; More on the ZL2AOM Transceiver; A New Lease of Life for the Leader Model LSG-11 Signal Generator; Voltmeter Check on Electrolytic Capacitors; My New Toy; The TCI Net; A Note on the Origins of Radio.

CQ June 1977
Provinciales, the DX edition Paradise of the Calcos Islands; Coherent CW; Versatility and the VOM; The WB2DCX Plumbicon SSTV Camera; The Phantom Strikes Again; The Kenwood TR-7400A 2 Metre Transceiver.

HAM RADIO April 1977
Solid State Microwave Power Generators; Five Band SSB Transmitter; Remote Base for VHF-FM Repeaters; Graphical Coil Winding Aid; How to Use the RF Power Meter; 2300-MHz Bandpass Filter; Antenna-Transmission Line Analog; Novel LED Circuits; Medical Relay by Satellite; Better Audio for Receivers.

QST July 1977
A Domestic Crisis Looms; Watts from the Wind; Profile of a Hard-Core Experimenter; Full Break-In and RIT for the HW-8 QRP Transceiver; Build This Solid-State Titan; Beat the Noise with a "Scoop Loop"; A Simple Approach to Complex Circuits; A 60-Watt Solid-State UHF Linear Amplifier; The Yesu FT-221 Multi-Mode Two-Metre Transceiver; Toward the Ultimate Amateur Satellite; FCC WARC Proposals, Round 2; Assessing the CD Appointment Structures; Results, Fourth Annual ARRL Ten-Metre Contest; 1977 ARRL International DX Competition High-Claimed Scores.

RADIO COMMUNICATION May 1977
The Ultimate Keyer; WARC 1979; The "disappearing Inductance" — A New Trick and Some Better Beams; A New Era in Amateur Radio; Multiple Beacons and other Aspects of Microwave Band Planning.

RADIO COMMUNICATION June 1977
A Television and SSB Transmitter for 432 MHz; Crystal Calibrator and Band Edge Marker.

RADIO COMMUNICATION July 1977
The DSB1 Mk. 2, A Simple Sideband Transmitter for the Beginner; The Heathkit SB-104 all Solid-State HF Bands Transceiver.

RADIO ZS April 1977
Counters are not Magic — They're Simple; Simple 2-Metre Oscar Aerial; Amateur Radio — Yesterday and Today; Oscar Pre-amp — 10m Down Link; The Barlow-Wadley XRC-30 Receiver Mark 2; The Katsumi Electroic Co. Programmable Memory Keyer, Mk. 1024; Modification of the Barlow-Wadley XCR-30.

WIRELESS INSTITUTE OF AUSTRALIA

Federal President: Dr. D. A. Wardlaw VK3ADW

Federal Council:
VK1 Brig. R. K. Roseblade VK1QJ
VK2 Mr. T. I. Mills VK2ZTM
VK3 Mr. C. K. Maude VK3ZCK
VK4 Mr. N. F. Wilson VK4NP
VK5 Mr. I. J. Hunt VK5QX
VK6 Mr. N. R. Penfold VK6NE
VK7 Mr. P. D. Frith VK7PF

Staff: Mr. P. B. Dodd VK3CIF, Secretary.
Part-time: Col. C. W. Perry, Mrs. J. M. Seddon and Mr. T. Cook (AR advertising).

Executive Office: P.O. Box 150, Toorak, Vic., 3142. 2/517 Toorak Rd., Toorak, Ph. (03) 24 8652.

Divisional Information (all broadcasts are on Sundays unless otherwise stated):

ACT:
President — Mr. S. W. Grimsley VK1VK
Secretary — Mr. D. J. Farquharson VK1ZDF
Broadcasts— 3570 kHz & 146.5 MHz: 10.00Z.

NSW:
President — Mr. T. I. Mills VK2ZTM
Secretary — Mr. I. A. Mackenzie VK2ZIM
Broadcasts— 1825, 3595, 7146 kHz, 28.5, 52.1, 52.525, 144.1, Ch. 8 and other relay stations: 01.00Z. (Also Sunday evenings 09.30Z and Hunter Branch, Mondays 09.30Z on 3570 kHz and ch. 3 and 6).

VIC.:
President — Mr. S. T. Clark VK3ASC
Secretary — Mr. J. A. Adcock VK3ACA
Broadcasts— 1825, 3600, 7135 kHz — also on 6m, 2m SSB and 2m Ch. 2 repeater: 00.30Z (Also on Radio 3HA).

QLD.:
President — Mr. D. T. Laurie VK4DT
Secretary — Mr. P. Brown VK4PJ
Broadcasts— 1825, 3580, 7146, 14342 kHz: 0.900 EST.

SA:
President — Mr. C. J. Hurst VK5HI
Secretary — Mr. C. M. Pearson VK5PE
Broadcasts— 1815, 3550, 7125, 14175 kHz, 146.5, 145.7, 146.8 (ch. 4), 431.965 6m and 2m (Ch. 8): 09.00 SAT.

WA:
President — Mr. R. Greenaway VK6DA
Secretary — Mr. N. R. Penfold VK6NE
Broadcasts— 3600, 7080, 14100, 14175 kHz, 52.656 and 2m (Ch. 2): 01.30Z.

TAS.:
President — Mr. R. K. Emmett VK7KK
Secretary — Mr. H. E. Hewens VK7HE
Broadcasts— 3570, 7130 kHz: 09.30 EST.

NT:
President — Mr. Doug Halg VK8JD.
Secretary — Mr. Henry Anderson VK8HA.
Broadcasts— Relay of VK5WI on 3.55 MHz and on 146.5 MHz at 2330Z. Slow morse transmission by VK8HA on 3.555 MHz at 1000Z almost every day.

Postal Information:
VK1 — P.O. Box 1173, Canberra, 2601
VK2 — 14 Atchison St., Crows Nest, 2065 (Ph. 43 5795 Tues & Thurs (10.00-14.00h).
VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 41 3535 Sat 10.00-12.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001.
VK5 — G.P.O. Box 1234, Adelaide, 5001 — HQ at West Thebarton Rd., Thebarton (Ph. (08) 254 7442).
VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (incl. with VK5), Darwin AR Club, P.O. Box 1418, Darwin, 5794.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.

RADIO ZS May 1977
Simple Fault Finding in Receivers; Ambidextrous Paddle for Electronic Keyers "Apek"; Another Means of Communication; Incremental Tuning for the Swan 350 Transceiver.

SHORTWAVE MAGAZINE May 1977
Socket Panel for the KW-2000B; Aspects of Radio Communications Receivers; No Test Gear? Use Your Receiver; Satellite Telecommand Centre at the University of Surrey; Mini-ZL Special for Twenty Metres.

SHORTWAVE MAGAZINE June 1977
Electronic Keyer; A 21 MHz Attic Array for the Short Wave Listener; Aspects of Communications Receivers; A Simple Tone-Modulator for a GDO; Phase Lock Loop Morse Decoder. ■

C.A.R.E.

(COMMUNITY AMATEUR RADIO EVENTS)

Mr. Bob Slutzkin (VK3SK) is sitting in his radio "shack" at his East St. Kilda home.

At precisely 3.30 p.m., he zeros in on 14.315 megahertz.

He is listening in as private yachts and other small vessels in the Pacific Ocean east and north-east of Australia as checks are made to see if they have an emergency, a medical problem or a priority message.

A message comes back saying a man named Cunningham has slipped on a jetty on the US controlled island Palryma, in the Polynesia group.

Cunningham, his wife and three young children are cruising the Pacific and were resting on the deserted island when the accident happened.

The amateur radio operators then go to work.

Details of injuries, food and water supplies are taken. A landbase operator in the Pacific advises not to eat the fish in the lagoon on the island because they are poisonous.

Messages are relayed and the US navy comes to the rescue and takes Mr. Cunningham to hospital.

And so ends another rescue initiated by the Pacific Maritime Mobile Net — affectionately known as the "Mickey Mouse" Net.

The Net is run on a strictly volunteer basis within the rules of amateur radio operation to ensure safety at sea.

Ted Mulholland 55, retired (VK4AEM), is the central base in Caloundra, Queensland, which makes the initial checks on the vessels to see if they have problems.

Ted keeps a running log of small craft movements within the area it covers.

The Net covers the Pacific, South China Sea, north-western waters and the Indian Ocean combining one sector at a time.

From Melbourne "Herald", 5/8/77.

AROUND THE TRADE

NEW PRODUCTS — VHF SWITCHED ATTENUATORS SERIES 2100

The units, available from Scalar Distributors Pty. Ltd., provide precise switched attenuation from 1 to 100 dB in steps of 1 dB. This range of Hatfield attenuators is exceptionally neat and compact and is housed in bondene aluminium cases fitted with switched attenuator pads.

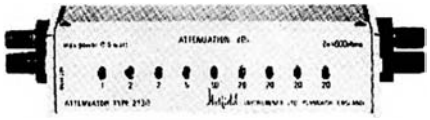
Models available: BNC terminations —

2100 50 ohm, silver switch contacts; 2105 50 ohm, gold switch contacts; 2110 75 ohm, silver switch contacts; 2115 75 ohm, gold switch contacts. DC to 250 MHz.

2120 600 ohm unbal., silver switch contacts; 2125 600 ohm unbal., gold switch contacts. DC to 5 MHz.

*2130 600 ohm bal., silver switch contacts; *2134 600 ohm bal., gold switch contacts. DC to 1 MHz.

* These types incorporate socket type pillar terminals and can be used up to above 1 MHz. ■



REDUCED COST FILTERS

Spectrum International Inc., who are regular advertisers in AR, have advised that in the light of galloping inflation, they have actually been able to reduce costs of their filters, etc., to last year's prices.

The new price lists will appear in subsequent editions of AR, however, in the meantime should any readers be wishing to avail themselves of their products, then we recommend that you revert to the prices stated in AR prior to January 1977. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

We have started to get a fair amount of feedback from this regular column, which should be of interest to most ATVers. I received a very newsy letter from Peter VK4ZWP in Brisbane. Peter and Graham VK4ZCH are using home-made solid state transmitters to the design of DJ4LB as published in VHF COMMUNICATIONS in February and May 1973. P r uses a Philips LDH005 and Graham a aden HV-15 camera. Antennae are Jaybeam 18 element yagis and the old reliable VK2ZIM converters with BFR19 pre-amps. Other calls in the Brisbane area playing ATV are Nev VK4ZNC, Paul VK4ZBV and Doug VK4ZDL. The former two have had ATV gear going for some time. Thanks very much, Peter, for the information, and I will be dropping you a line in the very near future answering your other questions.

Due to the untiring efforts of Ross VK3ZFV on his recent holiday to VK2 and VK4 we are able to bring you some more news of activity. In the Lismore area there is a small pocket of activity comprising Harold VK2AWH, Warwick VK2ZLD and a few others. There is at least one DJ4LB transmitter and a few converted UHF car phones. I believe that they use Channels 40 or 50 for liaison. The antenna systems that they all use are phased arrays.

Unconfirmed reports from the Hunter River area tell that some of the stations involved with ATV are VK2ZVM, VK2BMB, VK2ZKF and VK2AHE. There are also unconfirmed reports of an ATV repeater in the Gosford area, which is keyed on by a 2 metre carrier. Obviously they do not have any of the simpletons that we have in Melbourne who delight in interfering with repeaters and generally making a nuisance of themselves. It has been brought to our notice that some of the smaller pockets of ATV activity are looking for more information on how to better their transmissions and reception. If you have any questions that you want to ask or any little gimmicks that you can let the other ATVers know of, we can publish this information in this column. Also if you have any ATV gear to flog, or wish to buy, let us know also, we can probably help.

The 40 metre net on 7085 MHz between VK5KG and VK3AHJ on Sunday mornings discussing ATV welcomes ATVers from all States to join in the contact. This contact starts after the ATV segment on the VK3BWI broadcast about 10.45 EAST.

In Mt. Gambier, VK5TH has now obtained a camera and is concentrating on setting up his transmitter.

Peter VK3ZPA recently had a visit from the gang from Bendigo to line up some converters and arranged to lend a camera and transmitter to VK3XO, who has been throwing pictures around the area. VK3AXT in Katunga is also playing pictures.

Les VK3ZBJ and Ron VK3AHJ had a visit from Bill VK3AMI and VK3ZL from the Ballarat area and are setting up an ATV net in that area.

I have found that the bandpass filter as described in VHF COMMUNICATIONS for November 1971 has been a great help in getting rid of all the extraneous signals that are received on the standard VK2ZIM converter. I strongly recommend the design. The type number is DL6MH002.

Rod VK6RH is reported to be playing ATV using club equipment and he is sending pictures to VK6PR. Rod is moving very shortly to Albany and will be transmitting pictures to the eastern States and looking for their pictures. Adelaide and Melbourne, keep your eyes and ears open. A lot of people in Melbourne are starting to use the 88 element Jaybeams and are getting very good results on 426.25 MHz. It may surprise a lot of non-VK3 readers that the latest count of regular ATV viewers in Melbourne is up to over 80 with over 30 capable of transmitting. This is a large increase from our first report and much is due to the never decreasing efforts of Ron VK3AHJ and the Melbourne ATVers owe him a lot.

Activity in Melbourne is still very high, with a number of stations experimenting with various types of visual display units. Included in this issue is a PROM callsign generator modified by Kevin VK3ZVJ. It produces two lines of six letters, synchronising pulses being provided by an existing camera or external generator. If you have no facilities for programming PROMS, contact Kevin or one of the Melbourne ATV group for assistance.

The VK3ZBJ ATV converters are now available; contact Les direct for prices and deliveries. ■

QSP

NEW PREFIX

According to a note in Radio Communication, August 1977, the prefix series H6A-H6Z has been provisionally allocated by the ITU to the Solomon Islands on attaining independence.

CB RFI

Whatever the benefits of citizens' band radio, Americans are finding there is a price to be paid.

Last year the Federal Communications Commission received more than 100,000 complaints from people whose TV sets, radiograms or tape decks were interfered with by CB radio.

Peter Smark reports from San Francisco that the problem was brought home to one of the commissioners one recent Sunday morning.

He was attending church when a burst of CB chit-chat came from the electric organ in the middle of a Bach chorale.

From "The Age", 12/8/77.

NOVICE MANUAL OF QUESTIONS AND ANSWERS

A circular from Westlakes Radio Club, Box 1, Teralba, NSW 2284, advises that the Manual, now in its revised and expanded fifth edition of 164 pages, is available from the Club at $3.50 per copy, post paid.

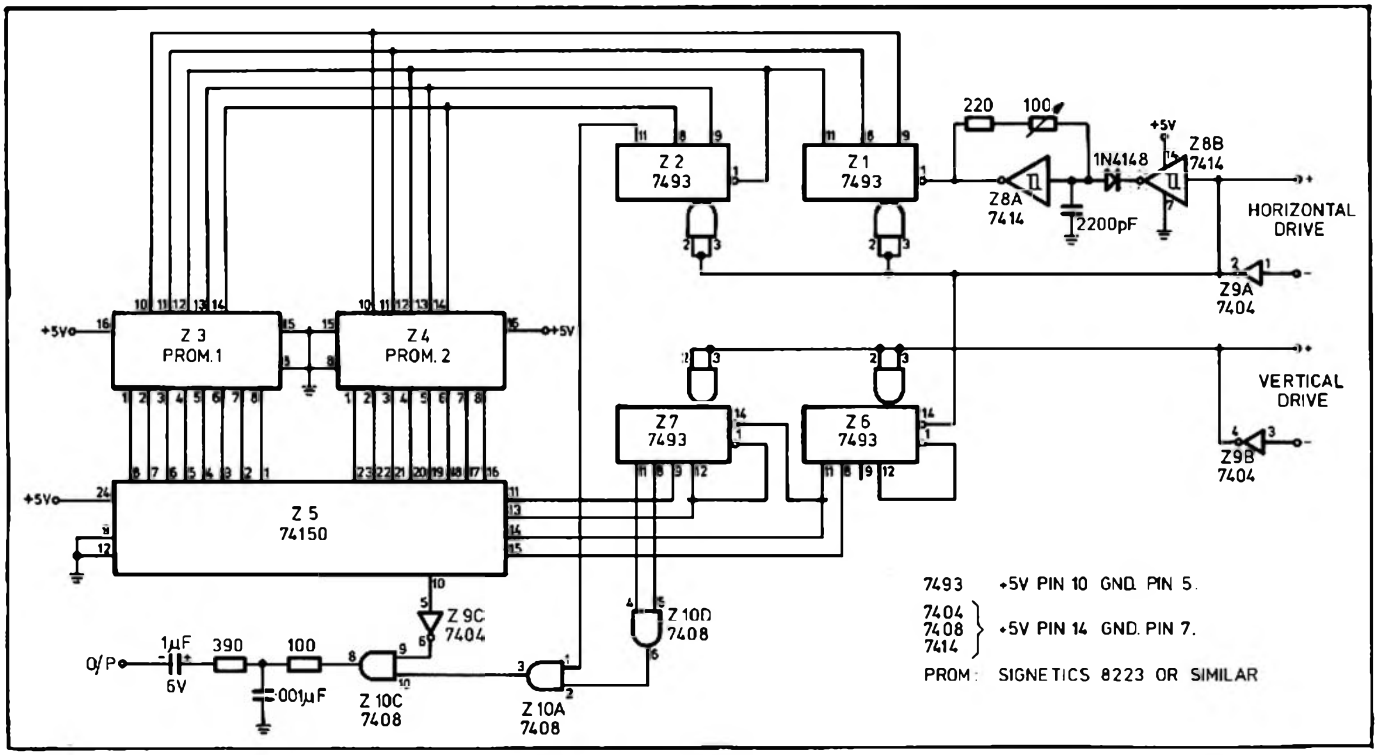


FIG. 1: ATV Callsign Generator.

QSP

RADIO AMATEURS OLD TIMERS CLUB
The RAOTC was founded by Bob Cunningham VK3ML following upon a successful dinner attended by some 45 members at the Science Club Melbourne in 1975. The club is purely a social one.

Membership is open to any ham who was licensed 25 years ago. There are some 150 members spread throughout Australia. After attaining membership, a member may nominate any other amateur at home or abroad, if it comes to that.

There is no subscription to the RAOTC as funds for postages etc. are obtained from a small levy made at the annual dinner. The certificate of membership costs $2 to cover printing and postage which should be sent when making application for membership to:

Membership Secretary,
Harry Cliff VK3HC,
P.O. Box 50, Point Lonsdale, Victoria
Phone (03) 052 52 1608.
In VK2 speak with either Len Grey VK2AKO or Gil Miles VK2KI.
In VK7 speak with Jack Batchler VK7JB.

The Club is looking for membership contacts in all other States.

From Bob Cunningham VK3ML. ■

NEW PREFIX
To mark Finland's 60th year of political independence Finnish amateurs have been authorised to substitute the prefix OF in place of the normal OH from 1st July to 31st December 1977.

OUTBACK Dx
VK8ZER (also VK8NER), Ed Roache of the Met. Bureau advises he will be operating portable from Giles Weather Station until the end of the year. Giles is about 400 miles SW of Alice Springs. He will be looking for QSOs on the 80, 15 and 10m Novice segments, as well as 6m, 2m and 70 cm FM and SSB, also via the satellite. QSL manager is VK8GG (VK8NGR QTHR in new call book). ■

HFers AND OTHERS
April '77 QST reports that the President of HF International has been the subject of an FCC call for hearing on his application for renewal of a CB licence. This call mentions a number of illegal activities urged or condoned by HFI and its publication.

LICENCE APPLICATIONS
21,500 amateur and 980,253 CB applications were received in January by the FCC. More arrived in just five days of the month than during the whole of 1973. End of January figures showed 293,655 amateurs and 8,159,176 CBers were licensed at the end of the month. QST April '77.

DILEMMA — COST v SERVICE
The "Editorial" in April 1977 QST contains items which look rather familiar. "But the problem is that, despite all of this, the (FCC) has not been able to obtain approval of a budget large enough to cope". The Division "has streamlined the CB license-issuing process so that it costs less than a dollar to issue a CB licence. But they still don't have enough money and people to handle the flood. Many of the recent actions taken and proposed by the (FCC) were designed to reduce the cost of regulating the amateur service. New programs, even though beneficial to the amateur Service can't be considered at this time, according (FCC), because to implement the programs would cost money, and there is no money". "Perhaps the higher taxes (for more money) wouldn't be necessary if there were fees which were calculated in a realistic cost basis and if the income from these fees went directly to FCC to support the regulation of the stations which paid the fees" (instead of going into General Revenue).

STATEMENT OF POLICY
"In the future, all amateurs will be asked to show us their FFCC Amateur Radio licence or a photocopy when purchasing a transmitter, transceiver or amplifier designed for the Amateur Service . . . we reserve the right to refuse sale of amateur transmitting or amplifier devices to anyone unwilling or unable to provide the above information". Noted from an advertisement in Worldradio May 1977, explaining the reasons for this self-imposed decision.

PURITY OF EMISSIONS
FFCC Docket 20777 lays down new amateur rules for purity of emissions, states Worldradio May '77, but ARRL has filed petitions relating to it. From 15th April harmonics and other spurious signals must be reduced 40 dB below the mean power of the fundamental for transmissions on frequencies less than 20 MHz and must not exceed 50 milliwatts. Above 30 MHz spurii must be reduced 60 dB and must not exceed 25 mW.

NEW ZEALAND NOVICES
According to Break-In for June 1977 the New Zealand Novice licensing is now official. No certificates will be issued but $6.00 is the fee for the non-renewable licence. Call signs will be ZL1, 2, 3 and 4 NAA up, the frequency band 3525-3575 kHz, mode AM, SSB and CW, xtl controlled Tx and power up to 100W DC input to the final. The once only Novice exam comprises a simple written theory exam, a regulations exam and a three-minute morse test at 6 wpm.

KOREA
A publicity package advises that the 8th Korea Electronics Show will be held from 18th to 25th October 1977 in the Kordea Machinery Permaent Exhibition Hall, Yol-do, Seoul. The exhibits range from Consumer Electronic products (including CB transceivers) to measuring instruments, components and various industrial items.

INATTENTION KILLS
In a report from the Sydney "Daily Telegraph" on 17/8/77 it was reported that a motorist who drove through a red light and killed an 8-year-old girl, had apparently been distracted by his car radio.

The girl had been on a pedestrian crossing outside a school.

The motorist pleaded guilty to culpable driving.

This is a sad lesson learnt the hard way.

Do not let anything, particularly microphones, distract you when you are driving.

Submitted by Max Riley VK2ARZ.

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded. Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book (note for October AR only — because of delays in processing, the 1975 Call Book refers).

FOR SALE

Pye Model F10 2m FM Transceiver (solid state Rx and exciter), 10W output, with channels 2, 4, 8 and 40, mobile mount and circuit, $85. VK3ZHI, QTHR. Ph. (03) 90 4937.

Bendix RA-1B Aircraft Receiver, .15-18 MHz, with AC pwr. supply (home brew) and handbook, goes well, $60. VK3ZHI, QTHR. Ph. (03) 90 4937.

3 Element 20 metre ZYGI Beam, as new, complete with BN86 balun, $90 ONO. Unused X beam hub casting, insulators, instruction sheet, etc., $15. Drake 2A receiver, 80-10 metres plus 27 MHz, good condition, $150. VK3ARZ, QTHR. Ph. (03) 232 9492.

Kenwood TR-220Q 2m FM Transceiver, fitted with repeater channels 2-8 plus channels 40 and 50 simplex. As new, complete with mike and handbook, $190.00. VK3ML. Ph. (03) 20 7780.

Teleprinter, Model 15, brand new, complete, $70. VK3ZY, QTHR. Ph. (03) 277 4748 A.H., (03) 630 5981 Bus.

Amateur Station, only three months old, comprising latest Swan transceiver 700CX SS-16B, fitted 16 pole SSB filter, separate combined power supply and speaker unit model 230XC, fitted VOX or PTT as selected, Shure 444 desk mike, Tx power input rating 700W on SSB and 400W DC on CW, with comprehensive kit of support spares to keep this rig on the air for some time to come. This station recently cost $1,100 or more to purchase, but a realistic $980 will secure. Good reason for selling, will not separate any item. VK2BFJ, QTHR (1977 edition). Ph. (043) 32 5758.

Frequency Counter, Dick Smith 7 digit kit set, $96, as per EA March 1977. VK6TU, QTHR. Ph. (09) 349 9342.

Yaesu FT2FB 2m mobile, fitted with chns. 40, 50, 2, 4, 5, 6, 8, in very good condition, $150. VK6DY, QTHR. Ph. (092) 87 1103.

Portable 6-band, short wave Rx (Sanyo). SW 2 MHz to 28 MHz, 4 bands, MW 510 to 1600 kHz, FM 87 to 108 MHz, only 6 months old, still brand new. Has telescopic aerial, optional AC or DC and many other features. Sold with AC power cord. Price $45. John Brereton, 27 Kent Ave., Brahma Lodge 5109, S.A.

Moving QTH, all going cheap. FS6 Mk. 2 Rx R3084A, Rx BC733, No. 19 dynamotor 12V, tuning unit, 6 ft. iron rack, radio tower, sundry crts., valves, transformers, tuning condensers, old mags and lots other bits. Prices, you name it. VK3HK, QTHR.

Realistic DX-160 communications Rx, ideal SWLs, excellent condition, $140, ONO. VK3BJE. Ph. (03) 435 4599 A.H.

Atlas 210X with dig R/O plus P/S and ex. spkr., also matching tmtr. for mobile ant., $850. VK3BDY, 131 Mickleham Rd., Tullamarine 3043. Ph. (03) 338 2105.

2m FM solid state hand-held portable transceiver, on ch. 40 charger and rechargeable nicads, .6W out., type TTR-8B G/C, $75, ONO. Vinten RT13 solid state power supply 3/12 output, unmodified, working on 120 MHz AM, $15, ONO. VK4ZFM, 3 Belbora Rd., Shailers Pk. 4128. Ph. (07) 209 8105.

80m Transverter, in case, missing PA stage. Will cover entire 80m band on 23 channel 27m transceiver, $47. Richard Cowles VK2NBN. Ph. (02) 699 9403.

ICOM IC22 2m FM Transceiver, channels 40, 50, 51, R2, R3, R4, R5, R6, R7, R8, $200. B. White VK2AAB. Ph. (02) 487 1428.

Yaesu FRDX400-FLDX400 Rx-Tx combination, complete with cables and manuals; Tx has socket fitted to run transverters, 28-29 MHz on 10, good operating condition, $420. Ken. KP202 hand held, chs. A, 40, 2, 8 plus 2 Ja, nicad batteries and charger, $100. VK3ASQ, QTHR. Ph. (052) 78 1886 A.H., (052) 78 9660 Bus.

Lafayette Micro P450 UHF tunable 450-470 MHz Rx, suitable St. John's freq. commercial mobile monitor, or UHF CB, $150. Ph. (03) 232 9616.

Estate Late VK3XM. Hallicrafters HT37 Tx, Drake 2B Rx, home built linear amplifier, Hammerland HQ 129X Rx/Tx, Geloso G222 TR, ICOM digital VFO DV21, Heathkit SB610, oscilloscope, antenna Rotor Ham II still in carton, bound copies of CQ and QST from 1955. Contact Mr. Butler. Ph. (03) 96 4757.

Yaesu FT301S, brand new, $650; Yaesu FT301, brand new, $850; National HRO m. Rx, top condition, manual, coils, etc., $120. Cliff. Ph. (065) 52 2722 Bus.

Heathkit DX60-B Tx, 10-80m, CW-AM; matching HG10-B VFO and HM102, Pwr./Swr. meter, 200/2000W, incl. all manuals and circuits, good cond., $100 lot. Trio 9R-59DS comm. Rx, $50. Ph. (02) 929 8166, ext. 6, Bus.

48' Self-supporting Tower, climbable, heavy duty, in 12 ft. x 18 ft. triangular sections, suit heavy beam or Christmas tree array, commercial mfg. made by Deeco, excellent condition, plus 20 ft. length pipe, $360. VK2AAK. Ph. (02) 635 1320.

CQ Magazine, almost complete 1950-69, several years "73". Best offer. VK2AAK. Ph. (02) 635 1320.

Collins KWM2 Transceiver, purchased new, no mods., excellent DX unit, plus PM2 Collins portable power supply, $1,100. Collins calibrated stainless steel portable multi-dipole 637T, all frequencies, mint condition, $130. GDO UHF megacycle meter, 420-940 mc., by Measurements Ltd., with power supply, $120. VK2AAK. Ph. (02) 635 1320.

IC212 similar to IC215, fitted with 9 sets of xtls, repeaters 2-8, simplex ch. 40 and 50, as new, ex. cond., $200. CB Tram XL5, 23 ch., SSB mobile and base, aerials, as new, $320. John VK2WW, QTHR. Ph. (02) 545 1927.

Kenwood TR-2200G, 2W out., 146 MHz, FM portable transceiver, 12 ch. xtls for 12 VK repeater and simplex ch. fitted, as new, used very little, with all accessories, $250, includes Kenwood owner's manual. Hallicrafters HT-37 SSB/AM CW Tx, 100W out., 80-11-10m, two 6146 PA tubes, excellent condition, $200, includes Hallicrafters owner's manual. Electro-voice model 619TR dynamic omni directional mic., with integral transistorised compressor amplifier in base, in original box, excellent condition, $55. James Goodger VK2JO. Ph. (02) 36 2981 or write GPO, Box 5076, Sydney 2001.

Yaesu FT400S (same as 401), complete with remote VFO and spare finals (6KD6s); fitted with noise blanker, 160m and internal speaker, excellent condition, in original carton, $400. VK5BI, QTHR. Ph. (086) 82 2899.

B5060 6 Ch. CB Base or Mobile, 240V AC and 12V DC operation, has 27.065, .085, .125 MHz, new, in original packing, $90. No. 62 Transceiver, 1.6 to 10 MHz, AM/CW, tunable or xtl, with service info., works well, $50. VK2HS. Ph. (02) 387 2492.

Yaesu FT620B, as new, $480, ONO. VK5AS, QTHR. Ph. (086) 82 2899 Bus., Cowell 144 A.H.

Heathkit HP13, 12V mobile pwr. sup., 750/250/var. bias; Bendix RA10B compass rcvr.; AWA carphone, pwr. sup., offers. VK2DT, 2 Patya Close, Epping 2121. Ph. (02) 868 1131.

WANTED

FT75B/BS FV50 VFO and AC P/S required by new Novice. Will consider FT200B and AC P/S, manuals required. Theo Vidler VK1NAR, 18 Heysen Cr., Weston 2611, ACT. Ph. (062) 88 1767 A.H.

Yaesu FL2500 Linear Amplifier. VK5AS, QTHR. Ph. (086) 82 2899 Bus., Cowell 144 A.H.

Any old vintage radios, old gramophones or music boxes, or parts, such as valves, dials, cabinets, etc. VK2DT, 2 Patya Close, Epping 2121. Ph. (02) 868 1131.

Buy or borrow manuals or circuits for No. 19 Mk. 2, No. 108 Mk. 3, No. 11 and a set marked "Aust. Arm. AME". Will pay for photostats. VK4SS, QTHR.

Licensed Amateur (full call) for private tutoring a student going for licence. Prefer local person. Fee negotiable (Theory only). Ph. (03) 97 6031 (Moorabbin).

Handbook for Yaesu FT-2F, English version; buy or borrow for copying. I have Japanese version only. VK3ZFI, QTHR. Ph. (03) 90 5347.

Ken. KP202, with or without nicads and/or charger. VK2BC, QTHR. Ph. (02) 663 2924.

Transceiver, FT200 or similar unit, complete, to establish base station for amateur who has lost both legs. Details, price, etc., to Lew Ansell VK2BTO, 131 Prince St., Waratah 2298, Newcastle. Ph. (049) 68 4390.

Mini-Products Hybrid Quad Antenna, 6-10-15-20m. Details and price to Ken VK6ZA, Box 768, Carnarvon 6701. Ph. (099) 41 1001.

Swan 410 VFO, Swan VOX unit. VK2BEJ, QTHR.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. W. E. SALMON	**VK2SA**
Rev. H. A. HARRIS	**VK2HT**
Mr. J. F. BULL	**VK4FH**
Mr. S. C. BAKER	**VK3BK**

JOSEPH FRANCIS (JOHN) BULL VK4FH

John passed away on 25th July.

Born in Egham, Kent, in England, in 1908, he came to Australia in 1929, later serving with the RAAF in World War II.

Licensed in 1947, John conducted many antennae experiments, particularly with the English G8PO.

With 53 award certificates to his credit, this would give some understanding of his love for amateur radio.

The sympathy of all amateurs is extended to his wife Anne, a daughter Mrs. Fong of Western Australia, and a brother Rev. Fr. Anthony Bull, living in England.

A. J. MACKENZIE VK4ZAN

HARRY HARRIS VK2HT

Although an early boyhood desire to built crystal sets did not lead to a career in electronics, the late Reverend Harry Harris was actively interested in amateur radio right up until his death in July of this year.

A member of WIA for many years, his words of encouragement and enthusiasm will be remembered by the many amateurs with whom he came into contact either on the air or in person. Perhaps it was the dedicated and talented support of his wife, Merle, that enabled Harry to find time to care for the many needs of two Parishes and still find time to assist with the supervision of YRCS examinations in the St. George District and to help in other ways.

Harry joined the RAAF in 1942 as a part-time Chaplain and transferred to full time duty in June 1943. He was stationed at Pearce, WA, Cootamundra, NSW, and at Horn Island, where he was attached to the 73rd Radar Wing.

At Brighton-le-Sands, Sydney, in the early sixties Harry was active on 40 metres with his 3BZ and dipole and later with a Swan 350 and ground plane which, mounted on the roof of his single-storey shack at about 10 feet and with "random length radials" and surrounded by "high rise" apartment buildings, brought the world to his doorstep in such a fashion that he was the envy of friends with more elaborate arrays who somehow suspected that he must have had some assistance "from upstairs".

After his retirement from active work in the ministry, Harry and Merle moved to Croydon, Sydney, where, with an FT 200 and a 3-element mono-band beam for 20 metres and a back yard the "size of a sixpence", Harry again had the world at his fingertips and there can be no doubt that the cheerful voice of "TWO HOTEL TANGO" will be long remembered and sadly missed.

JOHN VK5YY

PLEASE NOTE:

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S.S.T.V. contacts.
All mode, from
52 MHz to 432 MHz
Please contact VK2ZXL
C/O Sideband Electronic
Sales 521-7573 (02)

VICTORIAN DIVISION

Component Trading

Further to our notice in September Amateur Radio stating that our component trading will cease at 31st December, 1977, we hereby give notice that all outstanding credits in respect of such components must be presented by 30th November, 1977, and unless so presented by that date to the Victorian Division

412 Brunswick Street, Fitzroy, Victoria 3065

will be deemed null and void.

(Signed) Secretary,
WIA Victorian Division.

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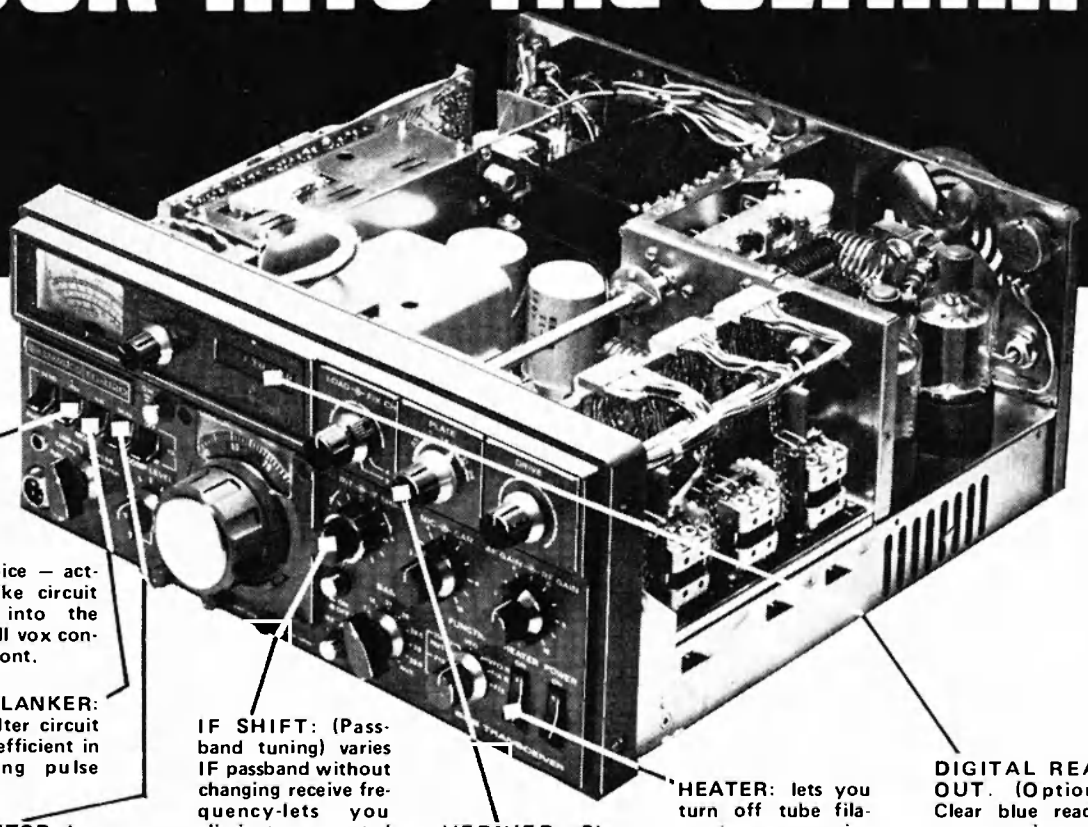
OCTOBER 1977
Vol. 45, No. 10

LOOK INTO THE ULTIMATE



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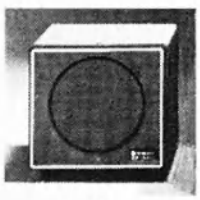

SP-520: 80hm external speaker

VFO820: Remote VFO 5.0 – 5.5 MHz

TV502: 2MTR band transverter

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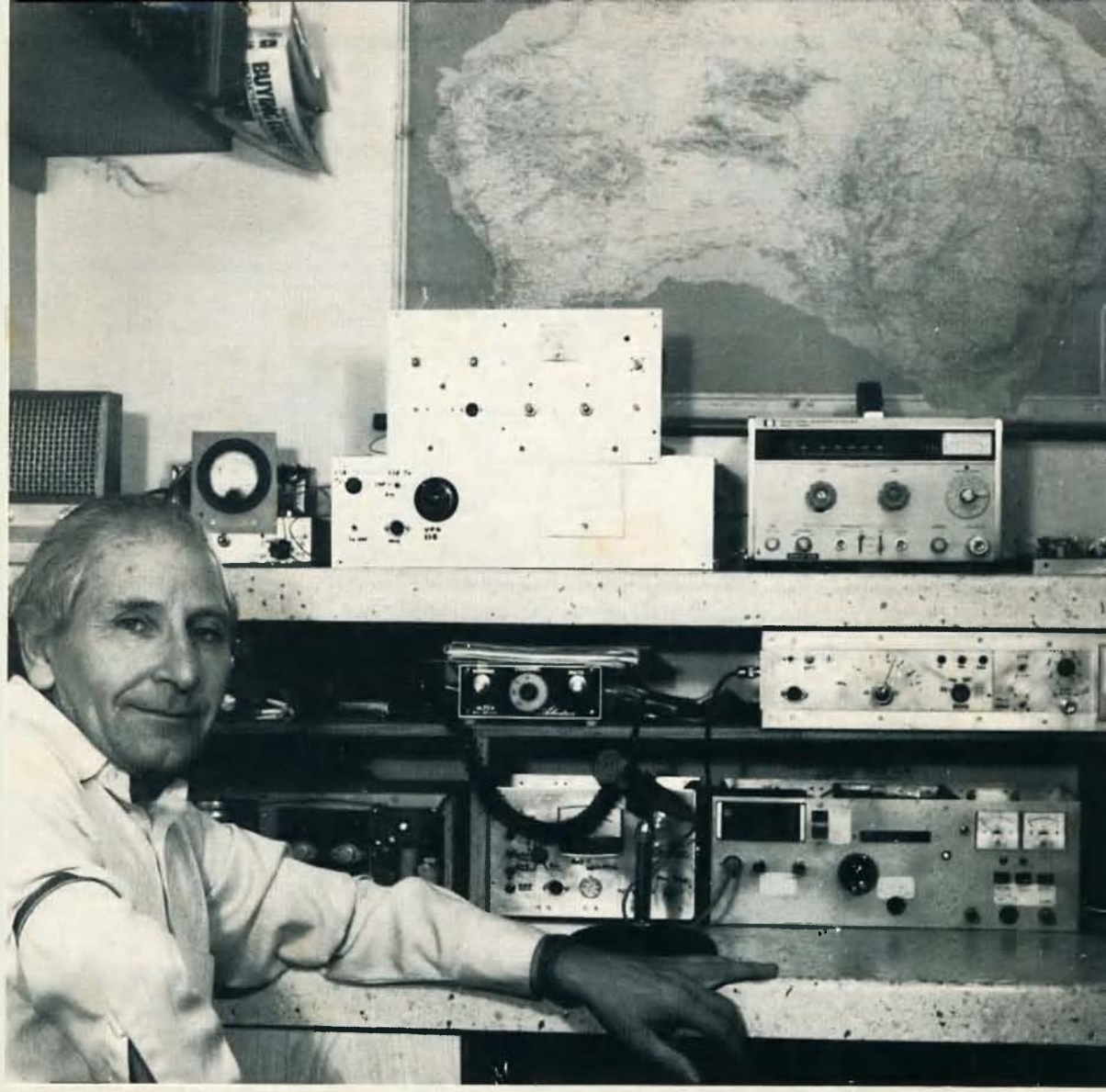

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GENERAL

DEPARTMENTS

COVER PHOTO

Les Jenkins VK3ZBJ, a well known amateur in VHF and UHF circles, proudly displays some of his home built equipment. Les is also very active on ATV with equipment capable of transmitting in the 432, 576 and 1296 MHz bands.

Photo by Reg Goudge

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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OWNER'S GUIDE — Operating Instructions.

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Semiconductor Complement:
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AM540-1600 kHz, CB channel 1-40, FM 88-108 MHz.
Intermediate Frequency:
AM/CB 455 kHz, FM 10.7 MHz.
Output Power:
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Speaker:
3" 8 ohm Dynamic.
Power Source:
Battery 6V "A-A" size.
Antenna:
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The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

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SPECIFICATIONS:

Power Supply: 12 V DC
Receiving Frequency: MW 520KC (580M) — 1640KC (183M)
Intermediate Frequency: 455KC
Audio Output: 4.5W
Transistors: 8, diode 4
Speaker: 5" Permanent Dynamic 4 ohm
Sensitivity: Less than 20 uV at 20 N/S
Selectivity: More than 25 dB at ± 10 kHz detuning
A.G.C.: More than 45 dB at 1,000 kHz
IF Rejection: More than 40 dB at 600 kHz
IM Rejection: More than 50 dB at 1,400 kHz
Cabinet Dimension: 1-7/8" (H) x 6-1/5" (W) x 4-1/8" (D)

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MODEL OL64 D/P MULTIMETER. Very rugged'y constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB. Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available, Model C $6.90.

$32.50 **Postage $2.20**

E.E.I. PORTABLE RADIO

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SPECIFICATIONS:

Freq. Range: AM530-1600 kHz, AIR (VHF) 108-174 MHz. **Intermed. Freq.:** AM 465 kHz, FM 10.7 MHz. **Output:** 450 mW max. **Speaker:** 2½" permanent—magnetic dynamic type, 8 ohm. **Power Source:** DC — 6V (4 x UM3 Penlite) or equivalent. **Semiconductor:** 10 trans., 7 diode. **Dimensions:** 8½" (W) x 4½" (H) x 1-7/8" (D)

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This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.

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SPECIFICATIONS, NC-310

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Selectivity: 45 dB at ± 10 kHz.
IF Frequency: 455 kHz.
Audio Output: 500 mW to External Speaker Jack.
Power Supply: 8 UM-3 (penlite battery).
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amateur radio

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Vol. 45, No. 11

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QSP — PANDORA'S BOX

The Amateur Service is unique and it is international. It is our duty to retain both.

The definition in the ITU Radio Regulations is included in the Australian Handbook 'for amateurs' and is three-pronged. It is a service of —

self training,

intercommunication, and

technical investigation, etc.

The definition is good but too concise for ease of understanding by the non-amateur. His only view of the service is the intercommunication aspect. To him this is the beginning and end of it. We have had good mileage from this out of emergency situations around the world. But without the other two prongs the definition would fall down.

WARC 79 now has Article 41 included on the Agenda. This Article of 6 clauses details the service requirements for amateur stations (banning of amateur radio, third party, morse below 144 MHz, technical qualifications, power, application of the general rules, spurii, identification and amateur satellite operations in shared bands).

A significant number of those who will be attending WARC 79 on behalf of many member countries may not know much about the background, development, history and aims of the amateur service.

Thus, if they are let loose on Article 41, it could happen that they will come up with outrageous, preposterous or positively undesirable or harmful amendments, which could be carried by numerical strength.

For this reason IARU HQ has advised member societies that it is considered in the overall best interests of the service not to take these risks. It is agreed there are some aspects of Article 41 which we all think can be improved, but by and large we have got along reasonably well on a global basis with what is there now.

We can follow our varied interests without too much hindrance. We can keep up with the state of the art within those guidelines. We can continue to retain our uniqueness as a radio service.

I hope this provides you with the latest background to the varied problems of WARC 79.

DAVID WARDLAW, Federal President. ■

WIRELESS INSTITUTE OF AUSTRALIA

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Federal Council:
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Secretary — Mr. I. A. Mackenzie VK2ZIM
Broadcasts— 1825, 3595, 7145 kHz, 28.5, 52.1, 52.525, 144.1, Ch. 8 and other relay stations: 01.00Z. (Also Sunday evenings 09.30Z and Hunter Branch, Mondays 09.30Z on 3570 kHz and ch. 3 and 6).

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President — Mr. S. T. Clark VK3ASC
Secretary — Mr. J. A. Adcock VK3ACA
Broadcasts— 1825, 3600, 7135 kHz — also on 6m, 2m SSB and 2m Ch. 2 repeater: 00.30Z (Also on Radio 3HA).

QLD.:
President — Mr. D. T. Laurie VK4DT
Secretary — Mr. P. Brown VK4PJ.
Broadcasts— 1825, 3580, 7146, 14342 kHz: 09.00 EST.

SA:
President — Mr. C. J. Hurst VK5HI
Secretary — Mr. C. M. Pearson VK5PE
Broadcasts— 1820, 3550, 7125, 14175 kHz; 28.5 and 53.1 MHz, 2m (Ch. 8): 09.00 S.A.T.

WA:
President — Mr. R. Greenaway VK6DA
Secretary — Mr. N. R. Penfold VK6NE
Broadcasts— 3600, 7080, 14100, 14175 kHz, 52.656 and 2m (Ch. 2): 01.30Z.

TAS.:
President — Mr. R. K. Emmett VK7KK
Secretary — Mr. H. E. Hewens VK7HE
Broadcasts— 3570, 7130 kHz: 09.30 EST.

NT:
President — Mr. Doug Haig VK8JD.
Secretary — Mr. Henry Anderson VK8HA.
Broadcasts— Relay of VK5WI on 3.55 MHz and on 146.5 MHz at 2330Z. Slow morse transmission by VK8HA on 3.555 MHz at 1000Z almost every day.

Postal information:
VK1 — P.O. Box 1173, Canberra, 2601
VK2 — 14 Atchison St., Crows Nest, 2065 (Ph. (02) 43 5795 Tues & Thurs (10.00-14.00h).
VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 41 3535 Sat 10.00-12.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001.
VK5 — G.P.O. Box 1234, Adelaide, 5001 — HQ at West Thebarton Rd., Thebarton (Ph. (08) 254 7442).
VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (incl. with VK5), Darwin AR Club, P.O. Box 1418, Darwin, 5794.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.

WIANEWS

POSTAL MOTIONS

The three Postal Motions listed in WIANEWS, October AR, were passed by Federal Council and therefore now represent policies of the Institute.

LEGISLATION

For a long time the Institute's representatives have made it known to those concerned that the WIA is actively interested in any impending legislation which affects the amateur service. For example please see WIANEWS in AR for December 1975.

This matter was the subject of talks with Government officers in April and May and culminated in a discussion paper being handed to the Department during June. The paper dealt with definitions, controls over equipment particularly transmitters, and the need for legislation to cover a number of assorted situations.

It was agreed there is little room for debate that the Wireless Telegraphy Act of 1905 requires substantial revision and assumes, as is well known, such a review is imminent. No attempts were made to evaluate the extent of the Commonwealth constitutional powers or to anticipate the many areas of detail requiring attention by reference to other bodies, for example, industry in relation to the control of EMC. The discussion paper did not pretend to set out the policy views of the WIA at that stage except to highlight some major matters of special interest to the amateur service as a whole.

Both the P and T Department and the WIA know that the law relating to the general radio services is under review and both are aware of the changes which have recently occurred or are proposed. It is therefore pointless for either of them to press for a general revision of the Handbook.

50 cm BAND PLAN

At the September meeting of the VHF/UHF Advisory Committee (a Committee of the Executive) a draft band plan for the 50 cm band (576-583 MHz) was discussed and prepared. Now that the P and T Department has given approval in principle for cross-band ATV repeaters (70 to 50 cm bands) it seems desirable to nominate certain frequencies in the 50 cm band so as to minimise interference between different modes.

Details of the draft band plan are to be published shortly in AR for general comment. The proposed video carrier frequency is 579.25 MHz.

MUF FOR VHF OPERATORS

The VHFAC advise in preparation for the Dx season the necessity to clear the calling frequency as soon as a contact has been established and then to QSY higher in frequency (Move Up in Frequency — not down).

MORSE EXAMS

The Federal Education Co-ordinator asks why have CW examinations at all, especially Novice morse. The reason mainly derives from the ITU regulations which require that all amateurs not exclusively using frequencies above 144 MHz shall prove the ability to send correctly by hand and to receive correctly by ear, texts in Morse code signals. Australia is in derogation, much to her embarassment internationally, because of setting the 6m band as the lower limit. At WARC 1959 many administrations wanted 1000 MHz as the lower limit.

The big question, raised with the Department, is the spacing format of the Novice morse exam. The P and T Department has stated that the ITU method of spacing is to be used. The length of the dot governs all the parameters. An analysis of candidates' reactions and additional tests carried out by experts shows that 5 w.p.m. ITU standard morse is much more difficult to copy than 5 w.p.m. where the characters are sent at a higher speed and the spacings lengthened to compensate. The submission made to the Department in May was based on a carefully documented compilation by Roger Davis, VK4AAR using a microprocessor to generate various CW speeds by sending letters at a constant rate and varying the spacing to double or triple the spacings. There is a distinct brain recognition problem in comprehending the ITU standard CW at the low speed of 5 w.p.m.

He also asks why steps are not being taken to make the Novice licence as easy as possible to attain without necessarily lowering standards in the process.

AMATEUR ADVISORY COMMITTEES

The role of these Committees has been discussed for many years and a review has been in the pipeline as an idea for some time. Certain events during August highlighted the situation already alluded to in the letter of 8th August to the P and T Department, see Sept. AR page 21 Appendix A Part A(9). The Advisory Committee system does assist towards reducing arbitrary decisions by the licensing authority, particularly in the light of the submissions by the WIA relating to third party provisions (see WIANEWS in the same issue).

GOVERNMENT POLICIES

The opening address by Senator J. W. Knight (on behalf of the P and T Minister) at the NCRA's first national convention (CB) in Canberra on 3rd September contains passages of interest to radio amateurs.

In referring to the introduction of CB in Australia he pointed out, it is reported, that the introduction of a (new) radio service is a very complex matter. To preserve the RF spectrum it has always been necessary to carefully restrict radio communication services to meet needs which could be demonstrated as essential and which are generally in accordance with the philosophies of the ITU.

He is reported as saying that another particular concept (apart from vast distances in Australia between cities) of any administration is the possibility of interference caused by transmissions in the HF part of the spectrum — very significant in relation to the introduction of CB.

The Government was anxious that Australian manufacturers should be given an opportunity to compete in the CB market and also believed on technological grounds the advantages of UHF as most suitable. He hoped CB-ers would change to UHF as quickly as possible.

Something still to be resolved was the maintenance of discipline on CB bands and he recommended self-regulation since Government could introduce the necessary legislation but preferred a representative organisation for consultations. He gave notice of Government intentions to change the CB rules and regulations.

There is concern, he said, about advertisements appearing in specialised CB publications advertising the sale and availability of amateur service equipment and power amplifiers. The Minister (P and T) wished it to be made quite clear to everyone concerned that the Government will not stand by and allow pirating activities into other authorised services. Nor will Government stand by and allow power amplifiers designed for another frequency to be sold for and used within the CB service. It is Government's view that strong action should be taken to ensure that other authorised services are protected.

The Government, he went on, is presently preparing a new radiocommunication Act to replace the existing WT Act and expected it would be introduced in the 1978 Autumn session of Parliament. The drafting of the Act is now taking place and it will rectify the faults of the old Act as well as making provision to strengthen Government control over regulating of services. He hoped the UHF CB service will soon commence and referred to a suggestion that Government's decision in relation to the acceptance of the interim HF (CB) service transfers an illegal operator situation of 1977 to 1982. This was not the case, he said. In 1982 operators of HF equipment will only be allowed to continue using that equipment under the auspices of the amateur radio service. Five years was enough time for people to qualify as amateur operators although it might well be that modifications to the existing examination procedures and restrictions will take place during this period. The WIA he said had already made a submission seeking changes which are now being studied.

At this Convention the WIA ACT Division held very preliminary talks with the NCRA and laid on demonstrations of amateur operators and equipment.

1977 CALL BOOK

Some of the call sign listings were poor in print quality but now under investigation are proposals to change our computer records to a commercial company undertaking the entire operation from computer records through to the mailing of AR! If this occurs the computer printouts for future call books hopefully will be an improvement. At the same time it should be possible for call signs to be printed on AR labels. Keep your fingers crossed; negotiations are still at an early stage.

One of the several problems which have emerged is the absence of some call signs from the 1977 listing. This was caused by membership changes occurring during the preparation of the input material as explained in the editorial in the Call Book. Please ask any VK amateur not in the Call Book to write in to the Executive Office if his call sign was issued prior to this year.

VARIOUS

Good news for members. The Federal element in the 1978 subscriptions will remain the same as for 1977, namely AR $7.20, IARU 30c, and Federal $7.50, making a total of $15.00 for each full and associate member. Divisional Councils have been considering ways and means of raising their pro rata amounts towards the expenses of WARC 79 representations.

The Federal President paid an official visit to the SW Zone Convention in Griffith during the first week-end in October and is hoping he can also find time to attend other Conventions including the NT Communications Convention '77 in Darwin on 3/4 December.

Some mention really ought to be made about Youth Radio Services activities in VK2 but this will have to be held over to December for space reasons. ■

QSP

EX-G CLUB

The Secretary of the Ex-G Radio Club, Australian Division, is Steve VK5ZB, of 1 Emily Avenue, Clapham, SA 5062. Anyone born in the UK and now living in VK might like to contact Steve for details of membership, nets, bulletins, etc.

KERMADEC ISLAND DXPEDITION

Auckland Branch of NZART plan to activate Kermadec Island from approximately 20-31 October under the call sign of ZL1AA/K. This island counts as a separate country for DXCC purposes. At least five operators, including two YLs, will use all bands 16-10m, both phone and CW. Split frequency operation is proposed with breaks for transceive. Special attention will be given to weak and QRP stations. Stations calling are requested to do so only in accordance with the operator's directions and to QRS to 15 w.p.m. on CW.

FRENCH STATIONS ON 160 METRES

For the first time since 1939 several French amateurs have been granted permission to operate 160m for special contests on 1826 kHz only. The mode is A1, power to the PA stage 10W, and clearance must be obtained before each contest. QST June 1977.

CANADA'S FIRST BLIND-DEAF AMATEUR

Yes, according to Worldradio News for July 1977, Kay Clarke of Ontario has just passed her amateur radio licence exam and has the call VE3KAY despite the double handicap of being both deaf and blind. The basic device used as a receiver is a sort of loud-speaker of special design with a plastic plate in place of the grille, which vibrates in response to the dots and dashes of morse code coming in on the receiver. She "reads" the code by touching the device with her fingertips and hit 14 w.p.m. in her exam. Kay was helped by many Ottawa amateurs, including two blind amateurs VE3KF and VE3EEK.

IREE — DIGITAL SYMPOSIUM

The Institution of Radio and Electronics Engineers is holding a Symposium for Engineering Support Staff on Digital Processors and Analog-Digital Interface Circuits at Clunies-Ross House, Parkville, on Thursday, 3rd November, from 09.00 to 17.00h.

GE PREFIX

QST for June 1977 reported that British amateurs would be permitted to use the special prefix GE from 4th to 12th June in honour of HM the Queen's Silver Jubilee.

EXAM EXEMPTIONS

The P. and T. Department has recently approved exemptions from the AOCP theory exam for two persons possessing suitable qualifications. These people possessed Radio Technician Certificate and Broadcast Ops. Certificate respectively. To obtain an exemption, the application must include a detailed analysis of the course syllabus covered, and documented evidence of a satisfactory pass in all subjects. Applications should be forwarded to P. and T. Department Central Office.

1977 CALL BOOK

By the end of September stocks of the 1977 Call Book were virtually exhausted. Only enough copies remained on hand to meet an occasional request for a single copy. Taking into consideration the increase in size and price compared with the 1975 edition, and the fact that the original 1975 print run was increased by 50 per cent, the result is most encouraging. The defective characters in some places in the call sign list was a computer print-out function over which the Institute had no control. This occurred even though a new ribbon had been requested for the Call Book print-out.

NORTHERN TERRITORY COMMUNICATIONS CONVENTION

On the 3rd and 4th of December the most comprehensive Communications Convention ever will be held in the Northern Territory at the Darwin Community College.

This general convention, open to the public, has been organised by the combined efforts of the two hobby radio factions in Darwin.

Display and lecture material will be presented by the Darwin Community College, Telecom Australia, A.B.C, Government Departments, the Defence Forces, local and interstate business houses and the Amateur and Citizen Radio Organisations.

The community of Darwin, intrastate and interstate visitors will find that aspects, applicable to themselves, will be covered.

Bodies interested in participating by way of displays, lectures or field demonstrations should contact Mr. John Tate, State Director of the NCRA, or Mr. Doug Haig, President of the Darwin Amateur Radio Club, on 85 2016.

RFI AND OTHER PROBLEMS

The June 1977 issue of Worldradio contains an article by K6RLP on the formation of the "Personal Communications Foundation" to combat a major legal crisis said to be only the tip of a future iceberg. To quote "Citizens Band and Amateur Radio operators are currently being sued in virtually every State for electrical interference, violations of antenna and tower ordinances and property deed restrictions stemming from their use of transceivers, towers and antennas manufactured and sold by the personal communications industry. State and local communities are enacting specific criminal statutes or are employing existing criminal nuisance and disturbing the peace statutes to subject users to substantial fines and the possibility of imprisonment when neighbours complain of television and radio frequency interference. Local communities in all States have enacted zoning ordinances which either prohibit radio towers and antennas entirely or which limit the height of antennas to as little as six feet above the roof line and which impose size limitations effectively prohibiting antennas longer than a medium sized television antenna. The explosive growth of the CB service in the US and Canada in the 1970s has placed personal communications in essentially the same position as the automobile at the start of the 20th century (local communities promulgating legislation prohibiting cars from city streets as being ugly, noisy machines scaring livestock, emitting unpleasant odours and disturbing the peace)."

ITU MEMBERSHIP

The total membership of the ITU is now 153 consequent upon the admission of the Republic of San Marino. 26 of these countries are in Region 3 and exactly half of these countries do not have an IARU membership society. In fact many of them have no amateur radio at all. Want to know what countries these are? Afghanistan, Bangladesh, China, Fiji, Indonesia, Iran, Khmer Rep., N. Korea, Laos, Maldives, Nauru, Nepal and Vietnam. Data from IARU RI News, September 1977.

NEW PREFIXES

IARU RI News lists the allocation of two new call sign series — H4A to H4Z to the Solomon Islands and J3A to J3Z to Grenada.

EDITOR'S DESK

By BRUCE BATHOLS
VK3UN

AMATEUR RADIO — AUSTRALIA'S WINDOW ON THE WORLD

Next month starts the usual hustle of Christmas and New Year celebrations.

In accordance with the practice over the last couple of years, we will be producing a bumper issue of AR. This year, in an endeavour to attract interested newcomers to the hobby, the December issue will be published in the form of a book.

Its title will be called "Amateur Radio — Australia's Window on the World", and will be available for sale to the general public on the book stalls.

Members of the WIA will be receiving a copy free in lieu of a normal issue of Amateur Radio.

The purchase price will be $1.35 plus 40c postage.

Copies will also be available in early December from the WIA, PO Box 150, Toorak, Vic. 3142.

Here is an opportunity to buy an ideal Christmas gift for a friend who may be showing an interest in amateur radio as a hobby.

The issue will contain several original articles specially selected for the newcomer, as well as the normal type of articles and Department series.

We would ask that this information be made known as widely as possible.

DIGITAL LOGIC CIRCUITS IN COMMUNICATION

J. Day VK3ZJF

Many people in amateur circles have played around with digital logic circuits, many also have not. In communication equipment we are seeing more and more digital logic creep in. This may be good, it may be bad, it depends on which side of the fence you sit. For those interested I intend to describe some applications I use in communication equipment and hopefully inspire other people to do the same.

Probably one of the most common applications of digital logic in amateur equipment is the PHASE LOCKED LOOP FREQUENCY SYNTHESIZER. The PLL SYNTHESIZER is becoming more and more commonly used, as our VHF and UHF bands become more crowded, for the generation of large numbers of closely spaced channels.

The PLL synthesizer relies on a basic mathematical equation for its operation.

$$fc = fr \times N \quad \text{or} \quad fr = fc/N \text{ (Eq. 1)}$$

Where fc = carrier or output frequency.
fr = reference frequency.
N = division ration.

Basically the PLL synthesizer looks like this:

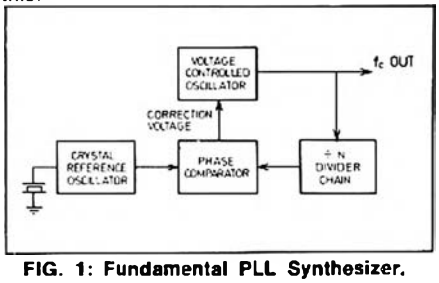

FIG. 1: Fundamental PLL Synthesizer.

The heart of the PLL synthesizer is the phase detector. Two signals are applied to the phase detector. One of these frequencies is the reference frequency. This reference frequency is normally derived from a crystal oscillator or some other stable source. The second signal comes from the source which is required to be controlled. If this signal is lower than the reference frequency, the output of the phase detector will be a continually high voltage. If it is higher, output will be continually low. When the two frequencies are the same, the control output will be pulses corresponding to the phase shift between the two signals thus attempting to bring the two signals precisely into step with each other. The above information applies to most integrated phase detectors and specifically the the MC14046 CMOS type from Motorola.

From the output of this phase detector, we drive a voltage controlled oscillator. The oscillator is basically a VFO which is tuned by using a varicap type diode. A typical circuit of a VCO is shown below.

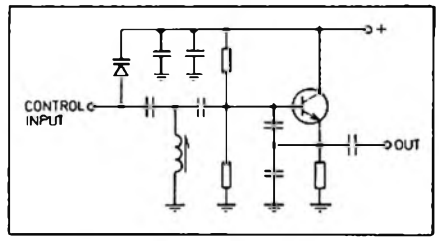

FIG. 2: Basic Voltage Controlled Oscillator.

This oscillator circuit, it can be seen, is almost identical to the conventional Colpitts type VFO, the only difference being the varicap control element. Normally the VCO is fed through a low pass filter so that it will follow a smoothed out version of the control waveform that corrects the frequency.

Thus if we have a crystal controlled reference oscillator, a phase comparator and a VCO we can lock the VCO to precisely the crystal frequency. In a lot of cases though, the required output frequency is different to the reference frequency.

Let us say we want a very stable source of signal at 100 MHz precisely and we have a 1 MHz reference. If we want a signal at 100 MHz we must obviously run the VCO at 100 MHz. How do we control this from a 1 MHz reference? If we divide 100 MHz by 100, what do we have? 1 MHz, how convenient! By comparing this with the 1 MHz reference we can control the 100 MHz and have its stability basically that of the reference. (See Fig. 3).

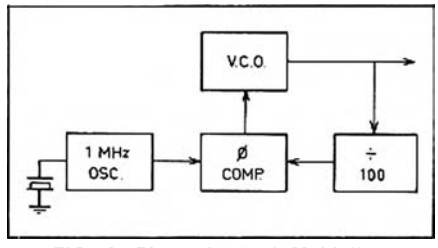

FIG. 3: Phase Locked Multiplier.

How strange, this look precisely like the block diagram of Fig. 1, and it can also be seen that is conforms to Equation 1.

$$fc = fr \times N$$
$$100 = 1 \times 100 \text{ (MHz)}$$

Now let us complicate things a little. If we replace the crystal reference oscillator with a 1-2 MHz VFO, what happens? If the VFO is set on 1 MHz the VCO frequency will be divided by 100 and the phase detector will lock the VCO to 100 MHz. If the VFO is shifted to 2 MHz the VCO will still be at 100 MHz, when this is divided by 100, fc/N to the phase detector will be low, and the phase detector will force the VCO to increase in frequency until the fc/N component is equal to the new reference frequency of 2 MHz. The VCO will now be at 200 MHz. Thus we now have a well controlled x 100 multiplier. Just one more form of PPL synthesizer.

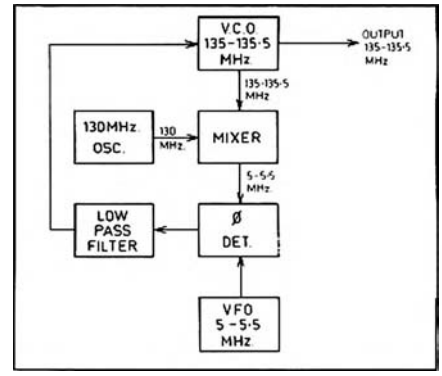

FIG. 4: Phase Locked VFO.

We don't really need to use a frequency divider in a phase locked loop, instead we can use a mixer chain. Say we wish to build a single conversion tunable receiver to cover 144.000 144.500 MHz, using a 9.000 MHz IF similar to the design presented by Harold Hepburn VK3AFQ.

To do this we must first work out the required injection frequencies. The injection will be between 144-9 and 144.5-9 MHz, or from 135-135.5 MHz. If we choose to use a 5-5.5 MHz VFO we have the opportunity of having a good high stability oscillator, none of whose harmonics fall into either the signal or IF frequency ranges. If we have a crystal oscillator with which to mix the output we can bring the VCO back to 5 MHz. (See Fig. 4.)

Now we have a VFO on 135-135.5 MHz which has the stability of the VFO and crystal heterodyne oscillator combined.

By using the basic phase locked multiplier we can generate a much more complex unit which is what is commonly called the phase locked synthesizer. In this form of system the divide by N counter is made variable. Consider a practical example.

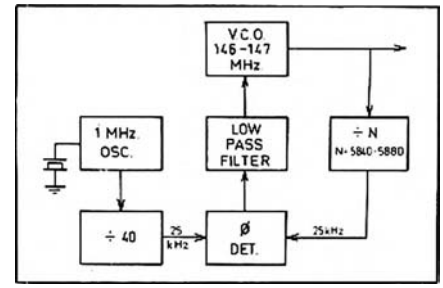

FIG. 5.

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We wish to generate a signal varying from 146-147 MHz in 25 kHz steps. If we have a VCO on 146 MHz and divide it by 5840 we have 25 kHz. If we compare this with a 25 kHz signal we have a phase locked source on 146 MHz. If we make the divide by N chain divide by numbers between 5840 and 5880 we have 40 channels between 146 and 147 MHz.

ACKNOWLEDGEMENTS

My thanks go to two people who have unwittingly contributed to this series. Mr. Ian Yandell VK3ZillY, with whom I have been privileged to work on synthesizer type systems, and to Harold Hepburn VK3AFQ, who has suggested several interesting applications of PLL circuitry to communication systems. ■

RTTY RECEPTION ON THE FT101

Peter Edwards VK3ZZU
2/100 Barrabool Rd., Highton, Vic. 3216

In his recent article (AR p. 10 July, 1976), Don VK3ADP described a modification of the filter switching of the FT101. I also decided to modify the switching, however I wanted to be able to use the CW filter in the SSB model. This seemingly idiotic feature is just what is needed for RTTY.

Fig. 1 shows the FT101B filter characteristic. In the CW mode reception is achieved with the USB oscillator. The signal is centred in the CW filter's 600 Hz passband, thereby producing a beat note of around 800 Hz.

If the LSB oscillator were used, together with the narrow filter, a beat of around 2200 Hz is produced. As the CW filter is wide enough to pass a standard 170 Hz narrow-shift FSK RTTY signal, the tuning can easily be adjusted to give the standard RTTY tones of 2125 and 2295 Hz. As it happens these tones are even the right way around for HF use! Perhaps Yaesu had this in mind — it seems too much of a coincidence to be an accident.

By using the LSB oscillator and the CW filter with the set in the SSB mode transmission of RTTY could be arranged by feeding 2125 and 2295 Hz tones into the speech amplifier. The necessary audio connections can all be made via the rear panel sockets.

The modification needed to achieve this happy state of affairs is extremely simple. With the help of the manual, locate pins 9 and 12 on the socket for the IF board (board number PB1183B). These lines are the narrow and wide filter enable lines respectively. Break the wires connecting to these pins and install a miniature DPDT switch connected as a reversing switch. I placed this on the bottom panel under the microphone socket to avoid altering the front panel. As these are DC switching lines any other convenient position may be used.

In use the switch enables the AM filter to be used in the CW mode (as in the VK3ADP modification) and the CW filter in the other modes. For RTTY only the narrow filter/LSB combination is of use. With a 2125/2295 RTTY TU and tone oscillator, transceiving should be quite simple, although I have not used this set to transmit HF RTTY (for obvious reasons).

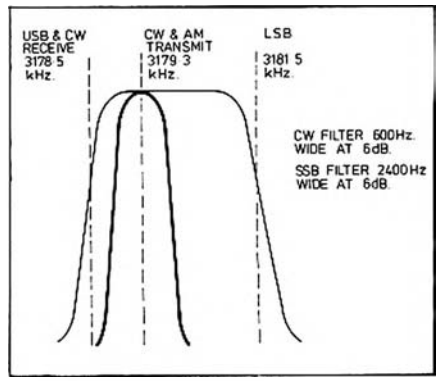


FIG. 1: FT101B Filter Characteristics.

The transceiver should presumably be loaded up as for AM or perhaps a little more heavily. Note that CW loading cannot be used — a 100 per cent duty cycle applied for the length of a RTTY over would liquify the finals!

(The FTdx401, FT570 and FT401 also use the same filter and oscillator frequencies and therefore the principle of the modification also applies.—Ed.) ■

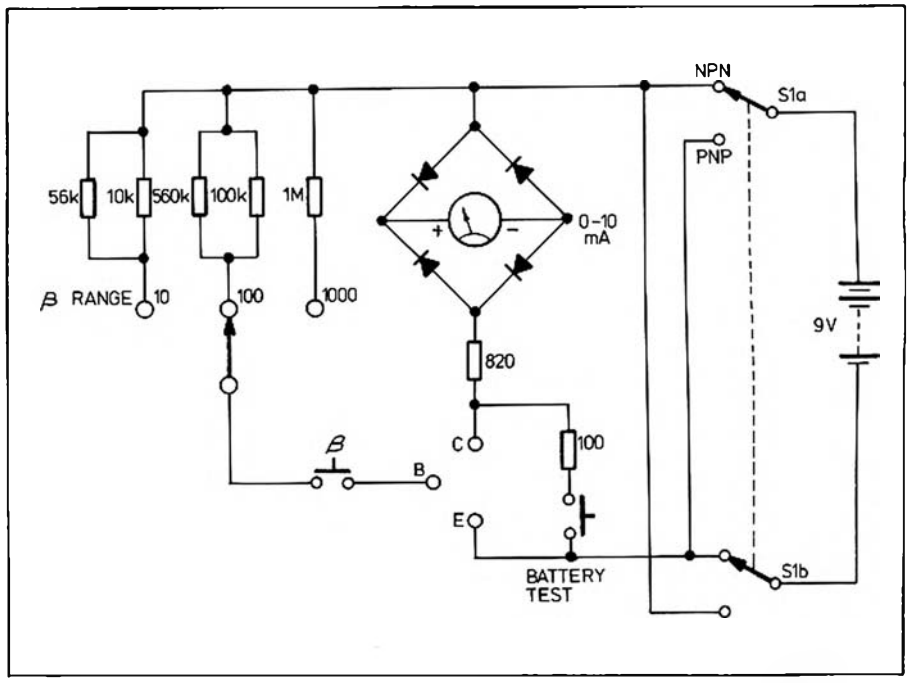
TRY THIS

With the Technical Editors

TRANSISTOR TESTER

Don't spend $30 on a transistor tester, build this simple unit from your junk box. The diodes may be any silicon or germanium diode of 15 volt or more PIV. ■

Ron Cook
VK3AFW.



CQ AERONAUTICAL MOBILE

Bob Cunningham VK3ML,
384 Glenferrie Road, Malvern.

My very first flight ever was made at night from the Essendon aerodrome around 1929. On this occasion the Victorian Division of the WIA was operating experimental aircraft radio in conjunction with the Aero Club and, in fact, had a workshop in the hangars at Essendon. A transmitter was built by members of this group and was made to fit in the front cockpit of the aircraft. It had been decided to advertise a forthcoming radio show in Melbourne by making the words RADIO SHOW with automobile headlamp globes fitted under the lower wing of the aircraft. A flight was to be at night and someone was to describe what Melbourne looked like from one, or perhaps two, thousand feet. Yours truly was the "lucky" one chosen for this task!

Now, consider a 60 h.p. Moth aircraft loaded with two men plus some six car batteries and a radio transmitter. That is one thing. Next consider the Essendon aerodrome in those days. It was a large paddock, encircled with a fence, and perhaps a few hundred yards in diameter. Landing lights did not exist and my pilot, Hughie Hughes, the Aero Club instructor, had chosen a dark starless night for this exciting adventure!

The rules of flying in those days required one to taxi to the extremity of the field so that the longest take-off path was used. Finding the fence was Hughie's first task, which he sucessfully did with the aid of a torch of about the same brilliance as used by ushers in theatres. With the 60 h.p. engine roaring like a snorting monster we proceeded to take off. Alas, the fence on the opposite side of the 'drome loomed up with the tail skid still on the ground. Hughie throttled back the engine and suggested I should disembark and he would try again without my weight. This he did and found with the aid of some grit and cunning a take off with my extra weight was possible. I am happy to say that the venture was successful. Once up the world was our own. I commenced transmission and told listeners through 3LO what Melbourne looked like at night from the air.

Coming back was another story. There were no illuminated freeways or well lit shopping centres in those days. Street lighting was by shaded 100 watt or maybe 200 watt globes and the Essendon airport was conspicuous by a black patch of land in a very lightly populated area. However, Hughie found the patch and set the nose down to land. The landing light consisted of a run-down torch which showed up mother earth just ahead of the landing wheels.

To me, that was a big deal! Sweet innocence I call it. Ask me to do the same trip today with 60 horses, two men and six batteries with a run-down torch for navigation? You MUST be joking! Still, it must have been one of the early aeronautical mobile operations in which the WIA played a great part.

Now I have a friend, Geoffrey Cox. He is the son of Harold Cox VK1GU, in Canberra, who pioneered the high frequencies over the Pacific many years ago. Geoff is a pilot at the Victorian Gliding Club at Benalla, some 150 km up the Hume Highway from Melbourne. I was invited to be his guest for a flight some weeks ago. After wearing down some bitter opposition from the XYL and promising to send messages back from Cloud 9 if I should ever reach the New world, I arrived at Benalla with Geoff. This location, by the way, had been an EFTS during the war years and later a migrant centre.

This Club has many members of both sexes and pilot training courses are in continuous operation. The glider to take me aloft had a wing span of some 17 metres and had become a popular two seater after its introduction into Australia from Rumania. Other gliders I saw included single seater competition aircraft having a wing span of some 15 metres. Our machine was a model IS-28.

For good flying conditions one needs atmospheric convections, experienced mainly in the summer. With favourable conditions gliders may stay aloft for hours, and cross country flights of 300 to 500 km are common, whilst beyond 500 km is quite possible. One must have uplifting currents, known as thermals, to achieve such performances. Unfortunately my flight was

Cockpit of glider.

Bob VK3ML

in the winter and because the sport is now so very popular, it was not until late in the afternoon when the thermals had died down that I was treated to a flip of only half an hour. There is not much room in the cockpit of a glider and you certainly do not have friendly hostess treatment! You are well belted in with the aid of a shoe horn, followed by the closing of a plastic canopy overhead. A tow line of some 150 feet is attached to a "tug" aircraft which tows you aloft to some 2-3000 feet, at which altitude the pilot of the glider opts to cast off the rope. It is a great sensation to be pulled gently to the cast off height and then to float alone. We must have flown some ten minutes at 3000 feet at about 50 knots before Geoff put the glider into a gentle dive at about 90 knots to demonstrate the aircraft's flexibility. Whilst all this was going on I extended the whip antenna of my 1 watt two metre transceiver and found I could trigger the repeaters at Wodonga and Bendigo with ease. I also had four simplex channel QSO's on 40 and 50. I thoroughly enjoyed sitting up there with just the whistling of the wind past the canopy and with no motor noise. Once again the world is your own at the base of the clouds and you are seeing countryside at 50 knots which you would not see whilst flashing past in a 500 knot modern airliner.

When the pilot feels he has no further air support he turns straight for home and glides in like a bird making a landing. When you finally come to a stop club members come out to man-handle the glider to other awaiting aspirants.

To me it was a great day and if I am asked if I want another flip in a glider I'll say "Just ask me". No motor is better than 60 horses. ■

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Basically identical except for power handling capabilities, the HC-75, HC-500, HC-500A and HC-2500 use the well tried and proven "transmatch" circuit. High quality components are used throughout, such as large variable capacitors with steatite supports, and high RF voltage rated rotary switches.
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Receiving advantages include improved cross modulation characteristics due to band pass effect of the coupler, improved signal to noise ratio due to correct front end matching.
These high quality HC series antenna couplers are available from Bail Electronic Services.

Technical Data

*1.9MHz only 200W PEP

	HC-75	HC-500	HC-500A	HC-2500
Bands	3.5, 3.8, 7, 14, 21, 27, 28		1.9, 3.5, 7, 14, 21, 27, 28	
Input Impedance	50 or 75Ω			
Output Impedance	10 ~ 600Ω			
Max. Power	75W PEP	500W PEP	500W PEP*	1.5KW CW 2.5KW PEP
Dimensions	160W 70H mm 200D	240W x 100H x 160D mm		340W 150H mm 255D
Weight	1.5 kg	3 kg		8.5 kg

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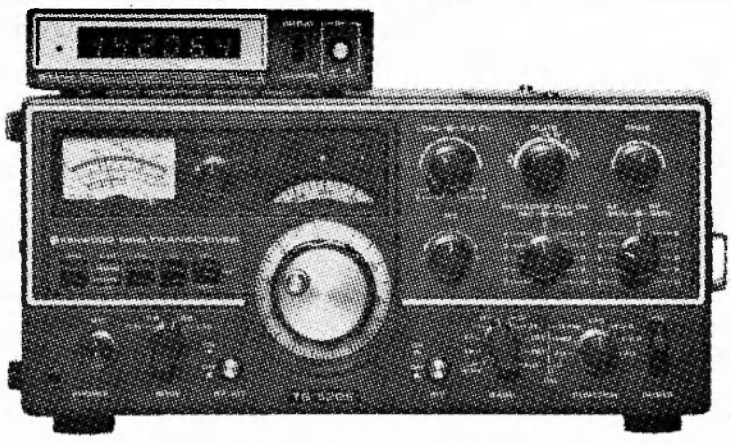

Full coverage 1.8 to 29.7 MHz ☐ Outstanding Receiver Sensitivity and Minimum Cross Modulation ☐ Vernier Tuning for Plate Control ☐ Highly effective Noise Blanker ☐ New Improved Speech Processor ☐ RF Attenuator ☐ Easy connection to Phone Patch ☐ Fully compatible for optional 6-Digit Read-out. — PRICE: TS 520S — **$700**

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KENWOOD TR 7400A FM VHF TRANSCEIVER
Full 4 MHz coverage, 25 watts high, 5 to 15 watts low, offset for Repeater. Fully synthesised, 6-Digit Read-out. PRICE **$440.**

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A SIMPLE, HIGH CURRENT REGULATED POWER SUPPLY

Bruce H. Riley, VK3ZSR
9/33 Evans St., Wangaratta, Vic. 3677

Over the years there have been a great many designs for DC supplies with good regulation. Most of these have, however, been fairly complex and use discrete components. With the advent of integrated circuit regulators the design of such supplies has been simplified, but many designers have included a great deal of sophistication into their designs, and hence increased the complexity. An example of such a supply was the design in AR of April 1975.

Whilst such supplies, with all their sophistication, have a lot going for them, many people require something a little simpler. The circuit to be described should suit the needs of these people. As may be seen from the measured performance at the end of this article, there is no compromise which also act as emitter followers. Resistors R5 and R6 are small value resistances which balance the current drawn by the two until each is carrying about 50% of the total current. Note that these two resistors must be capable of handling the full current output of the power supply. A short length of resistance wire is the best method of making these. Alternatively, 5 feet of 24 swg copper wire wound into a coil, air spaced, will work equally as well, but will take up more space. Note that these resistors will dissipate some heat and this should be allowed for.

Fully variable current limiting is provided by RV 2. As the current drain from the supply increases, the base current of the output pair will be increased by the regulator, and the voltage drop across the potentiometer will increase. The voltage across this resistor is applied to a transistor within the chip. When this exceeds 0.6V the transistor becomes biased on and shunts any further current from the output.

Note that RV 2 may be placed in any position where the current which flows through it is proportional to the total current drawn from the supply. The three choices are (i) in series with the output of the supply itself, (ii) as shown on the diagram and (iii) in series with the chip (pin 10) and the base of Q1.

Choice (i) is less satisfactory because the resistor must carry the full output current, i.e. 5 amps. This means that the resistor may be required to dissipate some 3 watts of power, and potentiometers of this rating are not cheap. Positions (ii)

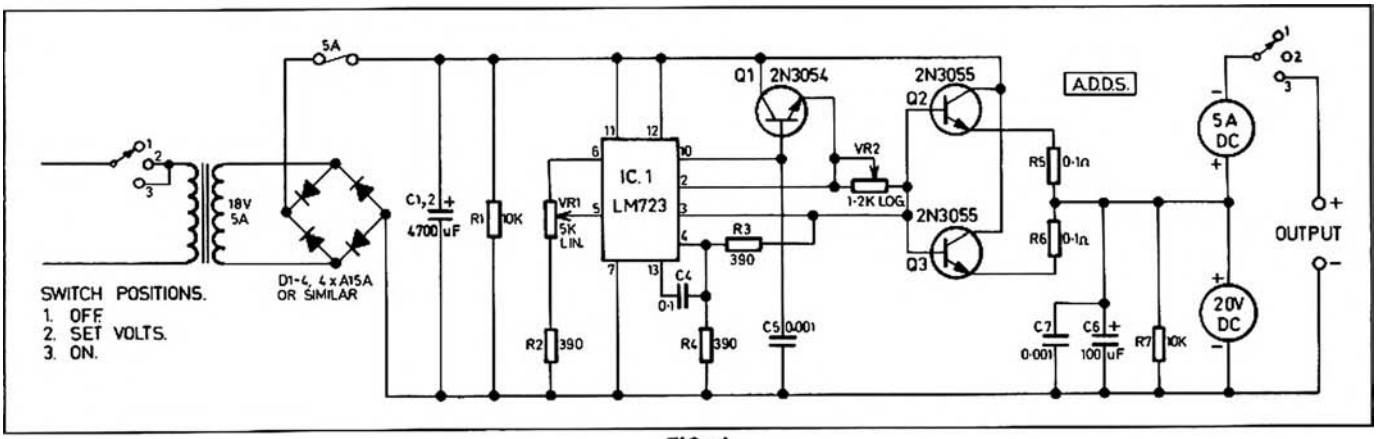

FIG. 1.

promise in this regard. The circuit is based on one in the National Semiconductor literature,[1] and, in the form described will deliver better than 5 amps at up to 15 volts, with current limited from 0 to 5 amps, fully variable.

The circuit is based on the LM 723 integrated circuit, which is a DC regulator IC. Note that in the discussion that follows, the pin numbers that are used are for the DIL package. If the metal can type is used, all the pin numbers are different.

The chip supplies a reference voltage, temperature stabilised, of typically 7.15V at pin 6. A voltage divider, RV 1 and R 2, taps off a variable voltage between 0.7 and 7.15V and applies this to pin 5. Output feedback is combined with this voltage in an error amplifier to give an output voltage on pin 10 of about 2.2 times the voltage reference, i.e. between 1.5 and 15 volts. The chip is capable of delivering currents of up to 150 mA from pin 10.

Output from this point is fed to the base of a 2N3054 transistor, Q1, in an emitter follower configuration. The output of this transistor, which can be a current of up to half an amp, is fed to the bases of a pair of transistors in parallel, Q2 and Q3,

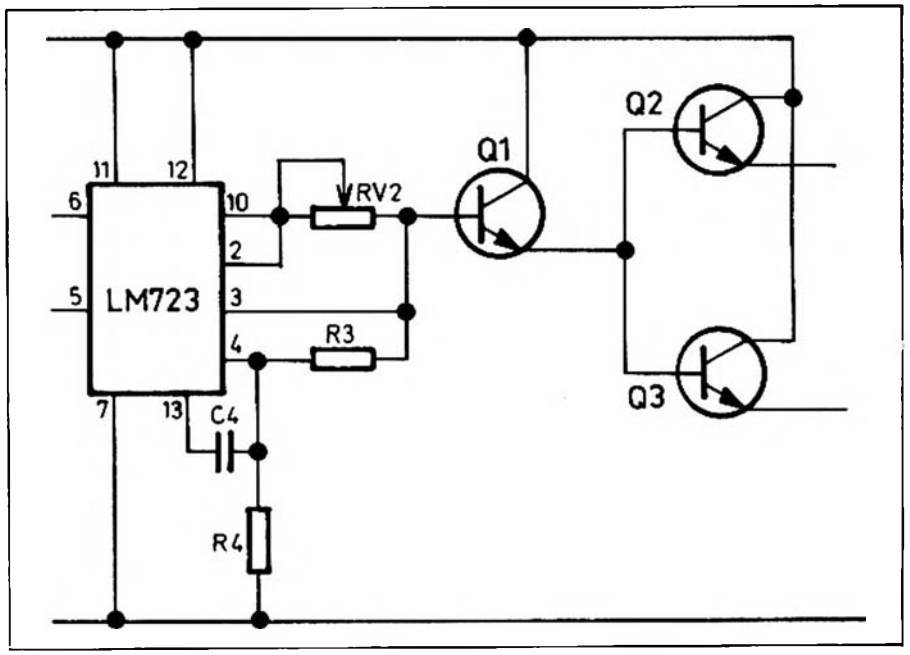

FIG. 2. MODIFICATIONS TO CURRENT LIMITING

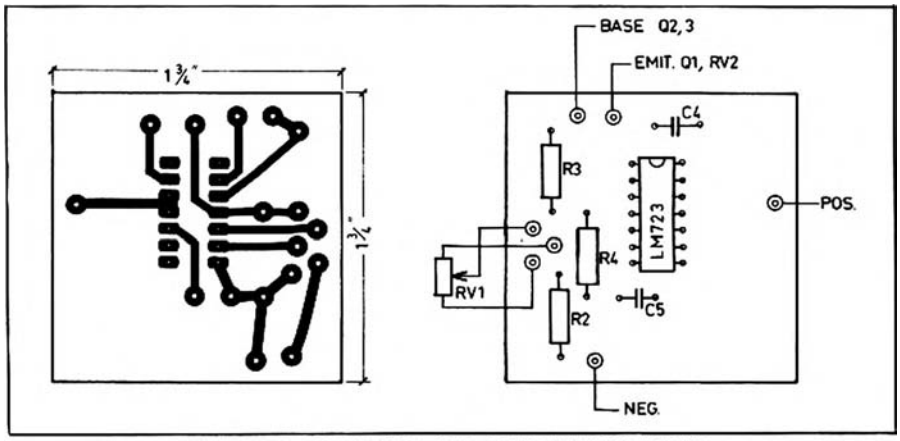

FIG. 3. CIRCUIT BOARD AND COMPONENT LAYOUT

and (iii) are both acceptable, but the position used was found to be the best in practice. Should you wish to use position (iii) the modifications are shown in figure (ii). This has some advantage in that the power dissipation in the potentiometer is lower than in the other position. Both positions, however, have a sufficiently low current to enable a normal carbon potentiometer to be used. A logarithmic taper potentiometer is used to give a better spread of current range on the calibration, but the calibration is reversed, i.e. the highest current is with the potentiometer anticlockwise. A reverse log potentiometer, if available, would put this around the other way.

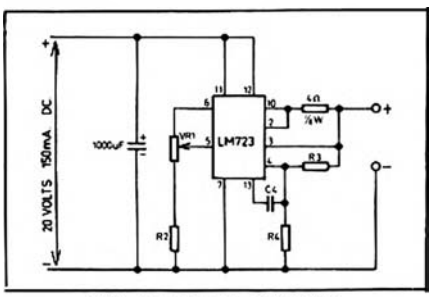

FIG. 4. 150 mA SUPPLY

CONSTRUCTION

The IC and the smaller components can be mounted on the printed circuit board as shown, or mounted on veroboard. The remaining components are best mounted on tag strips or tied to the appropriate points.

The output transistors, and preferably the driver as well, should be mounted on large, efficient heat sinks, and insulated from the chassis. The metering shown is, obviously, optional. SW 2 as shown is a three position switch. The three positions given are 1. OFF, 2. SET VOLTS, in which all circuitry is on and the voltage may be adjusted to the desired value, but the output terminals are still disconnected, and 3. ON, in which output is now connected to the terminals.

The current limiting may be calibrated on the front panel with reasonable accuracy. A version under development at present will have an additional switch position whereby the current limit may be set on the ammeter, and the ammeter will have several switched ranges. This will not add much to the overall complexity, and the modification may be published if sufficient interest warrants it.

The circuit board as shown is very versatile. As it is, with the addition of a couple of resistors, it can be used as a 150 mA supply by making the appropriate connections (see fig 4). Similarly, by the addition of a transformer with a higher rating and additional output transistors in parallel the maximum current could be increased to many times the original 5 amps.

If voltages above 15V are required, the whole circuit could be built above ground and a set of zener diodes switched in to raise the voltage; e.g. a 10V zener would give a range of 11.5V to 25V, etc. Note that the voltage across the IC must not be allowed to exceed 35V.

A higher current version could perhaps be built to power an Atlas HF transceiver for less cost than the commercial power supply.

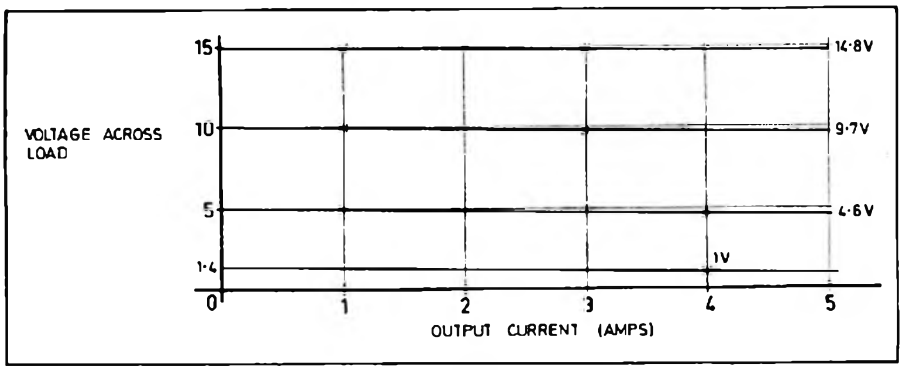

FIG. 5. VOLTAGE REGULATION

MEASURED PERFORMANCE

A study of the performance curves shown will indicate that the power supply puts up quite a creditable performance. The data was measured on the prototype, and verified by measurements on a second unit built to the same design by David, VK3ANP. At the full 5 amps, ripple was measured as 0.5V at a supply voltage of 15V, i.e. 3.3% ripple. Note that this was measured with the output virtually short circuited, no current limiting. At 4 amps, 15V, the ripple was 0.0025V, or 0.016%. At 3 amps the ripple was undetectable on a BWD 509 B oscilloscope. Analysis of the regulation curves shows that the regulation is about 3% or better, particularly at the higher voltage ranges.

A 30W two metre FM transmitter running on the power supply showed no hum present on the signal received at a range of 1 mile, on a listening test.

On three units constructed to date no problems have occurred, so the supply seems to be easy to get going.

REFERENCES

1. National Linear Integrated Circuits — National Semiconductor.
2. Linear Applications — National Semiconductor. ■

TRY THIS

WITH THE
TECHNICAL EDITORS

MODIFICATION TO THE TE-15 TRANSISTOR DIP OSCILLATOR

R. G. Farnsworth VK3BHJ

Here is a simple mod which allows true wavemeter operation with the TECH TE-15 transistor dip oscillator.

This relatively cheap device operates quite well as a "dip" meter for finding the resonant frequency of tuned circuits, but its performance as a wavemeter leaves a little to be desired.

By switching the 1K emitter resistor of the oscillator transistor in or out of circuit, normal or wavemeter operation is achieved (respectively). A miniature toggle switch was used and can be inserted in either side of the 1K, although the earthy side is suggested.

The beauty of this mod. is that the meter only deflects when there is RF present, e.g. no more varying oscillator level or false dips when you're looking for RF. The sensitivity control still works as such but tuning is broader with low sensitivity. ■

TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE or ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.
A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output.

MODEL MMT432/144 — Price $260

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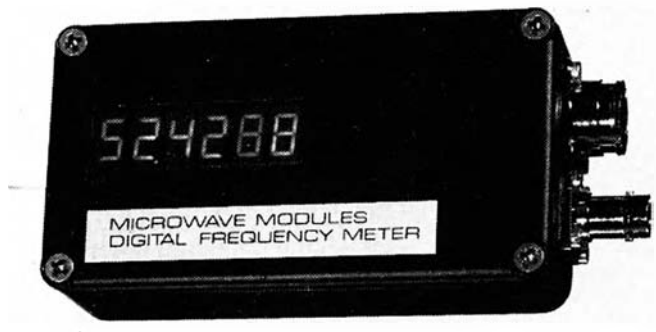
Second Crystal Oscillator gives two ranges: Low, 432-434 MHz — High, 434-436 MHz. Programming available to either Transmit/Receive both Low, both High, or a mixture of the two. Adjustable Drive Level is now provided by an input potentiometer. Optional RF VOX.
Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern Microstrip Techniques ★ Power requirements 12 volt nominal at 150 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432/28S — INTRODUCTORY PRICE: $235.



MMT432 TRANSVERTER

500 MHz COUNTER

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

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LINEAR AMPLIFIERS

FOR 70 CM — 90-100 WATT

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Input Frequency: 52-54 MHz
I.F. Output Frequency: 28-30 MHz
Typical Gain: 30 dB
Noise Figure: 2.5dB
Typical image rejection: 65dB
Crystal Oscillator Frequency: 24 MHz
Power requirements: 12 volt ± 25% at 35 mA.

MODEL MMC52/28LO — Price $49.00

2 METRE VERSION — WITH 116 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

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Microstripline, Schottky diode mixer. IF: 28-30 MHz or 144-146 MHz. Noise figure: typ. 8.5 dB. Overall gain 25 dB. **Price: $65**

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2 silicon pre-amplifier stages. MOSFET mixer. All UHF circuits in microstrip technology. Noise figure: typ. 3.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. **Price: $51.**

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Noise figure: typ. 2.8 dB. Overall gain: typ. 30 dB. IF: 28-30 MHz, 9-15 V 20 mA.
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VARACTOR TRIPLER 432/1296 MHz
Max. input at 432 MHz: 24 W (FM, CW) - 12 W (AM). Max. output at 1296 MHz: 14 W.
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Pack and Post $1

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Even the compact and sports car enthusiast can enjoy all band, SSB mobile operation, with the FT-75B "Mini-Mobile" transceiver. Features include a 120 Watt transmitter with provision for three, variable crystal controlled frequencies on each band; as well as provision for external VFO operation.

The FT-75B is all solid state except for the final and driver stages and includes a built-in noise blanker and squelch circuit.

The FT-75BS has one final tube removed and PS transformer tapped to reduce power to approx. 30W PEP output. When full call is obtained the set can be re-modified back to original condition.

TECHNICAL DATA — **FT-75B**

GENERAL

Frequency Range: 80 M 75 KHz segment, 40 M 100 KHz segment, 20 M 150 KHz segment, 15 M 240 KHz segment and 10 M 400 KHz segment.

Mode: Upper Sideband for 20, 15 and 10 meter bands. Lower Sideband for 80 and 40 meter bands. CW for all bands.

Frequency Control: Crystal control VXO with 3 channels per band.

VXO Coverage: ±3 KHz for 80 M, ±3 KHz for 40 M, ± KHz for 20 M, ±5 KHz for 15 M and ±6 KHz for 10 M.

Antenna Impedance: 50 Ohm unbalanced.

Size: 210(W) x 80(H) x 300(D) m/m.

Weight: 3.8 Kg.

RECEIVER

Sensitivity: 0.5 μV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW.

Selectivity: 2.3 KHz nominal bandwidth at 6 dB down, 4.5 KHz at 60 dB down on SSB and CW.

Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μV equivalent to antenna input.

Automatic Gain Control: AGC threshold nominal 1 μV. Attack time 5 millisecond and release time 1.5 seconds.

Audio Output: 2 Watts at 4 Ohm Impedance.

TRANSMITTER

Input Power: 120 Watts PEP on SSB and 100 Watts on CW at 50% duty cycle. (Slightly lower on 10 meter.)

Microphone: 50 K Ohm dynamic type.

Carrier Suppression: —40 dB.

Sideband Suppression: —40dB.

Spurious Radiation: —40 dB.

Distortion: —30 dB.

Final Tube: 12GB7 x 2.

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Filter Type	XF-9A	XF-9B	XF-9C	XF-9D	XF-9E	XF-9M	XF-9NB
Application	SSB Transmit.	SSB Receive	AM	AM	FM	CW RTTY	CW RTTY
Number of Filter Crystals	5	8	8	8	8	4	8
Bandwidth (6dB down)	2.5 kHz	2.4 kHz	3.75 kHz	5.0 kHz	12.0 kHz	0.5 kHz	0.5 kHz
Passband Ripple	≤ 1 dB	< 2 dB	< 2 dB	≤ 2 dB	≤ 2 dB	< 1 dB	≤ 0.5 dB
Insertion Loss	≤ 3 dB	≤ 3.5 dB	≤ 3.5 dB	≤ 3.5 dB	≤ 3.0dB	≤ 5 dB	≤ 6.5 dB
Input-Output Z_t	500 Ω	500 Ω	500 Ω	500 Ω	1200 Ω	500 Ω	500 Ω
Termination C_t	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF
Shape Factor	(6:50 dB) 1.7	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:40 dB) 2.5 (6:60 dB) 4.4	(6:60 dB) 2.2 (6:80 dB) 4.0
Ultimate Attenuation	≥ 45 dB	≥ 100 dB	≥ 100 dB	≥ 100 dB	90 dB	90 dB	≥ 90 dB
Price	$31.95	$45.45	$48.95	$48.95	$48.95	$34.25	$63.95

In order to simplify matching, the input and output of the filters comprise tuned differential transformers with the "common" connections internally connected to the metal case.

Registration Fee: $2.00; Air Mail: 31c per ½ oz. Shipping weights: Filters 2 oz. ea., Crystals ½ oz. ea. All Prices in U.S. Dollars.

Matching Oscillator Crystals

XF900 Carrier	9000.0 kHz	$4
XF901 USB	8998.5 kHz	$4
XF902 LSB	9001.5 kHz	$4
XF903 BFO	8999.0 kHz	$4
F-06 Crystal Socket (HC 25/u)		.50

Oscillator Crystals 50 kHz through 150 MHz available to order. Parallel resonant (30 pF) to 20 MHz, series resonant above 20 MHz. Write for quotation to your requirements (include mechanical size & frequency).

Matching FM Crystal Discriminators for XF-9E

	Freq. Dev.	Slope	Price
XD-9-01	± 5 kHz	40 mV/kHz	$24.10
XD-9-02	± 10 kHz	24 mV/kHz	$24.10
XD-9-03	± 12 kHz	50 mV/kHz	$24.10

SPECTRUM INTERNATIONAL INC. Box 1084A, Concord, Mass. 01742 USA

FILAMENT SWITCHING FROM A DISTANCE

P. Renton VK4PV,
20 Harold Street, Townsville 4810

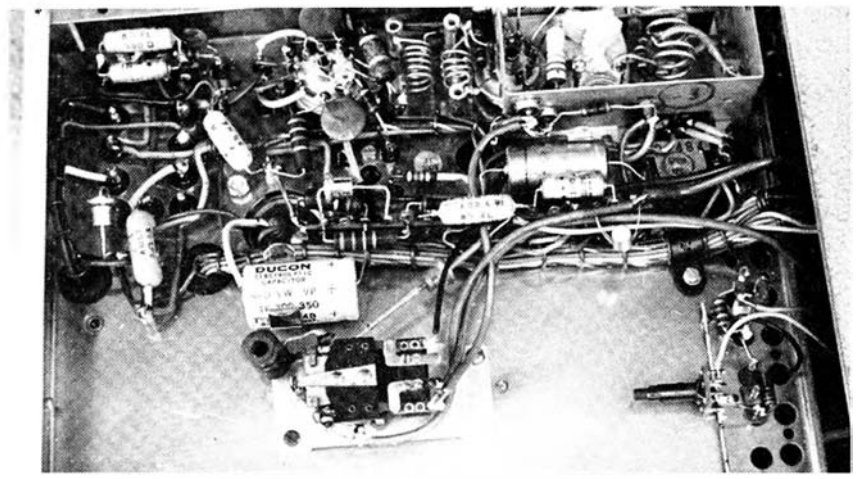
How to fit filament switching to a hybrid mobile rig without disfiguring the front panel.

Several months ago, I permanently installed a 2 metre Pye Overland mobile rig in my car, with the battery supply taken from the cigarette lighter circuit. As most people seem to do, I once left the rig running all night and found in the morning that I had a very flat battery, which was most embarrassing.

In order to prevent this from recurring, I then re-arranged the supply to come from the vehicle "accessory" fuse. This ensured that the rig would run only when the ignition was switched on, or if the ignition key was turned to "accessory".

The Overland is completely transistorised except for the driver and final valves in the transmitter. The next logical step seemed to be to fit a panel mounted filament switch to further reduce current drain when not transmitting. This scheme was rejected, however, as I felt that there were already enough additional controls on the front of the unit. I then decided to design a relay operated system, and have been very pleased with the results.

In operation, the rig is now normally left switched on at the front panel, with the receiver operative all the time the car is being used. When it is necessary to transmit, the PTT button on the microphone is pressed momentarily and then released for approximately 20 seconds to allow the filaments time to heat up. When the button is pushed, the panel lamp lights, indicating that the transmit mode has been selected, and the unit is operated normally from this time on.



Inside 2 metre Pye Overland showing installation of filament switch.

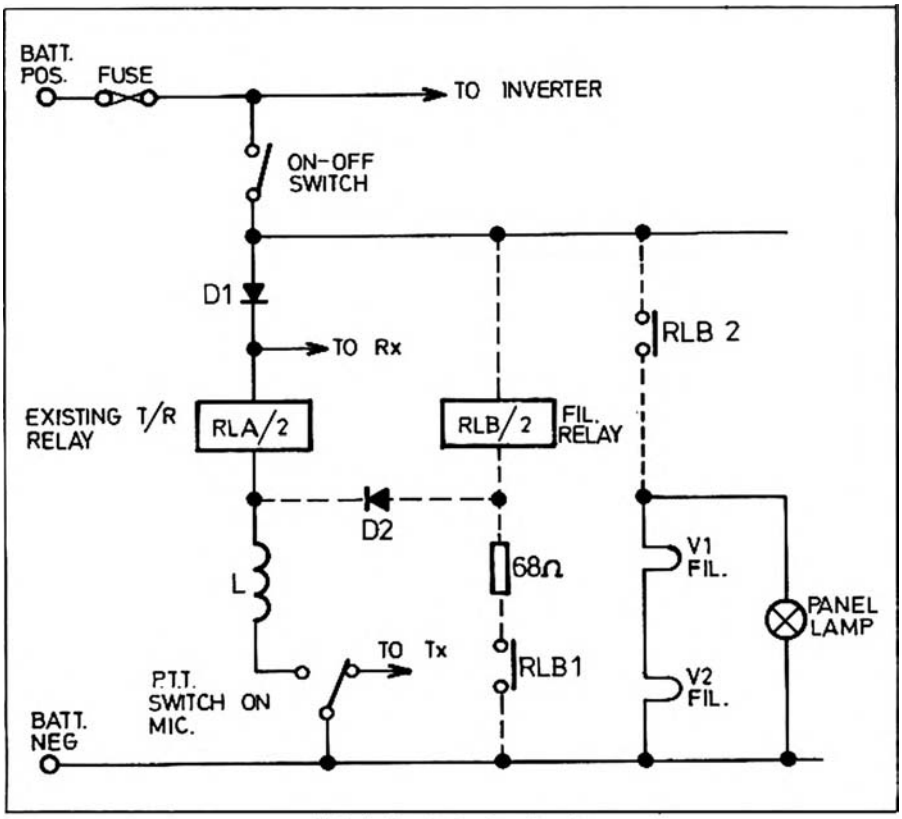


FIG. 1. Control relay circuit.

If it is desired once again to reduce the current drain, the set is switched off momentarily at the front panel and then on again. The transmitter filaments and panel lamp will now remain out of circuit until the PTT button is once again pressed momentarily.

The circuit is very simple, and I have shown the additional wiring as dotted lines (Fig. 1). As soon as the PTT switch is pressed, both relays RLA and RLB are energised. RLB then remains energised via its own hold-in contact RLB1 until such time as the battery supply is interrupted for any reason. From here on the valve filaments and the pilot lamp also remain energised via contacts RLB2. As soon as the PTT switch is released, RLA is de-energised, as diode D2 prevents RLA coil current from flowing through contact RLB1.

Relay RLB has almost full battery voltage applied to its coil while the PTT switch is closed, thus giving it a good pull-in force. To reduce long-term battery drain as far as possible, I included a 68 ohm limiting resistor in series with the hold-in contact. The value of this resistor should be determined experimentally to give secure holding-in of the relay at the lowest practical coil current.

In fitting the filament relay RLB, I chose to mount it on a small aluminium bracket which was then fastened beneath the chassis using two small self-tapping screws. This resulted in minimum disfigurement of the chassis with this particular type of relay.

As an indication of the benefits to be gained when using filament switching (whether by panel mounted switch or by relay), the standby current of my rig dropped from 800 mA to 38 mA after this modification. This makes it well worth the effort, particularly if operation for long periods in a WICEN net is a possibility. ■

DARWIN AMATEUR RADIO CLUB — POST TRACY PROGRESS

Trevor Lloyd, VK8ZTW
Publicity Officer, DARC

The Darwin Amateur Radio Club wish to express their sincere thanks to those amateurs who assisted by the generous donation of $1038.39, which was made available to restore an operating station at the club.

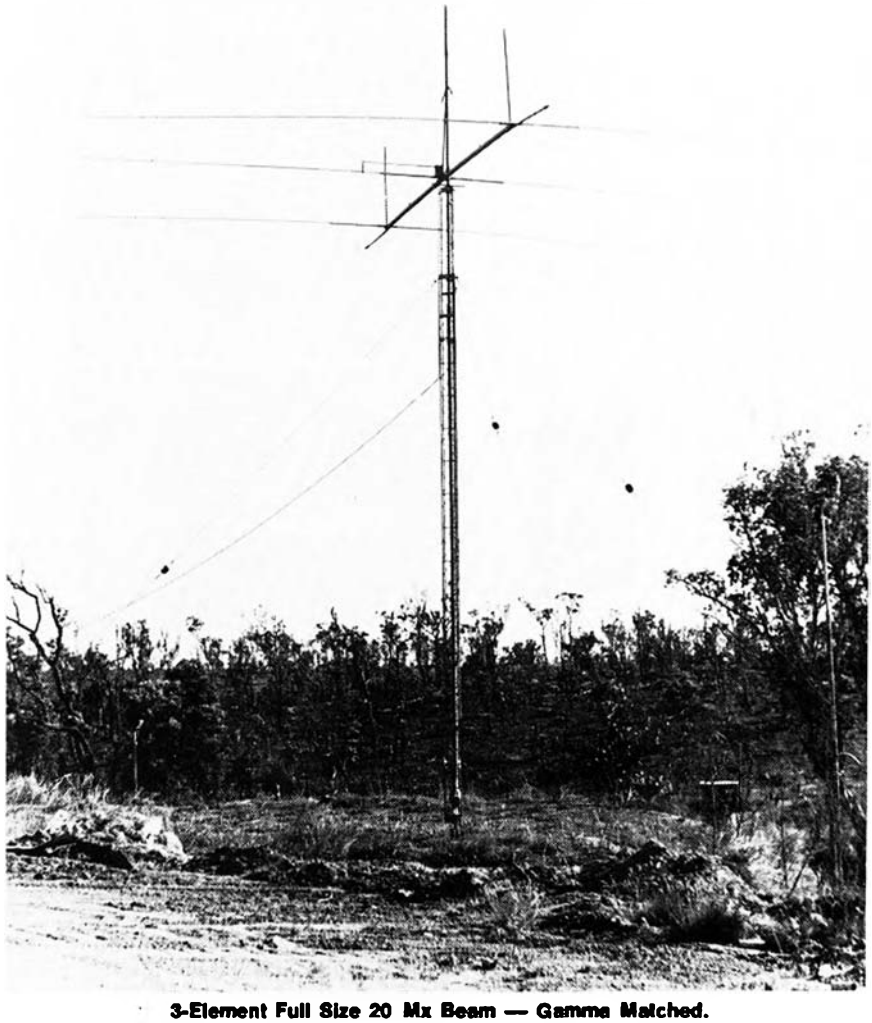
The equipment purchased from the fund were two IC-22As, FT101E and a HAM 2 rotator. This equipment has been labelled, "This equipment was purchased from funds donated by amateurs after Cyclone Tracy, December 1974."

Regular use is being made of the equipment and the rigs have been made available to members for outside club usage to maintain operational stations and extra 2 metre stations for fox hunts.

Owing to the brief nature of this entry in AR, it is anticipated that a detailed account of events regarding the restoration of the DARC since the cyclone will be forth-coming in a future issue. On the 7th of November, the Darwin Amateur Radio Club will have celebrated 11 years of successful achievement at their 132nd General Meeting. To commemorate this occasion, the members will be enjoying an anniversary dinner.

Furthering the interests of Amateur Radio in Darwin, the DARC will be presenting a display at the Northern Territory Communications Convention to be held at the Darwin Community College on the 3rd and 4th of December. The Minister for Posts and Telegraphs, Mr. E. Robinson, will be officiating at the opening. Also attending will be Mr. D. Williamson and Mr. D. Caudle from the Regulatory and Licensing Section; Mr. C. Hurst VK5HI) VK5 Divisional President and Mr. D. Wardlaw, WIA Federal President and Mr. M. Hurst-Meyers, National Director National Citizens Radio Association.

Operating Centre at VK8DA



3-Element Full Size 20 Mx Beam — Gamma Matched.

Participants at the display will be Darwin Community College, branches of the armed forces, Telecom, Department of Transport, Overseas Telecommunications Commission and other Government Departments, Commercial and non-commercial interests.

The theme for the convention is the role communications play in the development of the Northern Territory, the training schemes available to the public in commercial and non commercial fields and the benefits to the public of Amateur Radio through greater awareness will also be featured prominently.

The convention promises to be a tremendous success due to the co-operation of the Government, Military and Commercial interests.

The DARC hereby extend a warm welcome to all amateurs to attend this commemorative convention. ■

TRY THIS

WITH THE TECHNICAL EDITORS

1296 MHz SSB

1296 SSB may not be as difficult as it sounds. Instead of varacting FM up to 23cm why not use the varactor to both multiply up from 576 MHz and mix up the output of your FT221 or TS700 on 144 MHz.

In Electron, March 1977, the following circuit was described by H. R. van Leeuwen PA0DBQ. He obtained an output

NEW Robot Model 400

All solid state digital random access memory SSTV SCAN CONVERTER

- ALL SOLID STATE RANDOM ACCESS MEMORY
- SLOW-TO-FAST AND FAST-TO SLOW CONVERSION CAPABILITY
- SSTV PICTURE DISPLAY ON ANY STANDARD CCTV MONITOR
- FRAME FREEZE FROM ANY STANDARD CCTV CAMERA, BROADCAST VIDEO OR VIDEO TAPE SOURCE
- PERMANENT PICTURE STORAGE
- AUTOMATIC OR MANUAL TV FRAME SNATCH
- INTERNAL GRAY SCALE GENERATOR ADJUSTMENT STANDARD
- CAPABLE OF REAL TIME DISPLAY OF DIGITALLY PROCESSED FAST SCAN VIDEO

NEW: Medium-Sized Ham Antenna Rotator — FU 400.

Constructed for long trouble-free operation. 200 kg vertical weight capacity. Extra heavy duty disc brake that prevents wind-milling.

NEW Model DX-555 Counter-Generator

Generator:

440 kHz to 30 MHz in 3 ranges.
Output displayed on counter and available at jack on rear panel 600 Hz modulation for AM receivers.

Counter:

5 digit display, 7 digit readout capability, 10 Hz to over 30 MHz (250 MHz with prescaler). Input level 20m Vrms to 5 Vrms (Prescaler 200m Vrms to 2 Vrms). Base oscillator beats directly against WWV.

NEW Counter-Generator
Two vital pieces of test equipment in one.

DENTRON MLA-2500

DenTron Radio has packed all the features a linear amplifier should have into their new MLA-2500. Any Ham who works it can tell you the MLA-2500 really was built to make amateur radio more fun.

NEW NATIONAL — RJX1011 — Unique SSB/CW 160-10 metres transceiver with dual digital readout and matching speaker and external VFO.
TRIO KENWOOD: TS520S — SSB/CW, 160-10 metres with optional digital read-out.
TRIO KENWOOD: TS820S, 160-10 metres digital read-out.
TRIO KENWOOD: TS820, 160-10 metres.
TRIO KENWOOD: TS700A — 144-148 MHz all mode transceiver.
TRIO KENWOOD: TS600A — 50-54 MHz all mode transceiver.
TRIO KENWOOD: TR-7400A — 144-148 MHz FM transceiver.
YAESU MUSEN: FT101E — 160-10 metres AM, SSB, CW transceiver.
YAESU MUSEN: FT301 series, 160-10m AM, SSB, CW transceivers.

RECEIVERS:

TRIO KENWOOD: R300 general coverage BCL receiver.
YAESU MUSEN: FRG-7 general coverage Rx, Wadley loop system.

INTRODUCING LINEAR AMPLIFIERS:

DENTRON RADIO CO.: MLA-2500, 160-10m linear amplifier.
DENTRON RADIO CO.: MLA-1200 — 80-10m linear amplifier.
DENTRON RADIO: 160-10L Superamp, 160-10m linear amplifier.
SCS: HF3-100 L2, 3-30 MHz bi-linear amplifier.
SCS: 2M10-80 L, 144-148 MHz, FM/SSB linear amplifier.
YAESU MUSEN: FL-2100B, 80-10 metres linear amplifier.

ANTENNAS:

HUSTLER — 4-BTV — vertical trap antenna.
HUSTLER — Mobile vertical trap antenna (80-10m).

ANTENNA TUNERS:

DENTRON MT-3000A **DENTRON** 160-10AT **DENTRON** 80-10AT

RF Preamplifiers for 3-30 MHz Band:

Model SX-59 for use with transceivers.

SPECIFICATIONS:

Frequency range 3-30 MHz in 3 bands; 3-7, 7-14, 14-30 MHz
Gain 20 dB nom. (at 7 MHz), front panel variable control
Attenuator —20 dB attenuation selectable from front panel control.
Impedance 50 or 75 ohm systems, UHF connectors on rear panel.
Power handling capability 100W thru relay contacts — Power supply built-in VAC fused supply — Semiconductors 3 FET — Size 67 (H) x 150 (W) x 146 (D) mm (2.64 x 5.91 x 5.75 in.) — Weight 1 kg (2.2 lb.)
Switching requirements: requires external relay contact switching when used with transceivers. Remote contacts readily available from most amateur HF transceivers, including TS-510, TS-511, TS-520, TS-820, FT-101, FT-401, FT-200 & FT-201.

of 500mW PEP on 1296 MHz for inputs of 6 watts on 144 MHz and 3 watts on 576 MHz.

A varactor multiplier to 576 MHz was described in AR in April 1971. Suitably throttled back it would make a fine driver for the circuit shown. ■

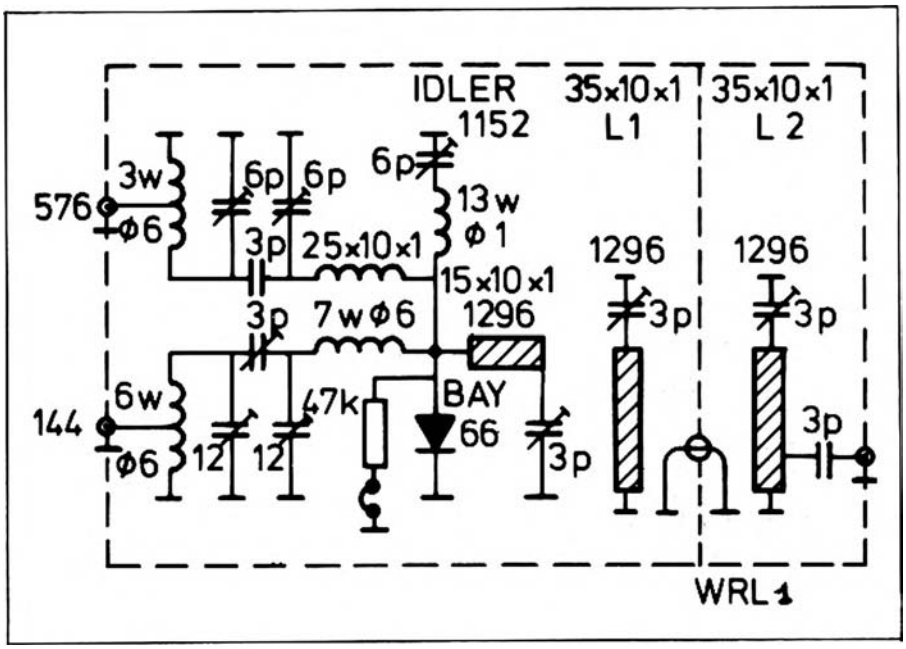


FIG. 1. Coils L1 and L2 are placed 8 mil. above the Chassis.

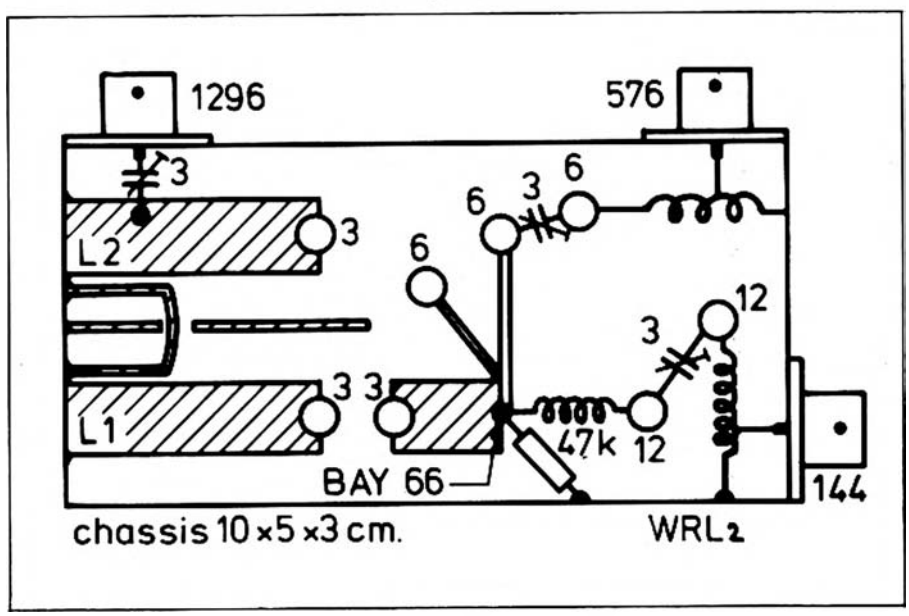


FIG. 2.

THE GENTLE (?) ART OF CRYSTAL GRINDING

Presented with a crystal, frequency 6840 kHz, style FT-243 and stern warnings about grinding gently, I set to work cautiously on a mirror removed from the bathroom, this being the only handy bit of plate glass. The recommended practice for raising the frequency of crystals is to remove the crystal from its holder (of course!) and grind the top side of the quartz plate on grade 200 wet and dry. Both sides of my crystal looked the same (it was an old reference book) so I ground both sides.

Heeding warnings, I began cautiously, using Brasso — grind, rinse in water, dry, replace in holder and check frequency. No change! I progressed to using smokers' tooth powder — still no change. Then tried Ajax, which had an astonishing effect on the mirror, but none on the crystal frequency. Rubbing on a piece of wet and dry (on the mirror) had some effect and the frequency went up about 60 kHz after about 15 minutes grinding.

Several days later (took time out for CW practice) back to the grindstone, and eventually the frequency reached 7 MHz. At one stage the frequency decreased between grinds, and I presumed that some moisture must have remained on the crystal. A final rinse with methylated spirits is recommended; I used dry cleaning fluid and this was an error as the crystal stopped oscillating. A good polish with Brasso, rinse, etc., restored activity, the final frequency being about 7006 kHz.

In conclusion, I cannot recommend the use of Ajax on mirrors as it spoils the glass; and neither would I undertake to move a crystal frequency more than a couple of hundred kHz. Now I would like to try lowering a crystal frequency by copper plating. More of that anon.

Sue VK8SU, from "Ground Wave", May/June 1977. ■

INTERFERENCE IN COLOUR TELEVISION SETS

Some television sets are very susceptible to interference from the lower HF bands especially 3.5 MHz. This interference is very hard to eliminate and seems to come from interaction between the direct transmission — not harmonics — and the frequencies associated with the colour subcarrier (4.4 MHz) frequency.

The television antenna picks up the 3.5 MHz signal and this gets directly into the set.

The solution is to prevent a path being available for the 3.5 MHz transmission and this can be done by using what is in effect a transmission line transformer as a choke. Obtain a toroid, the larger the better, and either wind the TV ribbon through it, making as many turns as possible, or alternatively do the same thing with the three core power flex. In the latter case a very effective toroid to use is the ferrite yoke which is used on some colour picture tubes. Also large toroids can sometimes be obtained from disposals and these are large enough to take a number of turns of normal three core cable.

In either case, the result is that there is no path from the TV antenna through the set to earth through the flex for the RF, and a potential cannot be built up across the internal parts of the set which will interfere with the colour frequencies.

This solution has also proved useful in the case of interference from strong local broadcast stations. ■

OUTLET PLUG FOR LOW VOLTAGE POWER SUPPLIES

With the increasing availability of transistorised gear, many hams are home-brewing low voltage power supplies for energising their mobile gear in the shack for test and/or base station operation.

If the power supply is fitted with a car type cigarette lighter receptacle the mobile gear can be energised via the lighter receptacle in the car or from the bench supply with a minimum of fuss.

Bruce L. McCubbin VK3SO. ■

WANTED KNOWN

If you have he'd an amateur licence for 25 years or more you are eligible for membership of the Radio Amateurs Old Timers Club now active in all States. If you would like to become a member contact Harry Cliff VK3HC, Max Hull VK3ZS, Stan Dixon VK3TE, Snow Campbell VK3MR, the founder, Bob Cunningham VK3ML, or any existing member of the Club for details of certificate, etc.

Sideband Electronics Sales

$1,000

The world's first digitally tuned 80M-10M SSB transceiver
with over 40,000 frequency synthesized channels.

● 1200 Watt Linear Amplifier
FL-2100B $525

The FL-2100B is a conservatively rated matching amplifier for the FT-101E. This amplifier features two rugged 6728 ceramic plate tubes in a class B grounded grid circuit with individually tuned input coils for each band. The FL-2100B operates on 80 thru 10 Meters with dual cooling fan and a solid state power supply with an effective 28 uF filter system, providing reserve ratings and linear operation. Dual

Features

* Conservative 1200 Watts PEP input on 80-10 Meters
* Easy primary voltage change from 117-234 VAC
* Dual front panel meters provide continuous monitoring of plate current and voltage

TS-820 PERFORMANCE SPECIFICATIONS

TS-820 SERIES
TS-820 –S
VFO-820
$1,100
KENWOOD

NEW MODEL
T.S. – 520s

$700

T R – 7500 144MHz F.M.

$300

2 METER TRANSCEIVER
TR-2200A
KENWOOD

The TR-2200A is a compact FM transceiver designed for use in the 2 meter amateur band. The TR-2200A is engineered with the latest techniques in all solid state construction.
The small and light weight design of the TR-2200A offers you a versatile use.

$200

TR-7400A $440

The hottest 2-meter mobile rig on the market. Features a brand new and unique squelch system with continuous tone coded squelch, tone burst, or carrier squelch. Full 4 MHz band coverage and 25 watt output. It's phase locked loop (PLL) frequency synthesizer provides operation on 800 channels. The TR-7400A's list of features goes on and on, but even more important is its superb performance and dependability... and all at a surprisingly low price.

General Coverage Communications Receiver FRG-7

PORTABLE TRANSCEIVER
TR-3200
KENWOOD
$330

The Model TR-3200 is a handy transceiver designed for use in 430 MHz amateur radio band. It is small and light weight, and is equipped with 12 crystal-controlled channels for transmission and reception on F3.
The RF output power is switchable in 2 steps, either 2 watts or 0.4 watt.

HY-GAIN ANTENNAS
18AVT/WB 10-80 M, temporarily out of stock
TH3MK3 10 15 20 senior 3 el. Yag 14' boom
THEOXX 10 15 20 senior 6 el. Yagi 24' boom
HY-QUAD 10 15 20 cubical quad Yag 8' boom
TIGER ARRAY 204BA 20M/4 el. Yag 26' boom
BN-86 balun for beam purchasers only

MARK MOBILE ANTENNAS
HW-80, 6' long for 80 M
HW-40, 6' long for 40 M
HW-20, 6' long for 20 M
Swivel mounts & chrome plated springs for all

CUSH CRAFT ANTENNAS
A144-11-11 Element 2M Yag
A147-11-11 Element 2 M Yag
A147-20 combination horizontal vertical 2 M

ANTENNA ROTATORS
Model COR Ham-11 for all ht beams except 40 M
Model COR AR-22 E junior rotator for small beams
KEN model KR-400 for all medium size ht beams with internal disc brake
All models rotators come complete with 230 volt AC indicator control units
6 conductor cable for KR-400/500 65 cents per metre

World Clock
QTR-24

HAM – 11 Rotor

$240
Control Box

INDICATOR CONTROL UNITS
KR-500 KR-400

ELEVATION
180 DEGREE

HORIZONTAL
360 DEGREE

HORIZONTAL ROTATOR
$120

KR-400

Deluxe Mobile/Base Station
FT-101E
● Solid State 160 thru 10 Meter Transceiver

E MODEL WITH R.F. PROCESSOR
$850

"computer type" modules for unparalleled reliability and service. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere ideal for today's active amateur. Just add an antenna and 12 VDC or 100-234 VAC for instant operation on 160 thru 10 meters. The FT-101E/EE is another step for amateur communications from the world's leader in communications equipment, YAESU. The Radio Company.

The world's number one transceiver now offers even more value and performance in one compact, thirty pound package. An effective RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile-ups without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E/EE features the latest in solid state technology, incorporating time proven, plug-in

Kenwood has opened the 6-meter band to the amateur who wants to go first class without paying an arm and a leg. Behind its pretty face is a ruggedly built, versatile performer offering full 4 MHz coverage (50-54), all modes (SSB, FM, CW, and AM), and 10 watts out.

SWR METER $700
Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality

DRAKE TV-3300 TVI lowpass filter	$ 28
SSR-1 Receivers	$ 31
CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals.	$270
APOLLO 3 position co-ax switches	$ 15

ICOM
VHF TRANSCEIVERS SSB

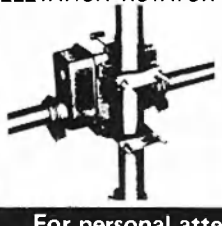
ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz	$215
ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz.	$215
ICOM IC-22-S synthesized 22 channel 2 M transceiver 10 channel pre programmed. Supplied with 50 extra diodes for the programming.	$269
ICOM model IC-245	
ICOM model IC-211	

COAX CABLE
RG-8-U foam filled per metre $1.20

AUSTRALIA'S SOLE DIST. OF KLM PRODUCTS
KLM SOLID STATE POWER AMPLIFIERS

(MHz)			
144-148	PA10–80BL	80	OUTPUT (watts)
"	PA10–140BL	140	"
"	PA10–160BL	160	"
"	PA 2–70BL	70	"
400-470	PA10–70CL	70	"
	PA 2–12-B	12	Watts
	PA 2–25BL	25	Watts P.O.A

KR-500 MODEL
ELEVATION ROTATOR



500MHz Frequency Counter

● YC-500S and YC-500J are available at lower prices.

For personal attention: 24 KURRI STREET, LOFTUS.
P.O. BOX 184, SUTHERLAND. N.S.W. 2232
OPEN SATURDAY TILL 12 NOON
TELEPHONE: (02) 521-7573 Peter Schulz, VK2ZXL

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

November

3-4	YLRL Anniversary Phone Party
5-6	RSGB 7 MHz CW
12-13	European RTTY Contest
13	Czechoslovakian Contest
19-20	WWDXA CW Contest
26-27	CQ WW DX CW Contest

December

3-4	Spanish Phone Contest
10-11	Spanish CW Contest
10-11	ARRL 10 Metre Contest
10-11	Hungarian CW Contest
10-Jan.8	ROSS HULL VHF/UHF MEMORIAL CONTEST

January

27-29	CQ WW 160 CW Contest

CZECHOSLOVAKIAN CONTEST

0000 to 2400 GMT Sunday November 13.

All bands 1.8 to 28 MHz may be used, both phone and CW. The same station may be contacted on each band for QSO and multiplier credit. Crossband and crossmode contacts not permitted.

Classifications are: single operator, single band and all band, and multi-operator all band only. Exhange RS(T) plus 2 figures indicating your ITU

Score 1 point per QSO, 3 points if it's a Chech station. Multiply total QSO points by sum of ITU zones worked on each band for your final score. Own country may be worked for multiplier credit, but not for QSO points.

Certificates will be awarded to the top scoring station in each class in each country.

Use a separate log for each band, include a summary sheet and a signed declaration that rules have been observed.

Send entry to the CENTRAL RADIO CLUB, PO Box 69, 113 27 Praha 1, Czechoslovakia. Mailing deadline is December 31st.

ROSS HULL VHF/UHF MEMORIAL CONTEST RULES 1977-78

The Wireless Institute of Australia invites Amateurs and SWLs to join in this annual contest which is held to perpetuate the memory of Ross Hull, who did so much to further VHF/UHF.

A Perpetual Trophy is awarded annually for competition between members of the WIA, and is inscribed with some details of the man the contest honours. The name of the winning member of the WIA for each year is inscribed upon the trophy and that member also receives a suitably inscribed certificate.

OBJECTS

Amateurs from Australia and Territories will endevour to contact as many other Amateurs as possible under the following conditions.

DATE OF CONTEST

10th December 1977, 0001 GMT to 8th January 1978 2400 GMT.

DURATION

Any seven calendar days within the dates mentioned above which need not be consecutive. These periods are at the operator's convenience. A calendar day is from 0001 GMT to 2400 GMT.

RULES

1. There are two divisions, one of 48 hours duration, and the other of 7 days duration. In the 7 day division there are four sections.

(a) Transmitting Open
(b) Transmitting Phone
(c) Transmitting CW
(d) Receiving Open

An open log is one where points are claimed for more than one mode, i.e. Phone, CW, RTTY, ATV, SSTV. (AM, FM and SSB are grouped together as phone.)

In the 48 hours division, the best score over any consecutive 48 hour period is the winner.

In the 7 day division, the best score over any seven days (not necessarily consecutive) is the winner.

2. Any Amateur operating fixed, mobile or portable within the terms of his licence may participate.

3. All Amateur VHF/UHF bands may be used, but crossband contacts are not acceptable. At any one time, single frequency operating only is permitted. Cross mode contacts are permitted.

4. Amateurs may enter for any one of the sections and either or both divisions. 7 day certificate winners are not eligible for 48 hour awards.

5. Two contacts per band per day, irrespective of mode are permitted provided that at least two hours elapse from the previous contact with that station on that band.

6. Logs from a multi operator station are not acceptable. One operator only may operate a station at any one time, and must submit a log for his own operation.

7. Entrants must operate within the terms of their licences.

8. The exchange of RS or RST reports with a serial number starting at 001 and advancing by 1 for each successive contact will be proof of contact.

9. Entries should be set out on Quarto sheets, using one side of the paper only, and must be forwarded to reach the Federal Contest Manager, Wireless Institute of Australia, Box 67, East Melbourne, 3002, in time for the last opening of logs on Friday, February 17th. Envelopes should be clearly marked Ross Hull Contest. Early logs will be appreciated.

10. Scoring will be based on the following table:

Freq. MHz	Less than 200 km	More than 200 km within Call Area	More than 200 km other Call Areas
52	2	5	10
144	2	5	10
432	5	15	25
576	10	25	50
1296 and above	20	50	100

Bonus points: Each new call area contacted, 20 points, once only per band per day (including own call area).

Operation via active repeaters or translators not permitted for scoring purposes.

11. Logs should be set out as in the example and must carry a front sheet showing the following information:

Name
Address
Section
Call sign
Claimed 7 day score
Operating days
Operating dates
Highest 48 hours score
Operating period

Declaration — I hereby certify that I have operated in accordance with the rules and spirit of the contest.

Comments

12. All times to be logged in GMT only.

13. Awards: Certificates will be awarded to the highest scorers in each section, in each call area. Additional certificates will be issued to contestants who break any VHF/UHF record during the contest.

The VK contestant who returns the highest score in the transmitting section, and who is a member of the WIA will have his name inscribed on the trophy which will be held by his Division for the prescribed period.

Certificates will be awarded to the highest 48 hours entrants in the transmitting section, who have not won a 7 day certificate.

RECEIVING SECTION

1. SWLs only may enter for this section.

2. Contest times and logging of stations will be the same as the transmitting section except that there will not be a 48 hours section.

3. Logs must show the callsign of the calling station, the serial number given, and only the callsign of the other station. Scoring will be as for transmitting stations.

4. Any scoring contacts may be logged. There is no limit to the number of times that a station may be logged provided that serial numbers are given.

5. The logs for any 7 days may be submitted and the winner of the section will be highest scorer.

6. Certificates will be awarded to the highest scorer in the contest, and if sufficient interest is shown, to state winners.

GENERAL

It is preferable that complete logs be submitted as an aid to checking, but contestants must clearly show their best 7 days or 48 hours.

Enjoy yourself in another friendly contest, and remember — it is only as friendly as you make it.

EXAMPLE OF A VK3 TRANSMITTING LOG

Date/time GMT Dec. 18	Band MHz	Emission	Callsign	RST sent	RST rec.	Points	Bonus
0156	52	SSB	VK4DT	59001	58037	10	20
0207	52	CW	VK4XA	569002	579012	10	—
0212	144	SSB	VK7ZAH	58003	58026	10	20
0216	432	SSB	VK3ZBB	59004	59042	5	20
0320	1296	SSB	VK3ATN	53005	52023	50	20

WESTLAKES NOVICE CONTEST

Westlakes Radio Club announces a new contest for all novice and fully licensed radio amateurs. The contest will take place on the 10th and 11th December, 1977 from 0800 GMT on 10th to 0759 GMT on 11th December, 1977.

OBJECTS

To encourage contest working between amateur stations in Australia and New Guinea during a 24 hours period with special emphasis on contacts with Novice and Radio Club stations.

RULES — STATIONS ELIGIBLE

All VK and P29 stations licensed for amateur operation in the 80, 15 and 10 metre band may take part. Calls within and outside the call area of the calling station are eligible. Except for Radio Clubs, no multiple operator working is allowed.

BANDS

All the 80, 15 and 10 metre allocations may be used but Novice operators must observe the band limitations outlined in their licence. No cross band operation allowed but cross mode operation is allowed. Contacts may be made phone or CW.

SCORING

Full Call Operators: For contacts with other full call stations: 2 points per contact*; with Novice call stations; 5 points per contact*; with Radio Clubs: 10 points per contact*.

Novice Call Operators: For contacts with other Novice stations: 5 points per contact*; with full call stations: 2 points per contact*; with Radio Club stations: 10 points per contact*.

Listeners: For Novice to Novice contact: 5 points; for full call to novice or novice to full call: 2 points; for full call to full call: 2 points; for contacts in which a Radio Club is involved: 10 points; all 10 metre loggings: 10 points.

*All contacts on 10 metres are worth 10 points irrespective of call being worked.

CALLING PROCEDURE

Stations should call "CQ Novice Contest" on phone or "CON" on CW. Stations may be worked once only per band per mode**.

*FOR ALL 10 METRE CONTACTS ONLY

**Stations may be worked once per mode each clock hour, e.g. a station may be worked at 0158 and again at 0201 but then not again until 0301.

Consecutive contacts with the same station may be worked on phone and CW provided that the second contact is commenced before the end of the clock hour, e.g. VK2NZZ works VK7NZZ on phone at 0258 and they say "go to CW". The CW contact commences at 0259.40 but does not end until 0301. This is a valid call in the clock hour 0200-0300.

EXCHANGES

Telephony stations should exchange five (5) digit number consecutively in chronological order commencing with —001. The first two numbers would indicate signal strength and readability e.g. 5 by 9. CW stations should exchange six (6) digit numbers in order commencing with —001. The third number in this case would be to indicate tone. Listener stations should log both numbers and callsign in an exchange. Radio Clubs will add "C", e.g. 59023 C.

ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	CD4026	CD4724	LM380N	MC1496K	UAA180
CA3013	CD4027	CD40097	LM381N	MC1590G	UA723C LM723
CA3018	CD4028	CD40098	LM382N	MC14553	UA757
CA3023	CD4029	CD40174	LM387N	MC1648P	ULN2208
CA3028A	CD4030	CD40175	LM395K	MC4044P	ULN2209
CA3035	CD4031	CD40192	LM555CN	OM802	ULN2111
CA3039	CD4035	CD40194	LM555H	SAJ110	74C00
CA3046 LM3046	CD4040	CD40195	LM556N	SAK140	74C02
CA3053	CD4041	DM8097 1.90	LM562B	SD305DE	74C04
CA3059	CD4042	HEF see "CD"	LM565N	SD306DE	74C10
CA3060	CD4043	LH0070	LM566CN	SL415A	74C14
CA3079	CD4044	LM114H	LM567CN	SD425A	74C20
CA3080	CD4045	LM301AN	LM709N	SL437D	74C85
CA3081	CD4046	LM301CN	LM710CN	SL440	74C86
CA3082	CD4047	LM304H	LM710CH	SL442	74C90
CA3083	CD4049	LM305AH	LM723H	SL447	74C154
CA3086 LM3086	CD4050	LM307N	LM723N	SL449	74C160
CA3089E	CD4051	LM308V	LM725N	SL610C	74C162
CA30900	CD4052	LM309K	LM733CH	SL612C	74C174
CA3091	CD4053	LM310N	LM733N	SL613C	74C192
CA3120E	CD4066	LM311A	LM741CH	SL620C	74C901
CA3127E	CD4068	LM311H	LM741CN	SL621C	74C925
CA3128E	CD4069	LM312H	LM747CH	SL623C	80C95
CA3130T	CD4070	LM317K	LM747CN	SL622C	**MISC**
CA3140T	CD4071	LM318N	LM748CN	SL624C	AL5352
CA3600	CD4072	LM319H	LM1303N	SL630C	GL4484
CD4000	CD4075	LM319N	LM1310N	SL640C	GL5253
CD4001	CD4076	LM320K	LM1458N	SL641C	OL31
CD4002	CD4078	LM320T	LM1488N	SL645C	RL4484
CD4006	CD4081	LM322N	LM1489N	SL901B	RL5023
CD4007	CD4082	LM323K	LM1496N	SL917B	FND357
CD4008	CD4085	LM324N	LM1808N	SL1310	FND500
CD4009	CD4086	LM325N	LM3028 CA3028	SL3046	9001
CD4010	CD4093	LM326H	LM3046	SP8505	9368
CD4011	CD4502	LM339N	LM3086	SP8515	9601
CD4012	CD4503	LM340K	LM3900	TAA300	NSN71
CD4013	CD4510	LM340T	LM3905	TBA570	NSN74
CD4014	CD4511	LM349N	LM3909	TBA700	TIL306A
CD4015	CD4514	LM358N	MC1035P	TBA810A	11C90
CD4016	CD4515	LM370H	MC1312P	TB1750A	95H90
CD4017	CD4516	LM371N	MC1314P	TCA220	2102-2
CD4018	CD4518	LM372H	MC1315P	TCA290A	2513N
CD4019	CD4519	LM372N	MC1350P	TCA420A	S1883
CD4020	CD4520	LM373N	MC1351P	TCA580	S50242
CD4021	CD4528	LM374N	MC1454G	TCA730	MA1002
CD4022	CD4539	LM375N	MC1458 LM1458	TCA740	7805CP
CD4023	CD4555	LM377N	MC1468L	TDA1005	7824CP
CD4024	CD4556	LM379	MC1488 LM1488	UAA170	
CD4025	CD4720		In some cases pin for pin substitutes will be supplied.		

POPULAR SEMI-CONDUCTORS STOCKED

7400	7483	74S258	74LS174	BD238	2N3566
7401	7485	74S196	74LS175	BD437	2N3568
7402	7486	82S23	74LS181	BD438	2N3569
7403	7489	8281A	74LS191	BF173	2N3638
7404	7490	82S90	74LS192	BF180	2N3638A
7405	7491	74LS00	74LS193	BF194	2N3642
7406	7492	74LS01	74LS194	BF200	2N3643
7407	7493	74LS02	74LS195	BFY50	2N3694
7408	7494	74LS03	74LS196	BFY51	2N3731
7409	7495	74LS04	74LS221	BPX25	2N3819
7410	7496	74LS08	74LS253	BSX19	2N3866
7411	74100	74LS09	**SEMICONDS**	BU126	2N4037
7413	74107	74LS10	AC125	MFE131	2N4249
7414	74121	74LS11	AC126	MJ802	2N4250
7416	74122	74LS13	AC127	MJ2955	2N4355
7417	74123	74LS14	AC128	MJ4502	2N4356
7420	74132	74LS20	AC132	MPF102	2N4360
7422	74141	74LS21	AC187	MPF103	2N5245
7425	74145	74LS22	AC188	MPF104	2N5457 MPF103
7426	74150	74LS27	AD149	MPF105	2N5458 MPF104
7427	74151	74LS28	AD161/62	MPF106	2N5459 MPF105
7430	74153	74LS30	AS322	MPF121	2N5485 MPF106
7432	74154	74LS32	AT1138 2N301	MPF603	2N5590 MPF603
7437	74157	74LS37	ASY17	TIP31C	2N5591
7438	74160	74LS38	BC107	TIP32C	2N6027
7440	74164	74LS40	BC108	TIP120	2N6084
7441	74165	74LS42	BC109	TIP125	BA102
7442	74174	74LS73	BC177	TIP141	OA47
7445	74180	74LS74	BC178	TIP2955	OA90
7446	74181	74LS75	BC179	TIP3055	OA91
7447	74185	74LS78	BC182	TT800 2N4037	5082-2800
7448	74190	74LS86	BC212	TT801	40440 2N3731
7450	74177	74LS90	BC327	2N301 2N2869	40637A
7451	74191	74LS92	BC337	2N706A	40673
7453	74192	74LS93	BC547	2N918	40822
7454	74193	74LS95	BC548	2N2222A	40841
7460	74194	74LS109	BC549C	2N2646	BZX61
7470	74195	74LS113	BC559	2N2869	BZX79
7472	74196	74LS114	BC639	2N2904A	BZX70
7473	74S00	74LS151	BC640	2N2905	BZY93
7474	74S10	74LS153	BD131	2N3053	BZY91
7475	74S20	74LS157	BD132	2N3054	PA40
7476	74S74	74LS163	BD139	2N3055	PB60
7480	74S112	74LS163	BD140	2N3564	MEL12
7482	74S251	75LS164	BD237	2N3565	FCD820

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12" x 12" D.S.
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2M CONVERT

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16 PIN

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T-25 T-80
T-37 T-94
T-50

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CONTEST CLASSES
There are four classes in the contest — A: Novice/full calls working phone; B: Novice/full calls working CW; C: Novice/full calls working open; D: Listeners.

MULTIPLIERS
Notwithstanding the cass of operation if ten (10) but less than 20 stations *** are worked or heard on CW a multiplier of 1.2 may be applied to the total points score.

If 20 or more stations *** are worked or heard on CW a multiplier of 1.5 may be applied to the total points score.

*** On 10 metres it is possible to work a station more than once. Hence the score of stations worked for the purpose of the multiplier can only include the same callsign once, e.g.:

CW contact No. 19 VK2NZZ works VK2NZY at 0659. CW contact No. 20 VK2NZZ works VK2NZY at 0702 and has no more CW contacts. The multiplier (1.2x) may then only be applied since the CW station count is 19, not 20.

SUBMISSION OF LOGS
Logs containing the details: Station, time, band, mode, No. sent, No. read, points tally should be made up with a front cover which contains the following details:

1. Name of operator and callsign.
2. Address.
3. Class for which entry is made.
4. Stations worked (a) phone (b) CW.
5. Points claimed (actual).
6. Multipliers (if any).
7. Total points claimed.

DECLARATION
This declaration should also be made: "I have operated my station in accordance with the licence requirements and the rules and spirit of this contest". Signed and dated.

Logs should be sent to the Contest Manager by certified mail.

To:
Westlakes Radio Club,
Novice Contest Committee,
Box 1,
Teralba, 2284

Log entries close 15th January, 1978. Late entries may not be accepted.
The decisions of the committee are final and no correspondence will be entered into regarding the contest.

CONTEST AWARDS
Certificates will be awarded as follows:

Highest Score:
Novice Phone
Novice CW
Novice Open
Full Call Phone
Full Call CW
Full Call Open
Radio Club Phone
Radio Club CW
Radio Club Open
Listener Phone
Listener CW
Listener Open

A miniature replica certificate will also be issued to all stations and listeners who take part in the contest indicating their participation. Results will be notified in the February issue 1978 of the Westlakes Radio Club Newsletter and in the April issue of Amateur Radio. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,

PIRACY PREVAILS
I would like to refer readers to AR of August 1977, page 5, and I quote from the special announcement therein, "The general view is that a percentage of CBers will feel the need to expand their interests beyond the narrow confines of their service".

With this statement I must wholeheartedly agree, I do not however agree with the ensuing comment that the Novice licence is seen as the solution to cater for this interest. Obviously the "Pirate" response to the situation is to rush in and lay out a few hundred dB on a rig to get him out of the "narrow confines" of his band. Whilst, I agree, a large number of keen enthusiastic applicants are now working their way towards Novice and or full tickets as a result of a first blooding in CB radio, unfortunately these comparative few are far from being representative.

Let us face it, from the day the authorities announced the impending legality of the CB service that band has been a shambles. Anyone who cares to listen to the herd of channel switch flickers on 11 metres hears pouring forth the idiot jibberish, inanities, profanities and hogwash of thousands of untrained unconcerned and irresponsible button pushers. Those pirates of long standing, former users of the CB service are retreating, shuddering at the mess their nice little slice of spectrum has become.

The natural progression is for frustrated CB ops to obtain equipment to put them on other bands where spectrum space is less cluttered. In recent months I have heard everything from frustrated Novice "failures" driving their FT101s protestingly up and down 80m, QRM-ing all and sundry, to undisguised CB/CB QSOs on 80.

The most recent and glaring example of invasion of amateur territory was on Saturday, 2nd September, when at least two stations of indeterminate identification and QTH spent most of their afternoon calling CQ VHF CB on both R.CH.2 and R.CH.8 (VK3/RML/RGL respectively). Obviously these people have been able to purchase equipment fitted with repeater crystals and probably the usual simplex channels. The problem is as always, there is no law against buying equipment, only against using it. The authorities either cannot or will not police the situation, as their track record with 27 MHz indicates.

Yet the answer is within their grasp; sales of transmitting equipment to licensed recipients on production of licence, photo and signature on licence, and that is that. It is obvious that a man who buys an FT101 or an IC22 does not want it to decorate his cocktail cabinet. The current crop of equipment vendors have no excuses left now, the CB-ers had their way due to proliferation of equipment by these people until every Tom, Dick and Harry is in on the sales of CB radio. Meanwhile the legitimate amateurs have lost a band. Do we now sit by while sales of 2 metre and HF amateur equipment skyrocket into a million dollar industry and our bands become gaggles of squalling anonymity like 11 metres?

I trust that anyone, amateur or not, in the business of retailing two way communication equipment who continues to provide unlicensed recipients with other than CB equipment should be named, so that those amateurs who feel strongly about this situation may direct their business elsewhere. It is time that the Institute took a stand and that its members stood behind it to pressure legislation to prevent sale of equipment in the random manner existing at the moment.

I for one will volunteer to send a copy of this letter to my local M.P. to illustrate the potential developing problems.

Max Stark VK3APZ.

(Editor's Note: The Institute's opposition to the sale of equipment to unlicensed persons has been documented in AR many times over the past several years) ■

The Editor,
Dear Sir,
The editorial in September AR emphasises the futility of organisations representing amateurs throughout the world. The Radio Branch in this country has always been readily available for amicable discussions. Niggling in that area in editorials is to be deplored.

There seems to be little point in negotiating for additional privileges at WARC 79, whilst doing nothing to preserve the frequency allocations presently available.

Throughout the world, all active amateurs are aware that the greatest single handicap to current HF amateur operation is the 14 MW Russian "Woodpecker". This blatant incursion into the amateur portions of the HF spectrum has been with us for a long time, rendering whole bands unusable, but I have yet to see one editorial in any amateur publication denouncing it.

Further, I have yet to see any evidence that official objections have been lodged at any level.

Instead of belly-aching about unimportant inconveniencies, start demanding LOUDLY that the current, internationally agreed, frequency allocations of amateurs be observed.

Convincing the convinced is easy but futile. Start convincing those in power that they must protest strenuously, at the highest possible level, at this flagrant violation of amateur privileges.

Yours faithfully,
N. W. Lavelle VK3ABH.

(It is hoped the writer has duly reported his findings to the Intruder Watch Co-ordinator. It has been noted from overseas sources that at least one Government has taken up this matter with the USSR Government but there has not been too much improvement.—Ed.) ■

The Editor,
Dear Sir,

CB RADIO
Well now we have these pests all over TV Channel 3 here in Newcastle. Most of the trouble is due to 3rd harmonics from 27 MHz clashing with the visual carrier on 86.25 MHz. With half a dozen CB-ers going for the lick of their lives the consequent degradation of the quality of the picture has to be seen to be believed.

Some of us are old enough to remember the days when a group of illegal operators causing endless TVI would speedily be rounded up and put off the air.

The tragic part of this is that these people know perfectly well that they are causing this interference and couldn't care less. They blame everyone and everything except their own ignorance and stupidity; of course with a modicum of technical knowledge the 3rd harmonic could be suppressed.

I am one of those who has said all along the line that transmitting equipment should not be allowed into the hands of people with no knowledge of the principles.

We read in AR that the Institute has never opposed CB Radio. How true! How sad!

Yours faithfully,
Colin Yates, B.E. (VK2AGZ)
(Charlered Electrical Engineer) ■

The Editor,
Dear Sir,

ROSS HULL VHF-UHF CONTEST
With reference to the letter by VK2ZFB, Mr. A. Birch, in September AR, I agree with most of his remarks on the contest and possibly that the image of the WIA has not been enhanced by the changes in contest rules.

There is an urgent need for a new set of rules to be drawn up for this contest based on the general rules for other contests. The decision on rules should not rest with any one individual, but with contest committees formed from volunteers from each State Division, and who are interested in this and any other contest. A submission from each State should be drafted into an overall set of rules and agreed to by a unanimous vote among the committees. Any changes to the rules should go through the same procedure.

Clearly it is too late for a change along these lines for this year's contest, but the machinery should be set up now to have everything completed in time for next year's Ross Hull.

To encourage greater participation I would like to see improvements to the contest rules along these lines:

1. Abolish the 7 day and 48 hour sections.
2. Introduce **separate logs** for each band.
3. Have **separate SSB, FM, OPEN** and **CW** sections on each band with entry restricted to one section.
4. Have sections for **satellite contacts** on 2m and 70cm.
5. **Replace** the **bonus** system with an overall multiplier for each band, each call area counting the same in the multiplier.
6. **Issue certificates** for each State highest scorer on each band.

Yours sincerely,
Mike Hennessy VK7MC
P.O. Box 52, Sorell, Tasmania 7172. ■

The Editor,

Dear Sir,

Regarding CB operating in the USA, I am regularly in contact with K6NS in Vista, California, both by ham radio and by letters. He has sent me some newspaper clippings from an LA newspaper, and the article gives quite an insight on the problems of CB radio in the West Coast of USA.

The thing I did not know was that it is illegal in the USA to communicate at distances greater than 150 miles and the penalty for doing so is a fine of $100 per violation to maximum of $500!

I think that a limitation on distances should be applied in Australia as well, because I get incensed when I hear several local CB-ers boasting of how much "DX" they've worked on 27 MHz, not just across Australia but with Japan, Canada and the USA.

It is ridiculous that we amateurs have to be technically competent to operate our equipment(s) and yet those non-technical persons can get away with it for the price of the licence fee.

Another point of interest in the latest K6NS letters concerns two new RFI bills being pushed through the US Congress at the present time, which will force all TV and radio set manufacturers to install filters and traps at the factory before sale to the public, another good idea worth following up.

Certainly in my location I get a variety of spurious signals coming in via the antenna, some of these can be attributed to local colour TV sets, so there are many quite urgent new pieces of legislation required in Australia to protect "hams" as well as TV viewers and radio listeners from interference.

So there you are, my first letter to the Editor is a whingeing one; hope I've made my thoughts a little clear.

Keep up the present high standard of the Journal. I read it through from cover to cover and also purchase a number of items extracted from the various publishers, so all very good work.

Fred Jenkins VK2BFJ

(The newspaper clipping was enclosed with Fred's letter, but is unfortunately a little too long to reprint. The article mentioned the proliferation of CB, illegal use, and of course the usual interference problems. Thanks, Fred, for the comments.—Ed.) ■

141 Hyde St., Nth. Rockhampton, 4701

The Editor,

Dear Sir,

I wish to support the remarks of Albert Birch, VK2ZFB, in the September issue of AR, regarding the Ross-Hull VHF Memorial Contest Trophy, and would suggest that the following rules be considered and applied:—

1. That all those entering the Contest allocate themselves a specific number, to be used following the report given to the station worked. This would add to the competitive spirit of the Contest. With the present sequence number, everyone knows how the other fellow is going, and if he gets too far ahead many drop out and do not send in a log. This was most noticeable in the 1976-77 Contest. Hundreds more were in the Contest than logs sent in.
2. That the winners in each 7 day and 48 hour section in each call area be issued a certificate, as was done in the past. This gives a great deal more incentive to make more contacts.
3. The present system of scoring be left as is and also the duration times of the Contest, of 7 days and 48 hours.

Previous to the last "Ross-Hull", VK4DO was the first in VK4 twice in both sections, and last time first in VK in both. For this I have been awarded three certificates and the Trophy only for 76-77, so when the Trophy goes back there is nothing for the hours and effort. Surely a certificate award is warranted for the winners.

To complete the list of winners mentioned in VK2ZFB's letter, the following were successful after VK5HP: VK3ZER, 5ZKR, 3AKC, 4ZFB, 5SU (5 times), 4DO.

It is to be hoped that the Contest Committee will give consideration to the suggestions offered.

Harold L. Hobler, VK4DO

The Editor,

Dear Sir,

I refer to the article by Donald Pugh VK6DN on the "Teaching of Morse Code" and wish to thank him for his contribution to this important area of Amateur Radio training. I should like to submit further suggestions.

On the market are various Morse Training Schemes. Some involve "one-cassette" courses which I do not favour. I can see no alternative to "Cassette Courses" of 4 or 5 C-60 cassettes offering the Morse Alphabet and the Numerals in "small bites", each "bite" being taught and drilled and re-played by the students. As each new portion is learned, revisionary exercises should be added to include all the previously-learned letters and figures. Finally a stage will be reached where the student will KNOW all the symbols and will require only PRACTICE Cassettes to consolidate his receiving skills at the five or higher "words per minute" rate. There should, therefore, be a distinction between TEACHING (or LEARNING) cassettes and PRACTICE cassettes.

The attitude of the Instructor will largely determine the enthusiasm shown by the students. The Instructor should indicate that he really enjoys Morse operating.

One of the most important features of Morse instruction is the necessity for students to HEAR GOOD MORSE and to appreciate the good features LONG BEFORE they put a hand to Morse Key.

Even adult students in Theory, Regulations and Morse like to gain praise for their successes. This is sound educational practice. The use of PROGRESS WALL CHARTS has always been a worthwhile method of recognition — even with youngsters of 40, 50 and 60 years!

There is considerable difference of opinion regarding the necessity or desirability of using CODE GROUPS in practice sessions. Some Instructors hammer the need to eliminate "journalising". Others maintain that the Novice and Amateur examinations consist of PLAIN LANGUAGE passages. Therefore, the writing of PRINTED CODE GROUPS under class conditions involves a skill (printing) that is irrelevant to the Telecom Examinations. Ordinary handwriting of legible standard should be the aim of Novice Morse instruction.

Instead of CODE GROUPS, I have found that FOREIGN LANGUAGE text serves to deter the journalising practice. This is PLAIN LANGUAGE material and should be handwritten. Students find this quite acceptable.

I find it preferable to pre-tape the whole of the Morse material and to reduce the amount of Key-punching in front of the class. We have them for about 2½ hours per week — on ONE night. This makes it essential for them to "do their homework" and this can ONLY be done by the cassette or tape system.

Some overseas Morse training information suggests that two raw beginners should send to each other. NO WAY! Too much time can be lost later by efforts to eliminate the errors and bad habits gained during this period. In our Novice classes we can defer the sending instruction until the reading skills have been developed at five words per minute.

After the Telecom Examinations candidates have a waiting period, during which Morse instruction should be continued. Simulated contacts can be practised on the Club Audio Oscillator set-up. Correlation between the Regulations, operating procedures and Morse can be developed. Club Amateur Stations can be put to good usage by permitting the Novice members to operate on CW with other Stations — preferably by prior arrangements. In short, the Novice examination should not be regarded as the final goal — merely an incidental step on the way to Full Amateur status.

Morse Instructors may be interested enough to obtain "AN INTRODUCTION TO MORSE CODE", which I prepared for the NSW Youth Radio Service. This contains a wide range of ideas and opinions on the teaching of Morse and is intended to stimulate discussion. It is NOT intended to be dogmatic. There is no BEST WAY to teach Morse. Individual Instructors should use trial and error methods, persisting with those that have proved successful and rejecting those which experience shows to be unsuccessful.

R. C. Black VK2Y

(This letter has been shortened to assist early publication . . . Ed.)

NOTE

Contributors of letters to the Editor are requested to keep contributions to no more than 300 words so that all may have a chance of being published . . . Ed. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ

PETER COSSINS VK3BFG

At the time of writing this column Kevin VK3ZVJ and myself have developed a working prototype for an ATV call sign generator. Brief circuit details were provided for this unit in the last issue of AR. The prototype is an improved unit which accepts any video source and superimposes the data stored in two PROMs. Any 32 x 8 PROMs with suitable pinouts can be used in the circuit. Switching is provided to make possible a number of display variations. Kevin has also developed a programmer for the Harris 8256 and we can provide a service on the basis of no guarantees at a cost of $5 if the PROM is supplied or $10 if we supply the PROM. Circuit boards for this project will be available and enquiries for programming or boards can be made to the writer.

All revenue from this project will go towards meeting the cost of the proposed Melbourne ATV Repeater VK3RTV. PROMs have already been programmed and sent to Winston VK7EM and John VK5KG.

Motorola have a new RF device out which may be of interest to ATV-ers. It is a MRF646 and has a maximum output power of 45W. Les Jenkins VK3ZBJ is working on the design of a board for a pair of these devices as a linear amplifier. He estimates that the output power from this board would be comparable to a 4CX250B with the advantage of no machine work in construction, wide bandwidth and a single 12V supply.

It is good to see a number of stations joining in on the 7.085 MHz liaison frequency after the VK3BWI broadcast on Sunday mornings. It is a nice way of exchanging ideas and keeping in contact with latest developments in each State.

With activity at a high level it may be possible to chalk up some interesting DX this summer and possibly increase the current ATV record between the north coast of Tasmania and Melbourne.

P. J. Cossins VK3BFG ■

20 YEARS AGO

OCTOBER 1957

1957 was the International Geophysical Year, with amateur radio stations throughout the world participating in the study of VHF propagation.

Federal Executive had the following to say on the Editorial page of October 1957 Amateur Radio.

"It is fitting that an opportunity has come for Amateurs to take part in this aspect of IGY study on at least portion of the old 50-54 MHz band. Evidence collected by members of the WIA and submitted by Executive to the ABCB and Amateur Administration relative to the transfer of Amateurs to make room for TV channels. The problem of long distance interference was particularly stressed".

A new Amateur receiver was announced about this time. The Eddystone 888 was available from R. H. Cunningham Pty. Ltd. Perhaps when we complain about the present high price of amateur gear, we should look back. The 888 was $522.00.

Technical articles in October Amateur Radio included: part three of "90 RF Phase Shift Networks", by N. L. Southwell VK2ZF. EHT Without Tears, by M. Riley VK2ARZ. Selenium rectifiers were used in a voltage multiplying circuit to produce EHT for a modulation monitor scope.

Antenna Couplers for 50 and 144 MHz was reprinted from an earlier QST article.

Eric Trebilcock BERS195 that perennial SWL produced a bit of nostalgia with "Radio — 31 Years Ago".

With interest in the new mode of SSB running

high, a talk on the subject at the Victorian Division meeting was a sell-out. One of the reported statements made is interesting. "Rather elaborate gear is required in the Service and Commercial fields using this form of transmission, but the same high degree of perfection is not required on the Ham band". Well perhaps not, but times do change. ■

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC

Further to my comments last month there have been renewed bursts of activity throughout September and conditions generally have improved considerably. September was a month of spectacular solar flares and I think it can be said that "ol sol" is really going on the boil. The solar flux is rising significantly with an August mean of 84.93 and September up to 99.8. The A index whilst using spectacularly on occasions had means of 12.33 and 11.38 for the same period. Predictions for the solar flux for this period was 86 and 88. August being slightly lower but September quite a deal higher.

The smoothed sunspot mean for August was 29.9 with the running smoothed number for Feb. 77 being 18, a significant rise since July's 12.7. Predicted smoothed running numbers for Nov — 32, Dec — 34, Jan — 36, Feb — 38, at Sept. 1, 1977.

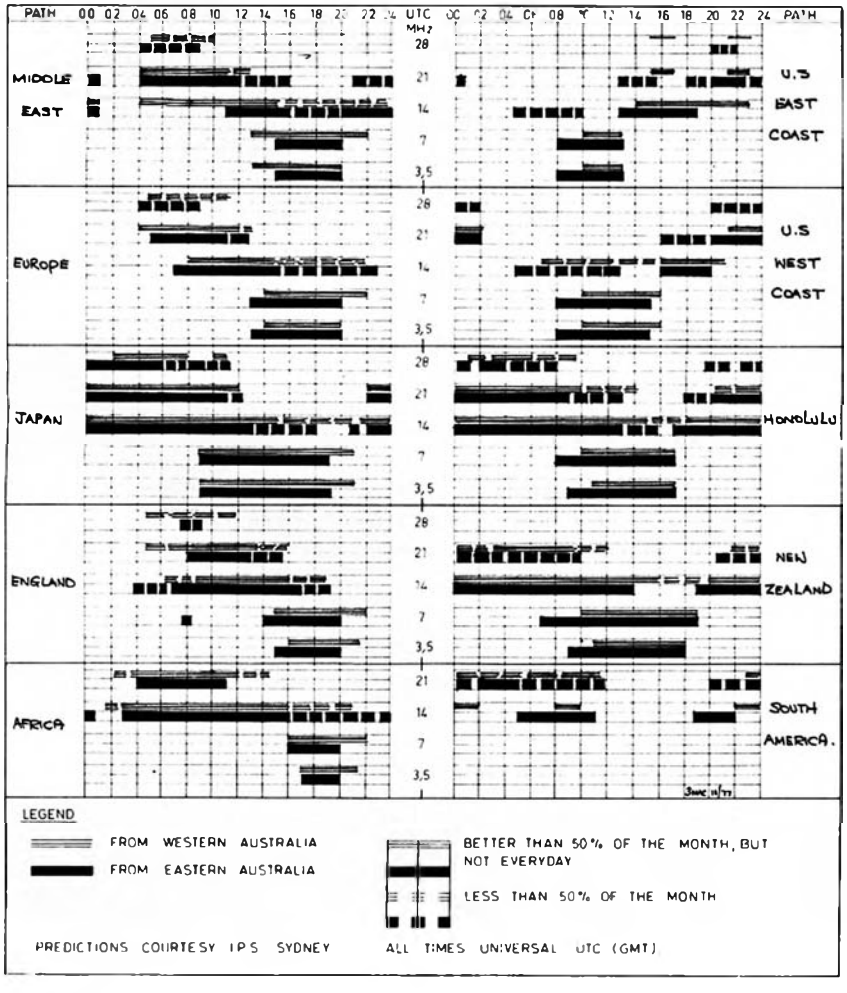
From overseas reports it appears May and June provided sure signs of Cycle 21 beginning to emerge. With all the higher bands 28, 21, 14 MHz being the Hams Happy Hunting Grounds. Even those who don't chase Dx found their logs filled up with stations in all continents, a different situation to the previous few years wallowing in the minima conditions. Many are getting excited at the prospect that the high might prove to be much earlier than originally expected and run as high as the oft quoted 58 peak.

However these conditions exist at the commencement of a new period of high solar activity. Each burst of energy puts new life into a somewhat dispersed Ionosphere and it follows that the good conditions soon find plenty of activity particularly in the portions of the bands with a high density population. On 21 MHz the US Novice CW portion is starting to sound like 27 MHz CB, only the CW QRM is quite high not to mention the JA phone area is now really alive. The VK Novice segment is now attracting considerable attention in anticipation of some juicy Dx. Already 28 MHz is QSBing in and out almost daily to the joy of many.

It appears much interesting scientific information was obtained during the minima and you can be sure the forthcoming peak will be even more closely observed than previously. Ground level and satellite observations have added tremendously to our knowledge but many frustrating events still leave the experts bewildered. There are still many unexplained events awaiting analysis and perhaps an answer. There is so much data being produced that it will take a lifetime to even study it, let alone some of its implications. One thing seems certain that propagation predictions will undergo many changes in the years to come. However reliability is still not quite within the grasp of these experts but the degree of reliability is increasing yearly. One likely outcome of recent decisions is a world wide early warning network. Of course we already have ours but just how good we can tune the system up remains to be seen.

Don't forget WWV at 18 minutes past the hour gives the solar indices for yesterday GMT — It's invaluable for record keeping. High solar flux low A index is a sure way of knowing conditions are good. The local K index is a fair guide to forthcoming conditions K moving higher — poor, K dropping — good. Keep an ear out for it daily on 10 MHz or 5 MHz after 0600 UTC.

73s, good Dx, VK3NAC ■



AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

WCPR50 AND WACPR (IARC GENEVA)

General:

1. The award is available to licensed amateurs.
2. Contacts on and after 1/1/1968 are valid.
3. Do not send QSL cards. A list showing full details of the contacts, including the ITU Zone, should be certified by a club official or two amateurs.
4. The award is issued for 2 x SSB, all CW, all phone, all RTTY and for mixed modes.
5. The award is issued to the operator and any number of call signs locations may be used number of call sign locations may be used.
6. The fee for the award is $1 or 10 IRC. Stickers are available for a stamped envelope or 3 IRC.
7. The address for application is —
   Harry L. Whiting W2JXH,
   20 Pocono Place,
   Holiday City, Tom's River,
   N.J. 08753, U.S.A.

Note: In addition to the 75 ITU Zones, a further 15 areas are made up with SEA Zones, giving a possible total of 90 Zones.

Rules: QSL cards are not required if contacts are made during the annual IARC CPR Contest.

Requirements: WCPR50 — The basic award is for confirmed contact with 50 zones and with stickers for 60, 70, 80 and 85 zones. With stickers it is necessary to submit any MM QSL cards to the Awards Manager. WACPR — The award is for confirmed contact with all 90 zones. It is necessary to submit the QSL cards from all the 15 MM Zones to the Awards Manager.

WAC — WORKED ALL CONTINENTS (IARU)

General:

1. The award is available to licensed amateurs.
2. Contacts after 1945 are valid.
3. Applicants should send cards to their IARU member society who will then certify the claim to the HQ society (ARRL) for issuance of the award. Where such a society exists applicants must be members of the society.
4. Contacts must be made from the same location — the "same location" being taken as an area not exceeding 25 miles (40 km) in diameter.
5. The award is normally issued for CW/phone but endorsements are available for 2 x SSB, all 80 metres or all 160 metres.
6. There is no fee for the award.

Requirements: One confirmed contact is required from each of the six continents — North America, South America, Europe, Africa, Asia and Oceania.

BROMSGROVE SILVER JUBILEE AWARD

(These rules have only just been received, but some of you might have qualified.)

Sponsored by Bromsgrove and District Amateur Radio Club to celebrate the Queen's Silver Jubilee 1977. Open to any radio amateur/SWL world wide.

1. This award can only be achieved during 0001 GMT 4/6/1977 to 2359 GMT 12/6/77 (to coincide with special GE licences).
2. All licence rules to be observed.
3. Obtain 25 points any band/any mode/mixed (special endorsement if requested).
4. GE3VGG must be worked/hrd. = 1 point
   Bromsgrove members = 2 points
   All other GE stations = 1 point
   i.e. GE3VGG-1, G2CLN, G8LJM-4 + 20 × GE.
5. Members worth 2 points: G2CLN, G3NOY, G3RBL, G4AAL, G4DHH, G6WI, G8IO, G8JTK, G8LJM, G8KLO, G8LXT.
6. All QSO direct, no use of any repeater/satellites on any band.
7. Check log of QSOs before 31/12/1979.
8. Special Certificate will be issued in silver print on confirmation of log by Award Manager G8KLO.
9. Cost cheque/PO 50p or 4 x IRCs/$1.
10. Bromsgrove stations will call "CQ Silver Jubilee Award" (CW-CQ-BSJ)
11. Any queries SAE/IRC to G8KLO.
12. Award Manager:
    J. K. Harvey G8KLO,
    22 Elm Grove,
    Bromsgrove, B61 OEH, England. ■

Deluxe Mobile/Base Station

FT-101E WITH R.F.PROCESSOR

● Solid State 160 thru 10 Meter Transceiver

The world's number one transceiver now offers even more value and performance in one compact, thirty pound package. An effective RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile-ups without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E features the latest in solid state technology, incorporating time proven, plug-in "computer type" modules for unparalleled reliability and service. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere-ideal for todays active amateur. Just add an antenna and 12 VDC or 100-234 VAC for instant operation on 160 thru 10 meters. The FT-101E is another step forward in amateur communications from the world's leader in communications equipment YAESU

Compare these features with any other set in it's class and you'll be surprised at the quality and price.

- Built-in AC & DC power supplies
- Built-in RF-speech Processor for increased talk power
- 260 Watts PEP SSB, 180 Watts CW, & 80 Watts AM.
- Factory sealed, solid state VFO for optimum stability and accurate 1 KHz readout
- Effective Noise Blanker, threshold adjustable, for elimination of noise spikes
- Built-in, fully adjustable VOX
- Automatic break-in CW operation with sidetone
- Selectable 25 kHz and 100 kHz calibrator
- ±5 kHz receiver clarifier w/separate ON/OFF switch
- Built-in WWV/JJY reception
- Heater switch to shut off final tubes for conservation of current drain
- Reliable easy to operate lever switches.
- Adjustable carrier level for tune-up and novice operation
- Built-in speaker
- High-Q, permeability tuned, RF stages to provide the performance required even in base station operation.
- Includes dynamic, hand-held type microphone
- Indicator lights for internal VFO and clarifier operation
- Eight pole SSB filter for unparalleled selectivity on today's crowded bands
- All mode operation – SSB, CW, & AM
- Built-in internal crystal control provision and Dual VFO adaptor

Optional accessories for the Ft-101E include:— external VFO with four channel crystal control provision. CW filter, 6 and 2m transverters, digital readout adaptor, external speaker.

Bail Electronics also offer a complete service facility, and the plug-in modular construction of the FT-101E allows quick, easy servicing, keeping costs to a minimum.

● Price $859.00

Above prices include S.T. Freight and Insurance is extra. 90 day warranty. Prices and specifications subject to change.

bail **ELECTRONIC SERVICES**

60 Shannon St., Box Hill North, Vic. 3129. Phone 89 2213
Agents in all States and A.C.T.

FRED BAIL VK3YS
JIM BAIL VK3ABA

AMATEUR SATELLITES

Bob Arnold

VK3ZBB

When reading these notes it should be borne in mind that they are written about six weeks before publication, therefore please forgive any omissions or delayed information now and in the future.

I have received an interesting letter from Eddy Roach VK8ZER/NER, who is operating portable VK6 from Giles, which is about the most isolated town in the country. Eddy is looking for contacts via Oscar 7 on both modes A and B; so far, we have not heard him in VK3 but expect to do so before long.

After hoping and trying for about twelve months, contact has at last been made on mode B with Stewart ZK1AA in Raratonga. QSOs with Stewart should be possible from the Eastern States during a period of ten days each month when ascending nodes of 165 or lower are in sight.

The period August/September has seen considerable activity in mode B with new stations appearing regularly. The following newcomers have been heard: ZL1BIV, WJ; VK6ZGQ; VK7JG; VK5SV, ZAU; VK3ADR; ZK1AA.

Notable contacts during this time: VK5SV — 5E, VK3ZBB — ZK1AA.

Have you heard of the Oscar Award? This award is made for confirmed contacts with Six Australian Call Areas plus Two Countries. QSL cards should be sent to Colin Hurst VK5HI, QTHR who is the award manager. Awards have been made to the following VK stations: VK5HI, VK5QR, VK5ZAD, VK3ZBB.

The qualifying conditions in the northern hemisphere are somewhat different from those for Australia and under these rules a total of 126 certificates have been issued. Thanks to AMSAT for these statistics.

Quite remarkable results have been made by mobile stations operating on mode B. VK5EU and ZL1FI have been driving around their respective countries giving good signals through Oscar 7 despite their simple antenna systems — congratulations to both.

Gremlins interfered with the notes published in September on the Phase 3 spacecraft. The reference to power should read 50W NOT 50 mW as printed — more news on Phase 3 later, but meanwhile here is a summary of the AMSAT Oscar D Spacecraft System which is scheduled to fly early in 1978.

1. Japan AMSAT Association 2m-to-70cm Transponder (JA1CBL, JG1CDM, JA1VDV, JA1JHF, and others) — "Mode J".
   - Input frequency passband between 145.90 and 146.00 MHz. User should transmit right-hand circular polarization in Northern Hemisphere, left-hand circular polarization in Southern Hemisphere, 100W EIRP.
   - Output frequency passband between 435.10 and 435.20 MHz (linearly polarized monopole antenna).
   - Power output is 1 to 2 watts.
   - Downlink passband is inverted from uplink passband.
   - Linear operation — SSB and CW are preferred modes. Do not use FM.
   - Morse code telemetry beacon at 435.095 MHz.
2. AMSAT Two-to-Ten Metre Transponder (WA4DGU and W3PK) — "Mode A".
   - Input frequency passband between 145.85 and 145.95 MHz. User should transmit left-hand circular polarization in Northern Hemisphere, right-hand circular polarization in Southern Hemisphere, 100W EIRP.
   - Output frequency passband between 29.40 and 29.50 MHz.
   - Power output is 1 to 2 watts.
   - Downlink is not inverted from uplink passband.
   - Linear operation — SSB and CW are preferred modes. Do not use FM.
   - Morse code telemetry beacon at 29.40 MHz.
3. Morse Code Telemetry System (W5CAY, WA4DGU et al.).
   - Six analog input parameters measured.
   - Converts each analog value into a two-digit Morse code number or "word".
   - A third digit precedes the telemetry value and gives the channel number.
   - Morse code rate is 20 words per minute.
4. Telecommand System (W3GEY, WA3LND, WA3ZCE, W3HUC, W3ITO, K1RT/WA1JZC).
   - Turns the "Mode A" and "Mode J" transponders on and off.
   - Initiates deployment of ten-metre dipole antenna.
5. Antennas and Antenna Deployment Module (W3GEY, W3HUC, W3ITO, K1RT, WA3LND).
6. 14-to-28 Volt Power Switching Regulator (JA1TUR, W3HQ).
7. Battery Charge Regulator (DJ4ZC, K1RT/WA1JZC).
8. Instrumentation Switching Regulator (WA3VDH and W3GEY).
9. Magnetic Attitude Stabilization System (left-over from Oscars 5, 6 and 7).
10. Satellite Structure and Module Containers (K6GSJ and others from Project Oscar, K1JX/WA1JLD, K1RT/WA1JZC, WA4DGU, VE3DPB, Henry Smith W3HSO and WB0GIM).
11. Satellite Inter-wiring and RF Cabling (Marie Marr and Others).
12. Engineering Drafting (WB4GIB).

AMSAT-OSCAR-D ORBITAL PARAMETERS
(Programmed orbit)
Apogee: 577.38 statute miles.
Perigee: 548.665 statute miles.
Period: 103 minutes.
Inclin.: 99.00 degrees.
Time of Descendong Node: 9.30 a.m. +30 mins., —0 mins. ■

IARU NEWS

WARC 79

The following general information which appeared in the September issue of IARU Region 1 News is worthy of reproduction here for general interest.

CEPT

"During the preparations for WARC 1979 a great deal has been said and written concerning the role of CEPT. For the few who may be unfamiliar with this organisation, the initials stand for Conference Europeene de Postes et Telegraphes. This is a permanent body comprising the representatives of 26 European nations, formed into a number of committees and working groups, with the intention of formulating common policies on matters of mutual concern and interest. The working groups meet at regular intervals with the plenary meetings every 2-3 years.

The composition of the working groups is solely of the representatives of the 26 member nations. Commercial organisations do not directly participate in the work of the CEPT as they may in the studies of the ITU organisations, the CCIR and CCITT. There is no place in the working groups for representatives of any particular service, e.g. broadcasting, maritime, amateur etc. The views of the different services are expressed by the delegates from the national administrations.

Therefore the only way that national societies can influence CEPT is by consultation with their own national administration. If the administration accepts the view of the society it may then take the matters raised to a meeting of the CEPT.

What influence will CEPT have on WARC 1979? First, remember that the voting strength of the ITU now stands at 153. The CEPT has 26 members. These figures speak for themselves. Also, not all members of CEPT will necessarily agree on a common policy that will cause them to vote in a similar way at an ITU conference. It has been noted at previous ITU conferences that differing views were expressed by the Scandinavian nations, by the Francophon group and by the UK. In this case the maximum number of 26 votes would be split at least three ways.

This does not mean that CEPT is unimportant. It should be the duty of every national society whose administration is a member of CEPT to take the views of the amateur service to their administration and thus into the meetings of the CEPT.

How many national societies have done this? According to reports reaching the Region 1 secretariat, only a very small number. WHY?

The IARU can advise and assist when requested but it does not have the power to talk with national administrations (unless asked). This is the duty of each national society. It is most strongly urged that this work, if not already commenced, should begin immediately before it is too late.

There are other organisations similar to CEPT, that exist in Eastern Europe and Africa, e.g. OIRT and PANAFTEL. The same comments apply to liaison with these groups.

The IARU exists to combine, assist and advise. If your national society is of the opinion that we can help in any way please let us know without delay. Also — and most important — please tell Region 1 the results of your contacts with your administration. We sometimes need to remember that the amateur service consists of communicators."

From the same source comes the news of a meeting of IARU R1 members and non-members in Johannesburg for 3-4th December to talk mainly about WARC 79. At least 32 African countries are members of the ITU but have no amateur radio societies.

Another short article from this journal would interest visitors to Europe —

4U1ITU

"This very well known station is located on the third floor of the headquarters building of the International Telecommunication Union in Geneva, Switzerland. The International Amateur Radio Club, which is responsible for 4U1ITU, is supported by the IARU, who recognise the high value of an amateur service station in the headquarters of world telecommunications. The Secretary-General of the ITU, Monsieur M Mili, is a Patron of the IARC.

There are many visitors to 4U1ITU and to keep the equipment in an operational condition is a difficult and lengthy task. During the past few months the IARC has had the valuable services of David Kaplan, CX9AAK, who has offered to give a great deal of his time to maintaining 4U1ITU. David is a professional engineer and his help has been invaluable.

QSLs for the station are once again being handled by Gerard de Buren HB9AW, who devotes a great deal of time to this work.

The members of the IARC are all working persons and often it is very inconvenient to receive casual visitors. If you have the intention to visit 4U1ITU it would be appreciated if you would give notice of your forthcoming visit to the President of the Club, Ted Robinson, F8RU, IARC, Box 6, Place des Nations, 1211 Geneva 20, Switzerland."

NZART has filed its formal submission to the New Zealand Post Office in relation to WARC 79. The frequencies requested are those set out in the IARU position paper.

IARU recognises the importance of microwaves to the amateur service and reports several new records. DL7QY is reported as having designed new 3W CW/SSB 10 GHz equipment and others in Europe have designed simple gear for the same band. Is anyone interested? The REF (France) is sponsoring interest in 10 metres under the "use it or lose it" slogan. ■

BOOK REVIEW

"Solid State Design for the Radio Amateur" by Hayward and DeMaw. 256 pages. Published by ARRL, 1977. $8.00 (US). Our copy courtesy of the publishers

Seldom has a technical publication so excited the reviewer's enthusiasm as this. Readers of OST will have noticed over the past ten years or so that the name of Wes Hayward (W7OI) has

often appeared on articles of interest to the "homebrewer". Now he has, in partnership with Doug DeMaw (W1FB), the Technical Editor of QST, produced a textbook of outstanding value to all those interested in solid-state communication equipment. It reflects throughout the professional competence of both authors. In particular W7ZOI is an engineer with Tektronix, and freely acknowledges a great deal of assistance from that well-known company and other members of its Communications Division.

The book deals, in nine chapters, with most significant aspects of transmitter and receiver design, plus test equipment, modulation methods, and field operation. Emphasis is mainly on applications in the HF bands, but VHF is not entirely neglected. There are five appendices on topics such as filter design, phasing-method SSB, and toroidal-coil data. There is also an excellent bibliography of 2½ pages of references to the amateur and professional literature.

Actual items of equipment are described throughout in sufficient detail to enable the competent experimenter to duplicate them, in performance if not appearance. But the purpose of the book is not primarily to describe equipment. Rather, it is to discuss the principles involved in achieving a desired performance level, and to show by example how the design requirements (often mutually conflicting!) may successfully be reconciled. It achieves the aim better, in this reviewer's opinion, than any other single book yet published. Only the most diehard "appliance-operator" could find it other than indispensable.

VK3ABP

"Newnes Colour TV Servicing Manual" by Gordon J King. Volume 3, 233 pages. Published by Butterworths, 1977. $18.00. Our copy courtesy of the publishers.

In as much as it refers entirely to colour TV receivers for operation on the 625 line PAL system, this book will be of interest to amateur television experimenters as well as service technicians. Some of the material presented is sufficiently general to be applicable to receivers sued in Australia.

However, the greater part of the book consists of detailed descriptions, with qualitative functional theory, of specific makes and models available on the English market. As such, it is not entirely relevant to our local scene. Particularly at the "nuts and bolts" level of control and test-point locations or circuit-board layout and connections it would be of little use to the Australian technician.

VK3ABP

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN July 1977
Reception of Double Sideband Suppressed Carrier Transmission; The "Galbraith" Keyer Paddle GK1; Extending the Gating Time of the "Galbraith" Counter/Timer; Kenwood TS-520 Enhancement for CW Operation; A Short History of Channel D Marlborough or How to Set Up a Repeater in Several Hard Steps; World Problems in Radio Communication.

HAM RADIO May 1977
New Multiband Longwire Antenna Design; The Ground Screen; New Coaxial Balun; Antenna Transmission-Line Analog; 10-GHz Broadband Antenna; Automatic Control of the Ham-M Rotator; Fine Tuning The Phased Array; Mobile VHF Antenna Comparison; High Performance 80 Metre Antenna; Using the Slotted Line; Remote Switching of Antennas; Raising Masts with a Gin Pole; Designing a Phased Array with a Hand Held Calculator; All Band Bob-Tail Curtain.

QST June 1977
FM Repeater Audio—Good or Bad; Testing Grade-Out Integrated Circuits; Learning to work with Integrated Circuits; A High-Performance Low Frequency Converter; Build This Solid State Titan, Part 1; Design Your Own Active Audio Filters; Weak Signal Reception on 160 — Some Antenna Notes; What Does My S-Meter Tell Me; Phase IIII: Toward the Ultimate Amateur Satellite; Educators Learn About OSCAR and Amateur Radio; See OSCAR and Lots more at the Kennedy Space Centre; Getting High for the Bi-centennial; The Silent Leaf Assault; Ham It Up on the Broadcast Band; Anderson Answered — Local Hams do the Job; Assessing the CD Appointment Structure, Part 1; First Canadian WARC Proposals List New Ham Bands; Repeater/Remote Re-Regulation; Moved and Seconded; Are You Legal; The JARL Awards Program; The 1976 Bicentennial Relay; Sixteen Years in Iran: The EP2BQ Story; Results, Seventh Annual ARRL 160 Metre Contest; Frequency Measuring Test; 1976 VE/W Contest Results.

RADIO COMMUNICATION August 1977
Observations on the Flyswatter Antenna; After Living with the G8IBR 144 MHz Receiver; CMOS Crystal Controlled Toneburst; Modifying the Yaesu FT221 for 1.6 MHz Shift for UHF Repeater Working; The Datong UC/1 Up-Converter; Propagation Study for Satellite Links at 12 GHz.

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Build the World's Simplest Keyer; Stop that Autostart; Predict the Weather; Learn a New Language; The History of Ham Radio; The Oily Resistor Wattmeter; SSTV Slalom Game; Computer-Controlled Thermometer; Computerised RTTY Takeover; Let BASIC Control Your Next Contest; Satellite Zapper; VHF Noise Snooper; Understand Your Pet Rock; TTL Techniques; Sending HI; Build a DDRR for Your Mobile; Headphone Jack Adapter; Automatic Taping Unit; Let's Use English; CB to 10 — A Legal Alternative; The Ham Classroom; Save Your Old Speakers; Beware the Compressor; Matching Output Transformers; Stop Time-outs; Have You Tried Television; Quick Vertical; Try Power Saver Logic; HF Bands Expander; Fight Inflation! Build It Yourself; Wilson HT Mods; Try These IC-230 Mods; All Electronic Selcall.

73 April 1977
Shoot the Moon; Frustrating the Thieves; Automatic Autopatch Release; Emergency 911 System; The Downspout Vertical; RTTY That's What; Do-It-Yourself Photosensitising; Making Your Own PC Boards; Curing Mobile Noise Miseries; More on HK1TL; An Intelligent RTTY Station; Interrupts Explained; CW for the 6800; The Suer Clock; Add Class to Your Mobile; The Final Feeder; What about Surplus NICADs; The History of Ham Radio; Wind Your Own; Discriminator Output for the HR-2A; The Phantom Exposed; Retire to a Ham Heaven; Hamming the Buggy Sweepstakes; Taming the Wild Beta; A Combiner for Your 2m Whip; The Carbon Marvel; Minicom Receiver; Those Illegal CB Channels; Leading Zero Suppression; An FM Gadget; The Real Truth about SWR; Improving the Dipole; The 60 w.p.m. Conversion; Digital Autopatch; Harness the Wind. ■

AFTERTHOUGHTS

LOW COST VIDICON AMPLIFIER
(AR September 1977)
ERRATA

Page 6, centre column, 2nd para. line 8 should read: "(FET input), and also facilities for line-"

Page 6, RH column, 1st para. line 6 should read: "slope of 6 dB/octave or 20 dB/decade,"

Page 6, RH column, 2nd para. line 2 should read: "low value load resistor will produce a low"

Page 7, LH column, 3rd para. line 3 should read: "gain of 4.7. Adjustable low frequency"

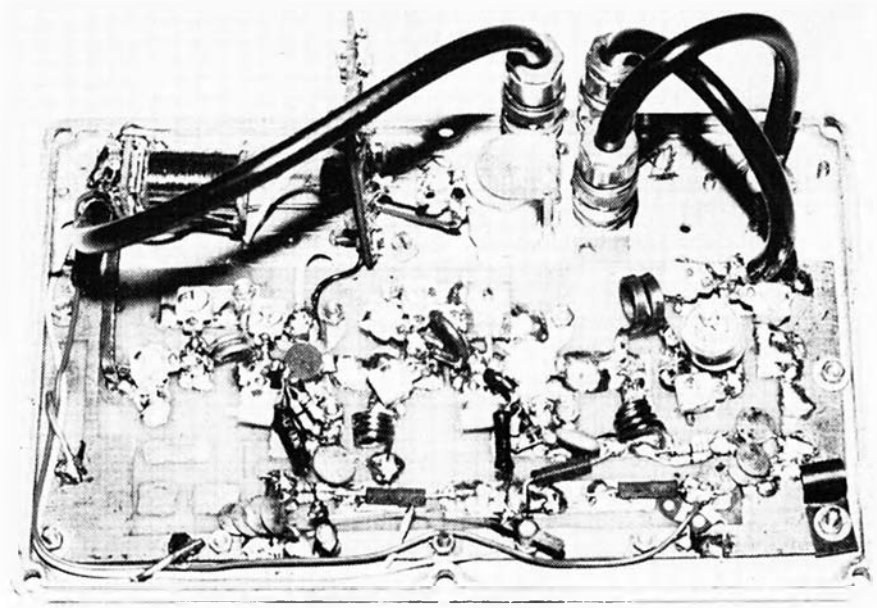
Page 7, RH column, 3rd para. line 20 should read: "across the +12V and earth rails at various"

Page 7, Circuit diagram. The bias divider chain for Q1 should have a 100 nF Hi-K ceramic capacitor across the 100 uF 16V bypass.

Page 8, centre column, 4th para. line should read: "at a certain distance from the camera, cor-" ■

PLEASE NOTE:
WANTED.
S.S.T.V. contacts.
All mode, from
52 MHz to 432 MHz
Please contact VK2ZXL
C/O Sideband Electronic
Sales 521-7573 (02)

A view of the "works" of Ian VK3ALZ's 2 metre 20W linear. See AR October 1977 page 18. — Photo by VK3AFW.



WHAT'S BLACK & WHITE AND TURNS 2-METRE OPERATORS GREEN ?

THE NEW KENWOOD TR·7400

This is the one, the Kenwood TR-7400 FM mobile transceiver of 25/10 watts and complete 2 metre band coverage (144-148 MHz). It has the largest digital readout in its class, and the 800 channel coverage with PLL frequency synthesizer provides you with all existing and proposed Australian repeaters. A convenient front panel switch offsets the transmit frequency up or down 600 kHz.

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TR-2200 2-metre VHF FM portable receiver

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Your nearest Kenwood dealer will be happy to give you more information on the entire Kenwood range of amateur radio products including the remarkable new TR-7400. Contact him direct or write to us at Weston Electronics.

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WEC AR 2

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	**VK0MA, Mawson**	**53.100**
VK1	**VK1RTA, Canberra**	**144.475**
VK2	**VK2WI, Sydney**	**52.450**
	VK2WI, Sydney	**144.010**
	VK2RHR, Mittagong	**144.120**
VK3	**VK3RTG, Vermont**	**144.700**
VK4	**VK4RTT, Mt. Mowbullan**	**144 400**
	VK4RBB, Brisbane	**432.400**
VK5	**VK5VF, Mt. Lofty**	**53.000**
	VK5VF, Mt. Lofty	**144.800**
VK6	**VK6RTV, Perth**	**52.300**
	VK6RTU, Kalgoorlie	**52.350**
	VK6RTW, Albany	**52.950**
	VK6RTW, Albany	**144.500**
	VK6RTV, Perth	**145.000**
VK7	**VK7RNT, Launceston**	**52.400**
	VK7RTX, Lonah	**144.900**
	VK7RTW, Lonah	**432.475**
VK8	**VK8VF, Darwin**	**52.200**
KG6	**KG6JDX, Guam**	**50.110**
KH6	**KH6EQI, Hawaii**	**50.104**
ZL1	**ZL1VHF, Auckland**	**145.100**
	ZL1VHW, Waikato	**145.150**
ZL2	**ZL2MHF, Upper Hutt**	**28.170**
	ZL2VHP, Manawatu	**52 500**
	ZL2VHF, Wellington	**145.200**
ZL3	**ZL3VHF, Christchurch**	**145.300**
ZL4	**ZL4VHF, Dunedin**	**145.400**

Graham VK8ZCJ writes from Darwin advising the beacon VK8VF is now operating 100 per cent. He goes on with news of happenings in that area, firstly on the six metre scene with openings to Japan as follows:

30/7 0811 to 0850Z JA1 and JA9, six stations.
17/8 1002 to 1030Z JA1TTS.
8/9 1148 to 1240Z JA1, JA2 and JA6, five stations.
9/9 1250Z JA6UWK.
10/9 1138 to 1219Z JA1, JA2 and JA3, 15 stations.
11/9 0710 to 0753Z JA1, JA2, JA3 and JA4, 16 stations.

"A couple of interesting things to note were that Tei JA1TTS worked into W6 on 12/7/77 and claimed this to be via sporadic E. This being so, five hops would be involved. For me to work VS6, JA and ZL it takes three hops and that is quite rare. (My contacts to VS6BE were by Es.) So five hop Es is really something! Tei advised me this year he has worked KG6, KL7, JD1, VK, DU, VS6 and W6, which is really great.

"KC6PO was operational last week from the Caroline Islands. The DXpedition was worked in JA on 11/9, nothing heard in Darwin.

"On 11/9 I was working JA2BZY who was copying WB5BJ/DU6 and I ran a test with the station in DU6 at the request of Yoshi. Nothing heard. Yoshi played back a tape of the station. We were all on 52.040 at the time.

"Also on 11/9 JR1AUW asked for a test on two metres. We arranged it for 1200Z but nothing heard. Six metres was not open at that time although for the three previous evenings it had been. Frequency was 144.100 MHz. There appears to be quite a bit of interest in JA about working VK on 144.

"Finally, 'Flash' VK6FN in Derby is now on 2 metres with about 100 watts to a 16 element yagi." Thanks for the news, Graham, it's good to hear someone is keeping interest alive on six metres from VK for the benefit of overseas countries. But how much easier it would be if you could operate on 50 MHz.

I was also pleased to receive a letter from Fred VK2BFJ, who lives in Killarney Vale, and who previously held the call of G3WS. For some years before coming to Australia Fred was very active on 2 metres in the UK, working a total of 14 countries in Europe in the period 1952 to 1959. Since moving to VK land he has confined himself mainly to HF operation.

However, as with all good VHF orientated amateurs he felt something lacking, and has decided to start operating on 2 metres again. A TS700A now has a good position at the operating table, and outside a 5/8 wavelength vertical for local contacts and a 10 element yagi for the DX contacts, and will look at the need for a 100 watt linear if the need arises.

We welcome you to the band, Fred, and hope you will have some enjoyable contacts, although operating is somewhat different here from the UK in that we have no close countries to work, even New Zealand is a rather elusive 2 metre contact. Good luck and always pleased to hear from you.

SIX METRES

It looks as though my thoughts on trying to regain all or portion of the 50 to 54 MHz band has not fallen on deaf ears or blind eyes. This month I have received some very interesting mail from readers, each one contributing their thoughts on the proposals outlined in the September issue of AR. There have been some extremely good suggestions made, and all will be carefully noted on the day of reckoning.

I am pleased to acknowledge correspondence on the matter from the following: Ron VK2ATQ, Geoff VK3AMK, Stephen VK3YEZ, Peter VK3ZYO, Keith VK4KK, Keith VK4AKT, Allan VK4ZBB, Reg VK6RM, Joe VK7JG and Graham VK8ZCJ. In addition Keith VK5SV and David VK5KK have both supported the proposals in discussions on the air. That makes ten letters so far, I would hope to receive at least another 100 in the next month or so. Why not write now and give me your views on the proposals? There have been a few side issues come to light in the present letters and points worth noting. At this stage I see no need to mention them as I would like to have the spontaneous presentation of your thoughts on the pros and cons of the matter without feeding you information.

I said before, and I'll say it again, if I take up something which I believe worthwhile, I will leave no stones unturned in an effort to get somewhere, but I do need the support of the VHF fraternity. Last year I worked more than 100 different stations on six metres alone, and I would expect to get some correspondence from all of you. I want your thoughts in writing, not only on the air, but certainly discuss it on the air, then write. And this applies equally to VK5 operators too, stop being lazy and half-hearted, just because I live in VK5 doesn't give you any more privileges, or to rest on your laurels or whatever you rest upon! Get cracking you locals, too.

GENERAL NEWS

From amongst the many pages of correspondence received on the matter of the 6 metre band allocation some have included various items of general interest, and the following has been selected from those pages, with acknowledgements as shown.

Ron VK2ATQ supports the suggestion re a memorial to Ron Wilkinson VK3AKC to be in the form of a trophy awarded each year to the operator who has made an outstanding contribution to VHF-UHF. What do the rest of you think?

Peter VK3ZYO remarks he had a great time on 6 metres last year, despite Channel 0, and worked VK2, 3, 4, 5, 6, 8 and P29 using 250 mW PEP output to a 4 element yagi. Great difficulty getting through at times when strong stations are around, but great fun! That's a fine spirit, Peter.

Joe VK7JG mentions in Tasmania they have a translator operating on Channel 0, which covers a limited service area and presents very little problem.

Keith VK4KK writes: "An incentive to work ZS on six metres with today's 'super-gear'. I heard ZS1ET on MCW on 50.02 approximately on Tuesday, 18th January, 1948, from 1700 to 1726 EAST R7 on peaks, with much QSB. It was apparently a beacon station identifying every 20 seconds. VK3, 5 and 6 were also in at the time. Weather patterns similar to present season. Rx — 522 (original) to 4 element yagi, 20 feet high." That's a bit of rather interesting reception Keith, I wonder if anyone else heard the station?

Geoff VK3AMK advises having received a report of W8GZ being anxious to work VK stations on 6 metres, and has been hearing signals on Channel 0 frequency.

MOONBOUNCE REPORT

From "The Propagator" Lyle VK2ALU reports that repairs were made to the dish surface and the main part of the Clavin feed was made up and installed. Initial tests showed a small improvement in gain, but the required impedance matching arrangements has yet to be installed to give the lowest SWR.

An EME test on 2/9/77 was scheduled with SM5BFK who was not heard, and F2TU who was contacted with "M" report both ways.

Further damage has been caused to the moonbounce site buildings by vandals but essential equipment has not been damaged.

VHF/UHF FIELD DAY

I note the New Zealanders are going ahead with their annual Field Day on Saturday, 3/12, and Sunday, 4/12, and will be operating on Saturday night and Sunday morning local time.

The VK5s have tried to hold a Field Day Contest on the first week-end in December for several years with not a lot of success, especially when it comes to having logs returned. However, there does not seem to be any need to drop the idea entirely, so what about the following suggestions being followed this year for a round Australia VHF Field Day?

1. Base the operation upon the rules and regulations for the 1974/75 Ross Hull Contest, including scoring on the distance scale.

2. Cross band contacts permitted with points being claimed for those applicable to the higher frequency band of the contact concerned.

3. Contacts with the same stations permitted at not less than two hourly intervals for band to band or cross band contacts as the case may be.

4. Field Day stations to be powered from a source other than AC mains. Operation from a vehicle permitted provided it is stationary. Contacts through repeaters not to be included in scoring.

5. Base stations are invited to work field day stations and to exchange numbers in the usual way.

6. Fill out your log book in the usual way, showing the contest numbers exchanged, add in the points score and approximate mileages, then have your sheets photo-copied. This will save the need for hand copying on to contest pages. Most people have access to a photo-copier in their area.

7. Include the usual front sheet as per Ross Hull rules, and forward to VK5LP by the end of January 1978. There will be a trophy for the winning entrant.

8. The aim of the field day is to assess whether there is enough overall interest to have a try at making it an annual event. By using the Ross Hull rules for 1974/75, which were published in the AR, instead of the current rules there is some incentive to take out equipment for more than one band. The cross band operation helps you to keep active during the day, and keeps you on your toes. Try it!

9. Operating hours to be from 0730Z on Saturday, 3/12/77, to 0730Z on Sunday, 4/12/77, for the 24 hour section, and for those unable to operate for 24 hours any two three hour continuous periods, e.g. from 0800 to 1100Z on 3/12 and 1900 to 2200Z. This makes a total of six hours. You may also operate for any one period of six continuous hours if you so choose. Your front sheet should show the operating hours and the points scored for those periods. Separate trophy for the six hour section.

10. These are a set of hastily drawn up rules anyway. If you are not sure about any points use your own sensible judgement and interpretation of what you believe would have been required. Even if you cannot go out to a field day site, why not come on and give those who do some contacts? With the possibility of some stations at good sites in different areas of Australia it might be surprising how far contacts can be made, particularly on 2 metres, and it will be the right time of the year for them too.

That's about all for this month, things have been a bit slack on the air, and I have been rather busy, so probably have missed a few things. Concluding with the thought for the month: "Most ignorance is vincible ignorance. We don't know because we don't want to know."

73. The Voice in the Hills. ■

AROUND THE TRADE

LOW COST SURVEILLANCE RECEIVER

The Watkins-Johnson Company, who specialise in defence communications equipment, has now produced a modestly priced general purpose HF receiver which is ideal for surveillance work.

Identified as the Model WJ-8718, it is designed to be used in either a manual mode or with remote digital frequency control. It is capable of detecting AM, FM, CW, ISB, LSB and USB transmissions (A1, A2, A3a, A3b, A3j, A4, F1, F2, F3 and F4) over the frequency range.

Using the building block approach, certain features are available as options to increase the capabilities of the receiver. The mainframe provides the following:

- 5 kHz to 30 MHz Frequency Coverage.
- Seven Selectable IF Bandwidths from .3 to 16 kHz (including the ISB option).
- Seven-digit Green LED Frequency Display.
- AM, FM, and CW Detection Modes.
- Low Phase Noise Frequency Synthesizers.
- 10 Hz Tuning Steps.
- Tunable Synthesized BFO (± 8 kHz).
- Audio Level/Signal Strength Meter.

Options included the following:

- Remote Control Module (RCM).
- Manual Control Module (MCM).
- ISB Module (ISB).
- Sub-Octave Preselector Module (PRE).
- 10 Hz BFO Synthesizer Resolution (B10).

Tuning range of the WJ-8718 is 5 kHz to 29.99999 HMz with a tuning resolution of 10 Hz. Frequency display is by 7 digit green LEDs.

Full technical specifications are available from R. H. Cunningham Pty. Ltd., phone (03) 329 9633. ■

SENNHEISER INFRA-RED SOUND

Sennheiser Electronic of Hanover, West Germany, and its partner in Australia for over twenty years, R. H. Cunningham Pty. Ltd., announces the introduction into Australia of Infra-Red sound. It will be known commercially as SENNHEISER INFRAPORT. It is claimed to be the only major innovation in high fidelity sound since the introduction of the "compact cassette" some thirteen years ago.

The major attraction to the SENNHEISER INFRAPORT system is that an audio signal may be received through headphones without any cables, wires or leads to get in the way or obstruct any movement. Models are available in both monophonic and stereophonic versions. ■

DICK SMITH RETAIL STORE OPENS AT PARRAMATTA

Dick Smith Electronics opened their sixth store at Parramatta on August 1st, 1977.

The new store, situated in Perkins House, 30 Grose Street, is the sixth in a growing chain of "Electronics for the Enthusiast Stores" — Grose Street runs parallel with Victoria Road, north of Parramatta.

The first store at Gore Hill opened nine years ago and since that date, Dick has opened stores in the City (York Street, Sydney), Bankstown, N.S.W., Brisbane and Melbourne. The Manager of Parramatta is Bill Edge who formerly managed his own electronics business in Sydney, called Edge Electrix.

Dick expects the Parramatta store to grow with the Parramatta area, which is a major shopping centre. ■

LARA

Ladies Amateur Radio Association

In this month's article we have news of YLs from all over the place.

Susan VK2BSB, after an absence of some years, is suddenly bursting with enthusiasm for amateur radio. She has started a new radio club, the Liverpool and Districts Radio Club. No doubt she will be pleased to hear from any interested amateurs living near Liverpool.

Two New Zealand YLs have joined the DXpedition to the Permadeck Island Group near Auckland. They are Marilyn Lister ZL1BKL and Carol Johnston ZL1AJL. They are at Raoul Island, which is the largest of the group and the only populated one. The population of ten operates the meteorological station on the island. The whole island group is a flora and fauna reserve and the DXpedition party had to obtain special permission from the New Zealand Government.

Speaking of New Zealand, Mavis VK3KS won 8th place in the recent WARO competition. She was the only DX YL to compete, and special mention was made of this fact. Unfortunately she was referred to as VK3XB.

Lorraine, wife of VK6BV, should by now be admiring the new quad in the back yard. The last one was destroyed during the Kalgoorlie earthquake.

One of the newest licensed YLs in New South Wales is Elizabeth VK2BIX. Elizabeth also holds a commercial operator's licence.

One of the latest Victorian licensees is our very own publicity officer, Heather VK3NFY. Heather is working steadily towards the full call.

In the 1977 Call Book 32 licensed YLs and 26 YL shortwave listeners are listed.

In next month's AR we will be starting a series on semi-famous Australian licensed YLs.

33's from LARA.

Heather Mitchell 3NFY, Publicity Officer. ■

QSP

QRP

An article by K8EEG in June '77 CQ mentions the "almost impossible" challenge of working 100 countries with less than 5 watts output. It had not been done before but now five stations have qualified. The harder DXCC Milliwatt Award (1 watt power output) has not yet been achieved, says the article.

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded. Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book (note for October AR only — because of delays in processing, the 1975 Call Book refers).

FOR SALE

DC-200 Yaesu Mobile Power Supply for FT200, complete with plugs and cable, very good condition, $60. Mark mobile helical whips HW-80, HW-40, HW-20, $15 each. VK3EK, QTHR. Ph. (03) 45 1861.

Toroidal Cores again available. Build that balun or antenna coupling unit now. Cores similar to p. 581 of 1977 ARRL Handbook. Handle legal power 3-30 MHz, $7.55 ea., plus postage. VK3AGF, QTHR. Ph. (03) 379 6524.

Yaesu FTDX 401 10/80m, matching speaker, mic., cooling fan, excellent CW filter and effective noise blanker. Instruction manual. Price $400. Also Multi 7 2m, excellent performer, 13 sets of crystals, $170. VK2AAC, QTHR. Ph. (02) 521 7080.

Ideal DX location at foot of Mt. William. Using old country church intended for conversion to weekender, easy access to Grampians, Ararat and Great Western, 200 km Melbourne; partly furnished, electric stove and refrig., electricity and water. Owner transferred interstate, $6,000. VK3OB, QTHR. Ph. (03) 560 2804.

Swan 350 Transceiver with AC power supply, good condition, $350. VK4WB, QTHR.

Grolier Australian Encyclopaedia (9 volumes plus 1 Index), never used, gift duplicated, $50. VK2AML, QTHR. Ph. (02) 59 6636.

Atlas AC Power Console for Atlas 210X, etc., in excellent condition; also complete set of ASAHI AS303A mobile centre loaded whips for 80 to 10m. VK4XT, QTHR, or write to Box 496, Dalby. Ph. (074) 62 2389.

Lafayette Ha-600A all band RX, excellent condition, 2 speakers, headphones, complete with manual and battery cable. $150 or ONO. A. Harrison, Nilma. Ph. (056) 23 2450.

Kyokuto FM114-10LA 12 channel 2m FM Transceiver, complete with commercial 5/8 whip. $120 or ONO. VK2BNL, QTHR. Ph. (02) 48 1263.

Ken KP202 C/W ch. 2, 4, 6, 8, Simplex 40 and 50, nicads, and Ken charger, original condition, $145. Siewa 25/2 watt C/W ch. 2, 4, 6, 8, Simplex 40, 50, 51, excellent condition, $160. Will exchange for good general coverage comm. Rx. Ray Price VK3AWQ. Ph. (056) 74 1351.

Brand new Atlas 210X solid state SSB Transceiver with noise blanker, Atlas 240V deluxe AC console speaker, Atlas deluxe mobile mount, Atlas 10X 10 ch. xtal oscillator, Shure 404C mike, mark anixer helical mobile antennas for 80, 40, 20m, with mobile base; all equipment brand new in factory sealed cartons, $1,250; also brand new Wilson WE-800 2m FM portable synthesized radio, switchable 1 and 12W output, complete with nicad batteries, frequency range 144-148 MHz in 5 kHz steps, five pre-set channels, $399. James Goodger VK2JO. Ph. (02) 36 2981.

Novice Band 10m Transceiver, converted SBE sideband, 23 ch. CB, new; nominal PEP out. 20W, $235. VK3BDM, QTHR. Ph. (03) 48 4083 A.H., (03) 49 5160 Bus.

Field Strength Meter for ham or CB use, $6; Joystick antenna, 1.50 to 30 MHz C/W type 5 and type 3 ATUs, $25; Woden UM1 modulation transformer, $8; HF and VHF tubes, all new or as new, QQVO3-20 or 20A, $10 ea.; QQVO6-40, $12; QVO4-7, $3 ea.; 2E26, $4; 5763, $3 ea.; 5B/254m, $5 ea. or $9 pair; EC91 at $3 ea.; EF95 EF91/Z77 at $2 ea.; power transistors, types 2N1490 and 2N1514, ideal for high current LV regulated power supplies, $5 ea.; Eddystone split stator variable capacitors VHF type 583, either 15 x 15 pF or 25 x 25 pF, $3 ea.; Collaro high fidelity crystal microphone, hand type, $10; fundamental freq. B7G type xtals, all new, in following frequencies 7027, 7066, 7083 kHz, $5 ea.; harmonic frequency types, also new, 10833, 11750, 14080, 15030, 21777, 32500 and 34000 MHz at $4 ea. VK2BFJ, QTHR. Ph. (043) 32 5758 any time.

Teleprinter Model 15, brand new, complete, $70. VK3ZY, QTHR. Ph. (03) 277 4748 A.H., 630 5981 Bus.

FT200 with full 10m crystals, power supply, speaker and mic., $295; TS520, used only Jan. to Apr. 1977, $570. VK2BMI, QTHR. Ph. (02) 771 1657 A.H.

Yaesu FT101 160-10m, plus SP101 and mic.; Yaesu FL2100 linear; Heathkit HQ10 monitor scope; Trio 9R59DS com. Rx 550-30 MHz; Trio mic. MR50 plus stand valves 572B 6JS6; mobile helical antenna and mount. Must sell all gear; best offers. VK2BSP, 7 Amaroo Ave., Wahroonga. Ph. (02) 48 6624.

Galaxy III, 80-40-20m Transceiver, 440W input, with matching AC power supply/spkr. and DC power supply, with manual, new spare final tubes and mobile mount, $350. VK6ED, QTHR. Ph. (097) 52 1173.

VHF Gear: FTV-650 6m transverter, "FTV-250" 2m transverter, switching box providing for mono/crossband operation with up to 4 transverters plus HF, 3 spare FTV-650 cases and meters, misc. Yaesu parts, $350 the set. FM 2m mobile, Inoue IC20 with 4 current xtls, $115. Oscar array comprising 2 el. 29 MHz yagi, 11 el. 146 MHz LPA, masts, AR22R rotator, control until and control cables, $100. Bob VK3AOT. QTHR. Ph. (03) 697 6612 (bus.), (03) 787 6426 (AH).

FT200 Transceiver with power supply, handbook and complete set spare valves, $350. VK2ABB, QTHR. Ph. (02) 520 0866.

Lafayette P100A VHF Rx Tunes 144-174 MHz FM, plus 2 xtl. channels, includes inbuilt A/C power supply, speaker, mobile cradle, dial lamp, mute, cables and hardware. As new in box, $75. Ph. (03) 467 2131 bus., or (03) 460 7973 (AH).

Collins 500 kHz Mech. Filters, 1 set, B/Ws 800 Hz, 3-1 kHz and 6.0 kHz, sell $30 or swap for 9 MHz SSB filter plus 1 or 2 carrier xtls.; also 1 Collins 455 kHz mech. filter for CW, $15. VK2YDY, QTHR. Ph. (067) 52 1185.

Steel Tower, 86 ft. free standing, 4 sections, fitted with heavy duty prop.-pitch rotator and indicator unit and TH6DXX antenna. Ultimate DX outfit, easily transported and erected, $450 ONO. VK3BAJ. Ph. (03) 874 5554 bus.

KW Viceroy Mark IIIa Tx 10-80m, $375; Hallicrafters SX117 Rx Triple Conv. xtl calib. xtls for 160m (plus 160 conv.) 80-40-20-15-10m. Up to 29 MHz 10 MHz WWV and provision for 5 further 500 kHz segments in range 75 kHz to 30 MHz, $300; SB200 10-80m linear amp. 2x572B in final, $400; DX100 Tx 160-10m CW rig, includes hefty (2 kW?) 117/234 tranny, $70. VK6HD, QTHR.

Rotators Ham II, $125; Alliance U100, 115 volt, ideal VHF or small HF ant., $35; Marconi HF sig. gen. 20 kHz-30 MHz, $175; IC22 crystals, rpt. 1, 3, 4, 5, 6 and 7, simplex 50, 51 and 147.63, $7 per set; Yaesu YD844 deluxe desk mic., $30. VK3OM, QTHR. Ph. (03) 560 9215.

Power Supply 230V 40/60 Hz input, 325V at 30/90 mA DC out, assembled on rugged chassis, primary and secondary fused, mains xfmr oil filled, size of PS is 12 in. x 7 in. x 6½ in., no case, $25; Woden UM1 modulation xfmr, $10; low voltage bench power supply 6 to 15V DC adjustable output at 50 mA, S/C protected, $15; VHF tubes QQV03-20A, $10 each; QQV06-40, $12; QV06-20 (6146), $5; QV04-7, $3; M/C meters 2¼ in. sq. face 0-20 mA FSD manuf. by E. Turner (UK), $10 ea. Please add little extra for postage or freight. Ph. (043) 32 5758 any time.

Central Electronics Signal Slicer (SSB adaptor) Model "B" with built-in "Q" multiplier — 115V AC — $50; Johnson Courier Linear, pair 811As, 115V AC — $95. VK3LS, QTHR. Ph. (03) 82 2152.

Atlas 215X Solid State HF SSB Transceiver, brand new, with noise blanker, mic. and comprehensive lab. report and handbook, guaranteed performance 160-15m, superb receiver, ideal mobile rig, price: $750, is approx. $200 off local new price. Vic. VK3AVP. Ph. (03) 231 2452.

Citizen Dual Time L.C.D. Chronograph Watch with stop watch facility, brand new with guarantee, gold, spare battery, accuracy within 5 secs per month, ideal watch for the Dxer, settable to any additional time zone. Price: $150 ONO. Vic VK3AVP. Ph. (03) 231 2452.

Brand new New-Tronics Hustler 4-BTV vertical trap antenna giving 10-40 metre coverage. Never used as minibeam to take its place. Separate settings for phone and CW not necessary. Radiation efficiency greater than other trap verticals. $100 ONO. Ken VK6ZA, Box 768, Carnarvon 6701. Ph. (099) 41 1001.

OBITUARY

LINDSAY H (TUBBY) VALE VK5NO

With the sudden death of "Tubby" Vale, VK5NO on October 1st, 1977, Australia and the world lost one of its foremost Amateurs and Contest Operators.

First licensed in the early 30s as VK3MK, Tubby worked with Electronics the whole of his life, as well as making it his hobby. Many of today's amateurs can look back to the help and encouragement given them by 5NO when studying for their AOCP. Right up to the time of his death he conducted slow code practice sessions for beginners.

His quest for further knowledge took him to various parts of Australia and England, with short periods in both France and Belgium and as well as the two callsigns previously mentioned he also operated VK2ALU, 2ANN, 8NO and a G call.

Although lacking in academic qualifications, Tubby was able, by sheer knowledge and ability to push his way to the fore in his sphere. He relinquished his job as Chief Electronics Engineer with De Havilland (Australia) to take up the position as Manager of the ELDO Satellite Tracking Station at Gove in the Northern Territory. It was while he was there that the heart condition that led to his death, first manifested itself.

Everyone who worked an RD Contest will remember the outstanding scores made by 5NO. This was despite the fact that he never used a transceiver, always separate pieces of equipment which he made himself. Only a few months ago he obtained the wherewithal to transceive. The first and only time he ever bought any ready made gear — and was looking forward to using it in the CW Section of the VK-ZL Contest this year. It was in CW contest operation that Tubby excelled and he won awards from all the amateur countries of the world. The electronic keyers that he designed and built are well known wherever code is used.

I first worked Tubby on Dec. 26th 1937; and shortly after that date we set up weekly skeds which, other than war years and when he was abroad (when we wrote), we kept up to the time of his death. The last sked was just an hour or so before he died, when he told me of a new TVI filter he had developed. These skeds became well known and many others joined in over the years and I know that several SWLs became Amateurs because of listening to them.

I and many others, will always remember him by his saying when faced by a problem: "There must be an easier way of doing this".

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. M. P. MARSCHALL	**VK3MM**
Mr. J. MARSLAND	**VK3NY**
Mr. L. H. VALE	**VK5NO**
Mr. R. J. MUTTON	**L20413**

All amateurs would like to extend their deepest sympathy to his wife Joyce, who has had a harrowing time over the last few years because she knew that Tubby could go at any minute; daughters Stephanie and Joanne and son Jeff VK3BHC.

73 Tubby Sk de VK2AHM Jeff

JIM MARSLAND VK3NY

It is with great sorrow we record the passing of Jim Marsland VK3NY, on the 29th September, 1977.

Jim was licensed in 1931 and three months later moved to Camperdown where he actively communicated and experimented on the 3.5 and 7 MHz bands and on the then very popular 200 metre broadcast band.

At a later date he moved back to Melbourne and was an active member of the Victorian Division of the Wireless Institute of Australia. Prior to World War II he was a member of the RAAF Wireless Reserve from which the Combined Services drew so many well trained operators.

In 1933 Jim was appointed to the Amateur Radio magazine committee to which he devoted tremendous energy, particularly during World War II when the magazine was produced on rationed paper supplies and took the form of a rationed publication. He continued this work until 1960.

In 1935 he was appointed Treasurer of the Victorian Division of the WIA which post he held until 1948. He carried out this arduous task in addition to the continuous work of the Magazine Committee. The continued success of the WIA Victorian Division and of the official WIA magazine was in no small part attributable to the interest and energy of Jim Marsland who gave unsparingly of his time in an honorary capacity.

Like all amateurs, he contributed his part to the vast world-wide network of amateur radio operators who have done so much for the progress of communications and whose international goodwill has bridged the boundaries of race, colour and creed in a manner unsurpassed by mankind in other walks of life.

The fraternity of amateur radio operators is the sadder for his passing and extend sympathy to the bereaved family of VK3NY.

FTV-650 6 metre Transverter in as new condition with handbook, $150. VK2ZDJ, 45 Blume Ave., Griffith. Ph. (069) 62 4937 A.H.

WANTED

Kleinschmidt Telatypewriter TT-119 or similar, any condition. Also Kleinschmidt series governed motor. Ed Penikis VK1VP, QTHR.

Multi 7 2m Transceiver, complete with repeater xtls, in going order or not; or repeater sets 1-8 suit same set (separate). Ring Geoff VK2AZT. Ph. (069) 42 1392 with prices.

Information/Circuit/Handbook BC 348m Rx and PS for school electronics group; self supporting tower to 50 ft. If in sections, Hunter Valley area. Quote to VK2BLP, Warners Bay High.

Linear Amp., 80-10m, good condition; VLF receiver down to about 14 MHz. Details and price to VK6ED, QTHR.

Linear Amplifier for HF bands, commercial unit preferred. Particulars to VK3PW, QTHR. Ph. (03) 99 5527.

Kyokuto Synth. 2 Mx Transceiver, VK3AFW, QTHR.

Licensed Amateur (full call) for private tutoring a student going for licence. Prefer local person. Fee negotiable (theory only). Ph. (03) 97 6031 (Moorabbin).

Mini-Products Hybrid Quad Antenna, 6-10-15-20m. Details and price to Ken VK6ZA, Box 768, Carnarvon 6701. Ph. (099) 41 1001.

Forest Phone, either converted or suitable for conversion to 160m. Please write John Dawes VK3BJE, P.O. Box 195, Greensborough 3088. Ph. (03) 435 4599.

Bottom mast clamp for EMOTATOR beam rotator, Model 1100M or rotator complete with bottom mast clamp. VK3LS, QTHR. Ph. (03) 82 2152.

German WW II Military Morse Telegraph Key. Preferably in going order. VK3GK, Box 5, Clayton, Vic. 3182. Ph. (03) 544 4108.

FT101 Transceiver, prefer early model to about $400. Partics. to VK3OM, QTHR. Ph. (03) 560 9215.

Antenna tower Hy-gain 'Hy-Tower' model 18HT, 80m to 10m vertical. VK2BFJ, QTHR. Ph. (043) 32 5758 any time.

FT200 or similar tcvr, unmodified, will pay up to $400. VK3NCP, QTHR.

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$795

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Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. In addition to the ham bands, tunes any fifteen 500 kHz ranges between 1.5 and 30 MHz, 5.0 to 6.0 MHz not recommended. Can be used for MARS, WWV, CB, Marine and Shortwave broadcasts.

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New high efficiency accessory noise blanker that operates in all modes.

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Scratch resistant epoxy paint finish.

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Drake MS-4

Drake MS-4 Matching Speaker for use with R-4, R-4A, R-4B and R-4C Receivers. (Has space to house AC-3 and AC-4 Power Supplies).

$695

Drake T-4XC

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. Four 500 kHz ranges in addition to the ham bands plus one fixed-frequency range can be switch-selected from the front panel.

Two 8-pole crystal lattice filters for sideband selection.

Transceives with the R-4, R-4A, R-4B, R-4C and SPR-4 Receivers. Switch on the T-4XC selects frequency control by receiver or transmitter PTO or independently. Illuminated dial shows which PTO is in use.

Usb, lsb, a-m and cw on all bands.

Controlled-carrier modulation for a-m is compatible with ssb linear amplifiers.

Automatic transmit-receive switching. Separate VOX time-delay adjustments for phone and cw. VOX gain is independent of microphone gain.

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Meter reads relative output or plate current with switch on load control.

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provide more than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.

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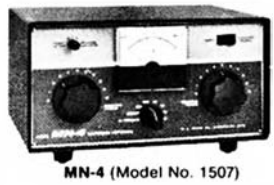

$165

MN-4 (Model No. 1507)

$310

MN-2000 (Model No. 1509)

Drake MN-4 & MN-2000 Matching Networks

• **Integral Wattmeter** reads forward power in watts and VSWR directly; can be calibrated to read reflected power • **Matches 50 ohm transmitter output** to coax antenna feedline with VSWR of at least 5:1 • **Covers ham bands** 80 thru 10 meters • **Switches in or out** with front panel switch • **Size:** 5½"H, 10¾"W, 8"D (14.0 x 27.3 x 20.3 cm). MN-2000, 14⅜"D (36.5 cm). • **Continuous Duty Output:** MN-4, 200 watts; MN-2000, 1000 watts (2000 watts PEP) • **MN-2000 only:** Up to 3 antenna connectors selected by front panel switch.

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NEW SHIPMENT — JUST ARRIVED

Low Pass Filters for Transmitters

have four pi sections for sharp cut off below channel 2, and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm. SO-239 connectors built in.

Drake TV-3300-LP

1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as TV front-end problems. **$32**

Drake TV-5200-LP

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Drake TV-42-LP

is a four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input.

$19

Prices shown include Tax

Write, 'phone or call for technical information.

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IC22S 2m fm synthesised with programmable matrix. ICOM quality with back-up technical support.

IC202

The IC202 is the 2M portable which puts communication in your hand with 3 watts pep SSB and CW, true IF noise blanker, VXO tuning, and provision for external power and antenna connections. Comes complete with mic, carry strap, dry cells, plugs, English manual, and VICOM 90 day warranty.

IC245

VICOM brings the VFO revolution to you with the IC245 mobile 144 thru 148MHz transceiver. The IC245 features accurate tuning over 50 detent steps, digital display in 5KHz steps, modes: fm, ssb (with optional adapter only) and cw. Carrier suppression better than 40dB. TX output 10w fm. Comes complete with mic, bracket, manual and VICOM 90 day warranty.

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The ATLAS 350-XL from VICOM is the new, all solid state SSB transceiver covering 160 thru 10 metres with 350w pep input and with the superb selectivity for which ATLAS is renowned. Plug in options include digital display, auxiliary VFO and auxiliary oscillator.

VICOM provides a whole world of communication products complete with the technical backup and support demanded in maketing specialised, sophisticated equipment. Come and see our wide range of transceivers and accessories, and receive the friendly personalised service for which **VICOM** has become famous.

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IC202 2m ssb portable transceiver	199.00
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– ssb attachment for above	10.00
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BC20 nicad battery pack	57.00
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ATLAS

ATLAS MODEL 210X/215X SERIES:	
210X transceiver, solid-state with noise blanker	990.00
215X transceiver, solid-state with noise blanker	990.00
ATLAS MODEL 350XL SERIES:	
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350PS matching AC supply, 240 volt	285.00
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TS520S HF transceiver 160 tru 10 metres	685.00
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AS-KDA spring mount (base) for mobile antennas	17.50
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CSW216 "two-in-one" incl swr/-pwr meter	219.00

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NRD-505 Professional Communications Receiver (with memory & filter options)	2499.00

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MERRY CHRISTMAS and HAPPY NEW YEAR

TO ALL OUR CLIENTS

73
KEN VK3CW

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THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER

The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

$328

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MW BAND
PUSH-BUTTON TUNING
SPECIFICATIONS:
Power Supply: 12 V DC
Receiving Frequency: MW 520KC (580M) — 1640KC (183M)
Intermediate Frequency: 455KC
Audio Output: 4.5W
Transistors: 8, diode 4
Speaker: 5" Permanent Dynamic 4 ohm
Sensitivity: Less than 20 uV at 20 N/S
Selectivity: More than 25 dB at + 10 kHz detuning
A.G.C.: More than 45 dB at 1,000 kHz
IF Rejection: More than 40 dB at 600 kHz
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Cabinet Dimension: 1-7/8" (H) x 6-1/5" (W) x 4-1/8" (D)

$32.90 — Free Post

MODEL OL64 D/P MULTIMETER. Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB. Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available, Model C $6.90.

$32.50 **Postage $2.20**

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AM/AIR VHF
SPECIFICATIONS:
Freq. Range: AM530-1600 kHz, AIR (VHF) 108-174 MHz. **Intermed. Freq.:** AM 465 kHz, FM 10.7 MHz. **Output:** 450 mW max. **Speaker:** 2½" permanent—magnetic dynamic type, 8 ohm. **Power Source:** DC — 6V (4 x UM3 Penlite) or equivalent. **Semiconductor:** 10 trans., 7 diode. **Dimensions:** 8½" (W) x 4½" (H) x 1-7/8" (D)

$18.90 — Postage $1.40

MODEL AS100 D/P MULTIMETER

This meter features double zener diode meter protection and 3½" full view easy to read 2 colour scale. It is fitted with polarity reversing switch and housed in a strong moulded case with carrying handle.
SPECIFICATION: 1000,000 ohm/volt DC. 10,0000 ohm/volt AC. **DC Volts:** 0.3, 3, 12, 60, 120, 300, 600, 1,200. **AC Volts:** 6, 30, 120, 300, 600, 1,200. **DC Amps:** 12 uA, 6 mA, 60 mA, 300 mA, 12A. **Ohms:** 2k, 200k, 2m, 20m, 200m ohm. **Centre Scale:** 20 ohm, 2,000 ohm, 20,000 ohm, 200,000 ohm, 20m ohm. **Decibel** —20 to +57 db. **Dimensions:** 7-3/5 x 5-2/5 x 2-3/5 ins. Carrying case for model I — $7.90.
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with screw driver adjustment, available in 9-17 and 25 pF. While they last at

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0-1 mA moemvent calibrated, 0-5 ounces. Brand new in boxes.

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All extremely high quality.

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We also have a large range of **ELECTRONIC DISPOSALS EQUIPMENT,** including TRANSFORMERS, CABLE, TEST EQUIPMENT, TRANSMITTERS, METERS, etc.

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WE STOCK CB GEAR AS WELL AT VERY COMPETITIVE PRICES, INCLUDING ANTENNAS AND ACCESSORIES.

FOR MORE BARGAINS SEE ALSO OUR ADVERTISEMENT ON PAGE 23

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped SAE for immediate reply from the above address. Larger items can be sent F.O.B. Due to circumstances beyond our control, prices quoted in this advertisement are subject to alteration without notice. New equipment available at our Bridge Road Store.

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YAESU

Equipment to complement any decor...

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Photo shows the latest in all solid-state equipment for the discerning radio amateur. Included is the FT-301D HF Digital read-out transceiver, with matching YO-301 CRO-monitor-scope and FP-301D A.C. P.S. which includes electronic digital clock and provision for automatic CW ident. Also shown is the FT-227R 800 chan. mobile/base FM transceiver with dig. frequency read-out, YP-150 dummy load/power meter, YD-844 desk microphone, YH-55 headset, HK-808 deluxe morse key, SWR-200 meter and 1102MXX Emotator control unit.

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FOREWORD

This book sets out to give you a wider glimpse of amateur radio, and should assist the beginner to understand why amateur radio possesses the fascination it does to so many people from all walks of life.

The original thought was to produce a Wireless Institute year book, but other commitments prevented this. The happy thought came forward that more might be achieved if the purchaser could see the kind of monthly journal produced for the members and distributed to them free as one part of the benefits of membership.

Although the book is a modied version of the regular "Amateur Radio" magazine, the style of presentation and most of the regular features have been retained and various articles specially prepared for those wanting to know more about amateur radio.

I commend this book for serious attention.

Melbourne
December 1977.

D. A. WARDLAW VK3ADW,
WIA Federal President.

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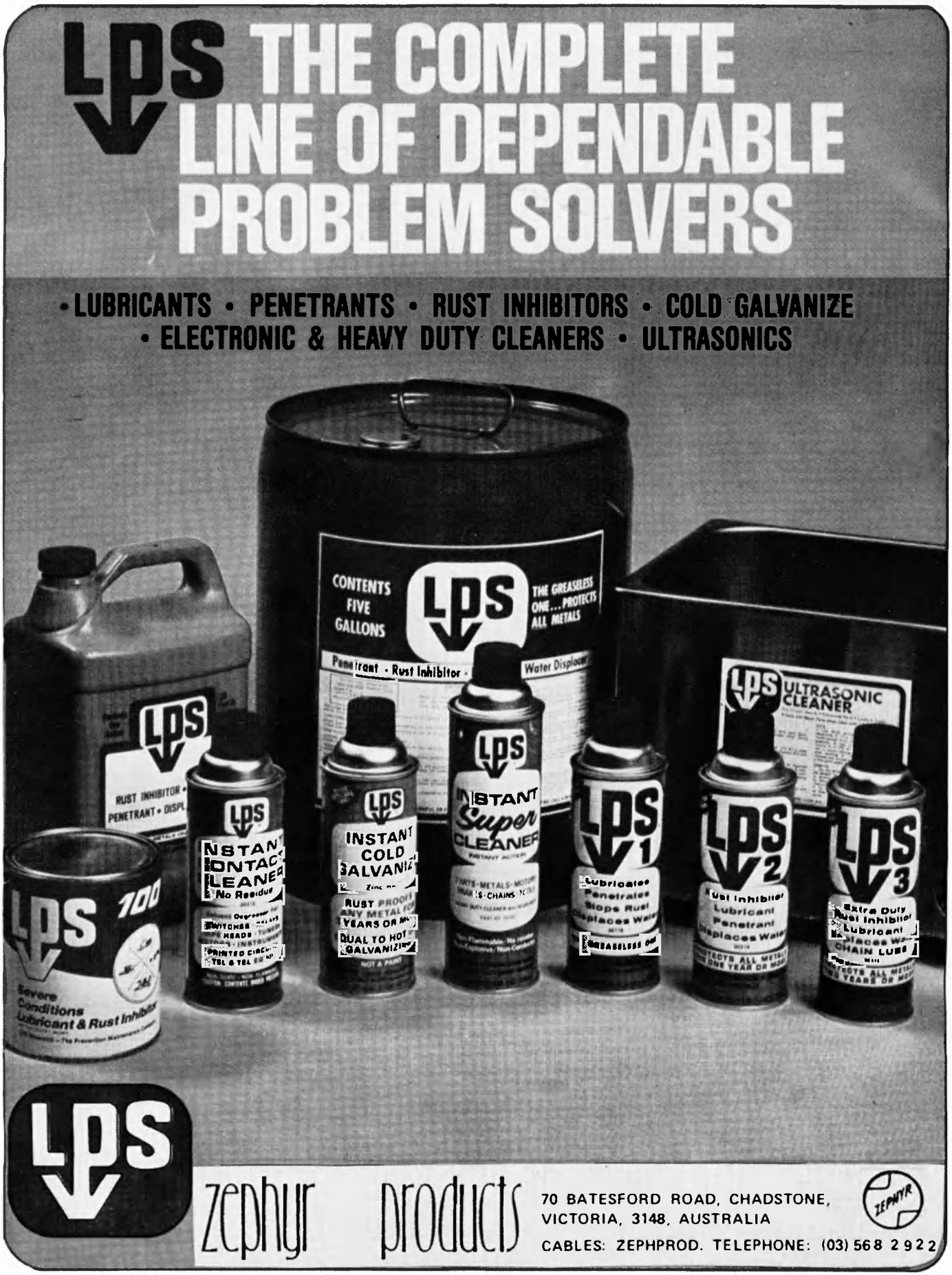
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WIANEWS

PUBLICATION DELAYS

The power restrictions in Melbourne during October have affected AR. Delays in type-setting, printing and addressing will affect distribution through into the New Year.

1977 CALL BOOK

The Call Book is virtually out of print, although individual copies may still be obtainable at technical bookshops and amateur equipment suppliers.

EDP

The October meeting of the Executive decided upon various changes affecting the computer programme after investigations had been made of commercial operations.

NOVICE EXAMINATIONS

The Federal Education Co-ordinator advised that the Novice exam syllabus submitted to the P. and T. Department was generally quite acceptable. Official comment is delayed through pressure of work. It was considered that various topic areas should be included in the syllabus at a very basic level to permit simple questions being set in the Novice exams. These topics were FM, frequency measuring technique, transmission lines, pulse modulation, CROs, 3-element yagis, receiver sensitivity figures and basic knowledge of VFOs.

In relation to Novice Morse exams the proposals from Roger Davis VK4AAR suggesting faster-sent characters and greater-length spacing to improve the intelligibility of 5 w.p.m. Morse has been favourably received by the Department.

2m REPEATERS

The Department has been advised of the newly WIA approved 2 metre band additional repeater channels.

NSW YOUTH RADIO SERVICE

Rex Black VK2YA, reports the Management Committee is rapidly reaching the end of its mammoth task of producing 1000 Novice questions. Sets of 50 questions will be available on five different topics. Details available from their Education Officer, David Wilson VK2ZCA.

YRS activities are not restricted to school age youngsters. Many of the YRS-registered clubs contain "student" members of quite mature years, including father and son combinations attending for Novice training. A large part of the YRS elementary courses for YRS certificate awards cover the Novice (proposed) syllabus.

Students of school age who gain these awards will find them useful when applying for employment in allied subjects as demonstrating a continuing interest in radio on a serious and systematic level.

Further certificate courses are available for telephony and telegraphy as well as Regulations to ensure learning and applying correct procedures. These courses include the availability of Morse tapes.

The trial Novice exam project introduced by NSW YRS has proved to be of great help to prospective Novices. This has also been the experience in Victoria. A Novice instruction kit has been prepared to make the instructional task much easier at club level — possibly similar to the package available in VK4. The price is only $12 to Class Instructors. Contact VK2ZCA, Ph. (02) 621 2763.

RON WILKINSON AWARD

The Federal President and the Executive Vice-President visited Mrs. Mary Wilkinson, widow of the late Ron Wilkinson (VK3AKC), early in October for discussions about the kind of award she favoured as a memorial. Mrs. Wilkinson has donated $1,100 towards funding this award and this was most gratefully received.

GENERAL

Mr. Peter Wolfenden VK3ZPA, the Federal Vice-President, has agreed to represent the Federal body of the Institute at the Eastern Zone Convention in Leongatha towards the end of November. ■

AMATEUR RADIO AND THE COMMUNITY

A member of the public could become aware of amateur radio in several ways. Public displays, Scouts' Jamboree-on-the-Air, or even through school radio clubs. Occasionally he might read about it in the press, although journalists still delight, erroneously, in lumping together as "ham radio" all radio activities by private persons.

But in more subtle ways the existence of amateur radio could come to notice in less pleasant ways. Either because a neighbourhood garden might suddenly sprout a tower topped by a beam aerial or by way of interference to the television or radio receiver or to an electronic item of equipment such as a hi-fi system or tape recorder.

Many people regard a tower with its beam as detracting from the amenities of the area thus causing an alleged reduction in property values. This has never been satisfactorily substantiated at community levels partly because people have become so accustomed to the real eyesores of the countryside such as power distribution apparatus that they never take them into account and partly through lack of knowledge of the benefits of amateur radio to the local community.

These benefits, however are well recognised at national and international levels. The literature on the subject is considerable but a quotation from a judgement handed down by the Town Planning and Appeals Tribunal of Victoria illustrates this recognition:—

"It seems to us that an amateur radio station conducted as a hobby in and from a detached home would be part of the normal use of such a house. We do not think a planning permit for the proposed mast is required though a building permit under the uniform building regulations would of course be necessary. Whether or not a permit is required we are, however, of the opinion that the proposed mast would have very little effect on the amenity of the neighbourhood and any slight adverse affect which it may have, is in our opinion more than compensated for by the community benefit given by this radio station." (Appeal X74/1023 of 14/4/1975 in re a 43 ft. radio mast with antenna at the top in area zoned "Reserved living" In Vermont South, Victoria.)

Amateur radio benefits the community in a number of less obvious ways, including the ability of radio amateurs to provide radio communications in emergencies and disasters and the intense interest taken in training courses and demonstrations for the benefit of students and others. Some young men and women seek a career in electronics and allied subjects for which there are fewer better ways of making a start than through amateur radio. Others seeks to enlarge their interests by providing themselves with a first class leisure activity, available to the young and old alike, to commoners and Kings, to labourers and professional people of all descriptions, both in the western and eastern parts of the world.

Amateur radio has flourished ever since electromagnetic wave communications were discovered and fired the imaginations of the pioneers. The Wireless Institute of Australia in fact traces its lineage back to as long ago as 1910. The first of its kind in the world. Although rapidly overtaken in numerical strength later on by many other countries such as the USA, Russia, Britain, Japan, Argentina, West Germany and others, Australian amateurs do not lag behind their counterparts elsewhere in technical and other achievements.

Strange as it may seem, amateur radio cannot confer any financial benefits on its followers. This is expressly forbidden in international and local laws.

The prospective radio amateur must put in a fair amount of study to qualify for a licence. Yet another international and local requirement — he must qualify himself and pass examinations before being granted a Government licence to operate transmitters. In Australia the licensing authority is the Radio Branch of the Postal and Telecommunications Department, quite often confused with "Telecom", which is an entirely different organisation.

There are several reasons why radio amateurs are required to achieve certain technical standards. One of the more important is a working knowledge of interference to other services and how to minimise or prevent this occurring.

It is a sad fact of life that any receiving equipment making use of the radio spectrum is susceptible to interference of many kinds — thunderstorms, unsuppressed electrical machines, including internal combustion engines and radio transmitters, to name only a few. It is also a sad fact of life that television and radio receivers slowly deteriorate with age and use. When new a good receiver would have had adequate gain at the operating frequency a year or two ago to have caused little but the very strongest interference from penetrating through to its sound or video outlets. And the same applies to TV aerials, etc. In a high percentage of cases, even today, there is little or no inbuilt protection against interfering signals even though these precautions would be relatively easy and cheap to be incorporated into the design.

Radio amateurs, having received training in interference matters and possessing, through Wireless Institute sources or directly from their own reference books, access to a very large range of technical literature on the subject, appreciate the complexities surrounding the problem. A cure in one case is useless in another, an easily installed and cheaply constructed external unit succeeds in nine cases out of ten, perhaps a good clean-up of the receiver's aerial connections may be all that is required. Whatever is deficient or ineffective can soon be discovered and righted if the owner of the receiver is willing to co-operate in finding a cure. Only in the most stubborn cases is it necessary to go to the expense of calling in an expert.

Unfortunately many owners of receivers refuse or fail to co-operate and seek some other answer to the problem such as complaining to the Radio Branch or to their Member of Parliament. The former can investigate and give advice, given time. The latter already have enough problems of their own to solve. Taking an interference matter out of the technical sphere into the socio-political arena seldom achieves very much except out of pocket expenses. Radio communication is full of complexities and technical compromises especially where consumer products are involved. That bargain receiver attached to a good high gain aerial as demonstrated in the local discount store might be most attractive until it is installed at home in an environment not quite so effective in reducing the incidence of interference. Caveat emptor, as they say!

In summary. Amateur Radio has been in existence since the beginning of this century. Radio amateurs have knowledge and experience in many fields. Their leisure activity is international and under strict controls. If amateurs do not self-regulate their activities they stand to lose their licences — few, if any, would want this to happen to them. Amateur radio has to be carried on without individual pecuniary gains of any kind.

Amateur radio in all its many facets thrives — to the tune of nearly a million persons all over the world. ■

AMATEUR RADIO ACHIEVEMENT AWARD

A new Award for Australian Amateur Radio Operators is about to be established.

This is to be a very special Award — one for achievement.

It has been made possible by the generosity of Mrs. Mary Wilkinson in memory of her late husband, Ron VK3AKC.

The Award will be funded from the interest obtained from a $1,100 donation by Mrs. Wilkinson.

It is anticipated that the Award, which is to be made annually, will know no bounds in Amateur Radio.

Further details will be published as soon as negotiations have been completed.

TIME

By R. L. Freeman — Reviewed by Peter B. Dodd VK3CIF

An article on "The Science of time and its inverse" in the ITU Telecommunication Journal February '77 sets out much detail relating to the measurement of time and how the various systems have developed since ancient times.

The primary building block of time, the second, has required in recent years, definitions and methods of achieving greater and greater accuracy — as, for example, space exploration requires stabilities of the order of 100 nanoseconds. Celestial navigation for ships requires accuracies of the order of 100 milliseconds. The time measured on the basis of orbital movements of planets, the moon and other planetary bodies is called ephemeris time (ET). The earth's orbital motion about the sun is used as the standard to define the numerical measure of ephemeris time.

The sidereal year can be defined with sufficient accuracy, as the average time required by the true sun to make a complete circuit of the ecliptic. It is the period of rotation of the earth (this is not uniform because of tidal retardation which is accompanied by a variation of the orbital velocity of the moon, a movement of the poles varying the position of axis and other irregular variations attributed by some to solar activities) or the diurnal motion of the stars. The sidereal year is given as 365 days, 6 hours, 9 minutes and 9.5403 seconds as compared with the tropical year of 365 days, 5 hours, 48 minutes and 45.9754 seconds.

Universal time (UT) deals with the alternation of day and night or the apparent diurnal motion of the sun. Sidereal time can be easily converted to UT but the conversion of either of these to ephemeris time is not so straightforward. However, ephemeris time has been chosen to agree as nearly as possible with universal time during the 19th century and the two will differ by only a few minutes in the 20th century.

1900, 0 January, Greenwich Mean Noon (i.e., 31.12.1899 GM Noon) is properly designated 0.1.1900 12.00h ET as beginning the fundamental epoch. The tropical year has 31 556 925.9747—5.30T ephemeris seconds where T is in centuries measured from 1900. Multiplication of the inverse by 86 400 gives the UT day. However UT is itself subject to corrections; UT or UTo being the deduction directly from observations, UTI being UTo + p where p is a correction factor for polar motion and UT2 introduces further corrections. The marine navigator is satisfied with the accuracy obtainable from using UT1 time.

When extreme precision is required all these time scales are prone to error. The time scale derives from the quantum phenomenon of the Caesium-133 atom, its transition frequency being 9192.631770 MHz. This gives a more precise time interval but for the exact time of day or date a formula is required to convert to UT or ET. In 1960, a universal co-ordinated time (UTC) was instituted, agreed internationally and was to agree with UT2 to within one-tenth of a second subject to an offset to allow for UTC running slow compared to atomic time early in this decade. The CCIR adopted a new UTC system effective from 1.1.1972 in which all clocks in this system operated at zero offset.

A description is given relating to time and frequency standards ending with the comment that comparison and synchronization of time at a distance provides one of the most ticklish problems in the science of time. Propagation delay for real time shows that approximately 3 microseconds per kilometre is a good yardstick. Thus a user 1000 km distant from a time source transmitter can expect to receive the leading edge of a timing pulse at the receiving antenna 3 ms later than it was launched at the transmitting antenna — assuming ground wave on great circle path. Skip in the ionosphere can account for 400 ms of uncertainty in HF timing dissemination systems. Descriptions then follow on the two radio navigation systems used for continuous time/frequency service information — namely OMEGA on about 10 kHz and LORAN-C at around 100 kHz — and basic satelltie systems. The US Navy's transit navigation satellites provide good time dissemination facilities. Navigation fixes are made by careful measurement of Doppler shift of a 400 MHz signal transmitted from the satellite in conjunction with an optional 150 MHz signal for greater position fixing accuracy.

Departing from the article, Greenwich Mean Time is known as time zone Z. British Summer Time is one hour ahead of GMT. Three hours ahead of GMT is Time Zone "C", Eastern Australian Standard Time (10 hours ahead) is Time Zone "K", and so on. New Zealand is two hours ahead of EAST. For contests and interstate affairs the recommendation is to use GMT, as for example 01.00Z. Many people keep their log in Z. ■

WHAT EXACTLY IS ELECTRICITY?

Alan Shawsmith VK4SS
35 Whynot St., West End, 4001

Every reader of this magazine will know something about electricity. Most of us are not physicists but we're Hams. We all fiddle with the stuff in a variety of ways each time we build gear or switch on the rig: no matter if it's AC, DC, LF, HF, VHF, UHF or whatever — it's still electricity.

Yes, I'm sure you all know what it is. Suppose it was listed as a question in the AOCP exam, "Write a short simple explanation, one page or less". Easy, huh! O.K., take up pen and paper **now**, and go to it. Remember, the criteria is that it be in simple terms; you should do it in ten minutes — or quarter of an hour, or maybe half an hour, or — well, how'd ya go? Not so good, eh!

"What **exactly** is electricity?" is a question that people repeatedly want to pin on to me. If it comes from a group of juveniles, it's no good replying, "You'd better ask a physicist!" Their response would be a silent glance amongst themselves — they assume I don't know. It seems a straightforward simple question to them, so they expect a reasonably simple answer. I usually start out fairly well but soon stumble to a halt, my lower clapper sorta hanging loose on my chest.

If you're well known in the neighbourhood, it's likely you've been approached by schools, teenage clubs, groups, etc., wishing to visit the shack and find out what AR's all about. Most youngsters file in with a look of awe on their faces — but, don't be fooled, in this the electronic age, they ask awkward questions.

After turning on the rig and making a QSO, I usually pass around some DX QSLs, point out on the wall map the countries they represent and then, for openers, go into a routine about propagation paths and iono bounce, etc. This always proves to be a good talking point —but, in most groups, there are always one or two dead keen types (future back roomers), who want to get down to the nitty-gritty of the works of the rig. Finally, the same old familiar question is asked, "Mister, what **exactly** is electricity?". Well, it's no use going into a spiel about coal that fires up the engine, that drives the powerhouse generator, that brings electricity into the shack, etc. Sure, kids need the simplest explanation possible but not that simplistic, which describes where it's at and comes from, rather than what it is.

Well, how do you clearly describe electricity to the enquiring but immature mind? The following is the best I can do, off the cuff. "Electricity comes from the electron: electrons make up the outer layer of an atom and have a small negative charge: they are terribly tiny, about ten billion billion working together are needed to glow an average light bulb. In order to produce electricity, it is necessary to pry loose the electrons from their atoms and get them all to move in the same direction. This is called current or electric current. Certain atoms have their electrons removed more easily than others: these atoms are the best conductors of electricity; the atom that makes up copper being one of the best examples. The trick is to jolt these electrons free from the attraction of their atoms — just like a good hard tackle jolts the ball free from the grip of a footballer. This is done by applying a voltage to the circuit: this voltage can be produced by chemicals such as those contained in a wet, or dry battery, which causes the electrons to move in one direction only (direct current). Another way of producing a voltage is by means of a generator, such as those used in a powerhouse. Basically, a simple generator is a coil rotating through a field around a magnet. As the coil rotates, so the electrons move to and fro, in any circuit connected to the ends of the coil (alternating current). Why electrons break free from their atoms when a voltage is applied to a circuit is not clearly understood. This happening is perhaps best described as being in the nature of things. It might be said finally that electricity is electrons in organized motion, in matter of suitable conductivity."

The above short attempt leaves a lot unsaid and unexplained but the description can be enlarged further by questions from those to whom you are speaking (you hope).

My YF works as a librarian at the local school. Each lunch-hour a small nucleus of kids habit the library, in search of ever more knowledge. Eventually, the inevitable question had to come. Arriving home from work one day, she announced, "Young Johnny Watts asked for a book on electricity, so I told him to drop by after dinner and you'd explain it all to him".

When I testily replied, "Why me?" she looked up in astonishment. See what I mean! Still, I suppose it's nice to be regarded what one is not — electronically.

About an hour later, the lad in question arrived. "Well, young Watts, what's on your mind? You want the good oil on the good herbs," I said, trying to make a friendly start by way of a weak joke.

No response showed on Johnny's dead pan dial. "Oh no, Sir," he said, "I already have a substantial knowledge of oils and herbs. My father is a naturopath."

Just for a moment I thought his reply was a have-on comeback. "Really," I said, wondering how substantial was his "substantial".

"It's the **exact** nature of electricity I wish explained."

"Sure, I'm a little foggy t-- er, we'll do our best. What do you know of physics and the atom?"

"Quite a bit, sir."

"Yes, that's what I was afraid of," I mumbled to myself. About an hour later, J. M. Watts departed, looking slightly disappointed. It had been an hour similar to taking an oral electronics test. Every comment made, J.M.W. had stopped me with a "why?" or "could that be proved?" or "enlarge on that, please sir". Those who've been through it will know what I mean.

I sank wearily into the shack chair and reached for the nearest magazine. An article in it under a heading "The Great Atlanctic Cable" immediately caught my eye. It read, "In 1886, two transatlantic cables were laid between Ireland and Newfoundland, the round circuit being 3,700 miles. To test the cable, a man named Clark, in Ireland, borrowed an ordinary silver sewing thimble; he poured into it a few drops of acid and added a fragment of zinc, thus creating a miniature single cell battery (probably only 3 or 4 volts or less). Using this minipower, he was able to pass enough current through the entire 3,700 miles of cable, to cause a full and clear deflection on a mirror-type galvanometer. The small thimble and a section of the cable are now on display in the Science Museum, South Kensington, London."

I read it twice and began to ponder on the profundity of it all. A drop of potential of 3 volts was enough to jolt electrons loose from their particular nucleii and start them marching in unison and over a distance equivalent to that from Melbourne to S.-E. Asia. It was incredible and more of a miracle than working LP DX on one watt QRP.

Just then my son appeared, holding one of the presently popular 100-1 electronic kit sets, which seemingly make an endless number of gadgets with a minimum of parts.

"Dad?"

"Yes!"

"I've built everything in this kit, twice over — and I've studied the book. I did most of the theory in it, like resistance, current, Ohm's Law, you know — and then it says, "the 9V battery makes the electron flow" — what's the electron flow?"

"That's the electrical current."

"Well, what **exactly** is electricity, Dad?"

I continued to gaze at the magazine. I wasn't going to get into that subject matter twice in two hours.

"Dad?"

"Look son," I said finally, "what say you ask me tomorrow, after lunch?"

"Why ,are you too tired right now?"

"No!"

"Then you don't know."

"Yes, I do know." The fateful day was close, when he, like all sons, see their Oms, not as a hero, but just as is — and I wanted to preserve my halo a little longer by being a little better informed on the subject."

"Well, why can't you tell me now?"

"Because I've an appointment with a physicist in the morning." ■

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Fun to build and use — and recommended for ER-3701 Amateur radio course at left! Most components mount on a single circuit board for easy assembly. The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and comes complete with telegraph key and phone jack. Has built-in speaker, volume and adjustable internal tone control. Once you get your license, the HD-1416 can serve as a side tone oscillator for any transmitter using grid block keying. Plastic cabinet matches Heathkit "SB" series.

Kit HD-1416 — $18.70 + $2.80 S. Tax

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Switches RF source to any one of several antennas or loads; unused outputs grounded. Use two to switch up to four different transmitters, receivers, etc. 1.1:1 max. SWR to 250 MHz. 2 kW PEP max. power rating.

Kit HD-1234 — $20.43 + $3.07 S. Tax

New

New HD-1426 Field Strength Meter

- *Built-in and external antennae*
- *Front panel sensitivity control*
- *Allows precise transmitter adjustment*

A must for ham, citizens band and marine radio enthusiasts. This compact, reliable unit may be used in a mobile or fixed location to measure signals of 1.8 MHz to 250 MHz received from a transmitter. Makes transmitter and antenna adjustments quicker and more precise; lets you know transmitter is actually operating (ideal for marine applications). For transmitter outputs from 1 to 1000 watts. A front panel mounted sensitivity control may be used to adjust the on-scale meter reading. Both a built-in printed circuit antenna and a whip antenna are included.

Kit HD-1426 — $21.30 + $3.20 S. Tax

HD-1426 SPECIFICATIONS: Frequency Range: 1.8 MHz to 250 MHz. Meter Accuracy: ±10% of full-scale reading. Dimensions: 2⅝" H x 4⅛" W x 4⅝" D.

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Direct Low capacitance probes LP-16X	2
Terminal adaptor	1
Test leads (three per set)	1

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NEW Counter-Generator
Two vital pieces of test equipment in one.

SOMETHING ABOUT RADIO AMATEURS

Anonymous

Amateur Radio. Seems an unromantic name for quite one of the best of the leisure activities. The old guard in the USA still persist in calling it "ham radio".
What is the fascination about it for radio amateurs? This is hard to answer in a few words because there are so many aspects of the activity which appeal to different people in different ways at various times.

Perhaps the traditions of amateur radio sound a bit dated but they have stood the test of time. Because it takes effort to get a licence it has more value than something you merely buy or pick up in the street. Why waste the hours of study to pass the exams if you do things later on which put your licence in jeopardy. Take pride in your chosen hobby.

There is another reason why radio amateurs value their licence. The activity has so much to offer why jeopardize your own enjoyment on account of other amateurs being on their guard if you do not conform to good behaviour. All of us know how many examples of people pirating amateur call signs — all because amateur radio is such fun. Unfortunately there are plenty of ignorants about the place wanting to spoil a good thing. Envy?

What is so good about amateur radio? The "CB" explosion goes some way in answering this. Communicating with others in an acceptable environment. When you are lonely, bored or have nothing else to do. The rules of the game allow radio amateurs to contact other radio amateurs anywhere in the world. It's an international service with standard basic rules in all countries. These create an immediate common interest. But, in fact if you make contact in Morse (CW) you can get along quite well even if the two of you have no common language. Identification of call signs, signal reports and Q code are internationally recognised and mean the same in English, Russian, Spanish, etc. Seven in Morse code signifies the numeral seven whatever word you use for seven. CW is still the easiest and most penetrating mode of radio communication.

Perhaps it is the modern trend to use the microphone as soon as you get your licence and rig. But there are also many radio amateurs who use the Morse key exclusively. Do some listening in the lower frequencies of the amateur bands — the exclusive CW segments. It so happens I use SSB myself but I recognise the value of CW to the amateur service and its future — even after 30 years of exclusively speech contacts. Perhaps it is my loss for not also trying RTTY, ATV, EME, Meteor scatter or satellite contacts or even VHF. Unfortunately there are only 24 hours in each day and the pocket has never been too deep. Have I lost anything in never having operated through a repeater?

No, speech contacts on HF have given me all the pleasure (and disappointments) I ever needed. For many years I built my own transmitters, the next "better" than the last one. When the pressures of the 24-hour day started biting, there was little option but to buy commercial equipment.

Becoming well known through contacts on the HF bands brought many friends in far away places. Yes, you make many friends on the air. Some you think you will never meet, but who knows what the future holds in store? Do you know anybody you could turn to in an emergency in London, Paris, Athens, San Francisco, Quito, Madras or Tokyo? And your overseas friends say "Yes, I know someone in Melbourne".

For every new contact you would like to exchange QSL cards. You collect cards for awards. Maybe simple awards at first, such as working all continents. Then progressing to working 100 countries, 200 countries, all USA States, 1000 prefixes, all six amateurs in Lagos, and so on. The list is very long. Maybe it takes you six years to get a contact in the Azores and another ten to get an Azores QSL card! That's all part of the game.

Perhaps you will never contact anyone in the Azores. Yet, if you could speak a little Portuguese you could work a CT2 in a few weeks. On CW you might do it in a few days. If you want to learn a foreign language, amateur radio could be the next best thing to living in a country.

But all this pre-supposes your signals can reach into far away places. This requires knowledge and work, and money if you buy fancy beams and other aids. You can roll your own though — the amateur reference books give you all the details you will ever need. The well known quad is most effective and could cost you little more than some wire, a few bamboos and a pole.

Remember though, you will never work the DX if you can't hear them. And furthermore, you'll never hear anything if you do all the talking and no listening. Most of the top DX men do about ten times more listening than transmitting.

Then again, you will hear amateurs on the 40 or 80 metre bands keeping "skeds" with close friends every morning — keeping in touch. Perhaps some of these amateurs never switch on their rigs for any other purpose except, perhaps, to join in the RD Contest every August.

Others take great interest in contests. Almost every week-end in the year there is a contest aimed at world-wide participation. Some avid DXers actually travel to places like uninhabited reefs which are far enough out in the ocean to count as separate "countries". Once ashore they set up their equipment and get on the air to give world amateurs a chance to work a really rare spot. On such occasions the QRM is 10 or 30 deep — CB QRM on 27 MHz has nothing on these pile-ups which are, however, reasonably orderly. The bloke in this "new country" will be operative for a few days at the rate of two or three contacts a minute as long as the bands are open. Just imagine writing and mailing 10,000 QSL cards for such an operation for a multi operator multi station DX-pedition.

There are also DX-peditions to real genuine countries which have few or no amateurs — Andora, Lichtenstein, Anguilla, Tahiti and so on. Or an amateur might be transferred in his work to a country where amateur radio may have been poorly represented for a considerable period of time — Mongolia, Madagascar, Falkland Islands.

With the world starved for such rare ones it is quite an art to have even a short ragchew. By and large, though, there are plenty of countries possessing enough amateurs for the novelty of DX to have worn off. Even today there are USA amateurs who have never worked Australia. There is an unceasing striving after sheepskins (awards) and wallpaper (QSL cards) everywhere in the world. One would think that after several years amateurs would tire of these efforts. Not at all. There are many radio amateurs still going strong after 30, 40, 50 years. Some may be in their 80s or 90s. Real OTs (old-timers).

Others may be blind amateurs or permanently disabled happily rag-chewing all day as long as a band opening lasts. There seems to be no records kept of the longest unbroken QSO — certainly many hours' duration. What subjects? You name a permitted subject and it will be discussed — especially technical matters. How to get that last ounce of "juice" up the "spout", how to "fire" a signal in the right direction at the proper angle of radiation long path or short path, how to beat the QRM. Then you might find the other bloke is also interested in stamp collecting, or wanting to find out about your country as you want to find out something about his, maybe like yourself, he is a computer expert or plays football or is a "real nice guy" interested in all kinds of things.

Sooner or later you will run into nets. Just ordinary nets for people to keep in touch, like SEANET or missionary and other specialist nets, or ad hoc nets to work a rare one or even to play chess over the air, or once a year to play host to Scouts in Jamboree on the Air, or . . . And when you've gone through all the changes you'll suddenly run into a QRP (low power) bloke who refuses to use more than one Watt in power output, or another bloke who works mainly on the higher frequency bands and keeps a receiver

running on beacon frequencies to alert him to band openings. It will not be too long before DX can be worked through Phase III of the amateur satellites.

The list is endless. You keep broadening your interests until one day you settle down to specialise in the things you find the most interesting. How does Shakespeare put it — "There's more in Heaven and Earth, Horatio, than was dreamt of in your philosophy" — or something like that.

And what is it all about? It is about *you*, my friend. Amateur radio is the only *world-wide* service catering for *you* as an individual person. The international definition says that amateur radio is a service of self-training, inter-communication and technical investigations carried on by amateurs. Amateurs (in every country) are duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Oh yes, and you can learn to be a radio amateur as a stepping stone to other things, such as a career in electronics. But that is another story. ■

AMATEUR ABBREVIATIONS

Many abbreviations are in common use in amateur radio (including Hamads). A short list is presented here — punctuations omitted. Note use of capital letters (in some cases optional).

A — Ampere (Amp)
AC, ac — Alternating current
AF, af — Audio frequency
agc — Automatic gain control
AH — Hamads — at home or private number. After hours
ALC, alc — Automatic level control
AM, am — Amplitude modulation
AMSAT — The Radio Amateur Satellite Corporation
anl — Automatic noise limiter
AOCP — Amateur Operator's Certificate of Proficiency
AR, ar (s) — Amateur radio (service), Amateur Radio magazine
ASCII — American Standard Code for Information Interchange
ATV — Amateur television
avc — Automatic volume control
balun — Balanced to unbalanced transformer
bc — Broadcast
BCD, bcd — Binary coded decimal
bci — Broadcast interference
BFO, bfo — Beat frequency oscillator
bit — Binary digit
Bus — Hamads — business or working hours, office hours
CB — Citizens band
CCIR — ITU — Comite Consultatif International des Radio communications
Ch — Channel
cm — Centimetre
coax — Coaxial cable
CRO — Cathode Ray Oscilloscope
CW, cw — Continuous wave, carrier wave (Morse)
dB — Decibel
DC, dc — Direct current
DX, Dx — Distance (relative)
EHF, ehf — Extra High Frequency (30-300 GHz)
EHT, eht — Extra High Tension (V)
EMC — Electromagnetic Compatibility
EME — Earth-moon-earth (moonbounce)
emf — Electromotive force (V)
ERP, erp — Effective radiated power
F — Farad
FCC — Federal Communications Commission (USA)
FET — Field effect transistor
FM, fm — Frequency modulation ("NB" — narrow band)
fsd — Full scale deflection
FSK — Frequency shift keying (F1 mode)
g — Gram
GDO, gdo — Grid dip oscillator
GHz — Gigahertz (1000 MHz)
h — Hour (24 hour clock), hecto
H — Henry
HF, hf — High frequency (3-30 MHz)
HI, hi — Greetings
HT, ht — High tension (V) (also hV, HV)
Hz — Hertz (cycles per second)
IARU — International Amateur Radio Union
IC, ic — Integrated circuit
IF, If — Intermediate frequency
ITU — International Telecommunications Union
k — Kilo (1000) — e.g. kilo-ohm (1000 ohms)
kg — Kilogram
kHz — Kilohertz (1000 Hz)
km — Kilometre
kV — Kilovolt
kW — Kilowatt
LAOCP — Limited Amateur Operator's Certificate of Proficiency
LC — Inductance capacitance (ratio)
LED — Light emitting diode
LF — Low frequency (30-300 kHz)
LT — Low tension (V)
m — Metre
m — Milli (one thousandth, 0.001)
M — Mega (1,000,000; e.g. 1 MHz = 1000 kHz)
u — Micro (0.000001) (one millionth)
uA — 0.000001A (also uF, uH, uV)
mA — Milliampere (0.001A) (also mM, mV, mW)
MCW — Modulated CW (A2 mode)
meg — Usually megohm
MF — Medium frequencies (300-3000 kHz) (medium waves)
MHz — Megahertz (1000 kHz)
mic — Hamads — microphone (also mike)
micromicro — Same as pico, obsolete term
mm — Millimetre
mox — Manual operated transmissions
MUF — Maximum usable frequency
NL — Noise limiter
ns — Nanosecond (0.000000001) (one thousand millionth of a second)
OSC — Oscillator
OSCAR — Orbiting Satellite Carrying Amateur Radio
om — Old man
P, p — Power (p page, pp pages)
p — Pico (0.000000000001) (one million millionth)
PA, pa — Power amplifier
PCB — Printed circuit board
pep — Peak envelope power
pF — Picofarad
Ph — Hamad — telephone No. (STD code first)
Phone — (fone) Telephony-segment, voice transmission
piv — Peak inverse voltage
PM, pm — Pulse modulation, phase modulation
ppi — Plan position indicator (radar)
PSU — Power supply unit
Q — Reactance-resistance ratio, transistor
Q code — CW abbreviations — see Handbook for amateur operators
QTHR — Hamad — address correct in current WIA call book
RF, rf — Radio frequency
RFC, rfc — Radio frequency choke
rfi — Radio frequency interference
RI — Radio Inspector
RMS, rms — Root-mean-square
RST — Readability, strength, tone (reporting signals) (RS only for telephony)
RT — Radio Telephony
RTTY — Radio teletype (teleprinter)
Rx — Hamads — receiver
SAE — Also sase. Self Addressed Stamped Envelope
SHF — Super High Frequencies (3-30 GHz) (microwave regions)
S/N, s/n — Signal to noise (ratio)
SS — Solid State
SSB — Single Sideband (suppressed carrier) — A3J mode
SSTV — Slow Scan Television
Std — Standard
SWL — Short Wave Listener
SWR — Standing Wave Ratio
Tcvr — Hamads — transceiver
TPI — Turns per inch
tptg — Tuned plate tuned grid
TV, tv — Television
TVI, tvi — Television interference
Tx — Hamads — transmitter
UHF — Ultra high frequencies (300-3000 MHz)
V — Volt
VFO, vfo — Variable frequency oscillator
VHF — Very high frequencies (30-300 MHz)
VLF — Very low frequencies (3-30 kHz)
vox — Voice operated transmission
VOX — Voice operated transmission
VU — Volume unit
VXO — Variable crystal oscillator
W — Watt

WARC — World Administrative Radio Conference (General) (ITU)
WIA — Wireless Institute of Australia
WICEN — Wireless Institute Civil Emergency Network
WT — Wireless telegraphy
WW, ww — Wire wound
Xfmr — Hamad — transformer
Xtl — Crystal (sometimes xtal)
xtl — Crystal (sometimes xtal)
Xvtr — Transvertor
XYL — Wife
YRCS, YRC — Youth Radio (Clubs) Scheme
YL — Young lady
Z, z — Impedance

DX AND THE NOVICE

Len Poynter VK3ZGP/NAC

The challenge of working DX with low power is the ultimate test of the novice operator's special virtues. Patience, endurance, determination and know-how. It also provides the opportunity to learn these virtues. The exhilaration of each successful contact makes the experience worthwhile. Invariably, persistence adds new countries, perhaps to a growing DX CC.

Other operators' results tend to create the impression that, in order to be heard you need high power and a very large antenna, are not necessarily true. What surprises many is the results of low power SSB signals.

Most novice stations have succeeded in DX-ing with modest antennas at affordable heights. An exotic antenna will help — for sure. However, at lower powers the greatest consideration is efficiency of the antenna — no compromise, must be the order.

An understanding of propagation is important to any form of operating, especially so in low power work. It will depend heavily on good to optimum propagation conditions, both because of the inherent power level and the difference between yours and most other normal rigs being used on the bands. The best results are obtained when "pipeline conditions" exists to a given area. The characteristics are most apparent on low power signals on long distance paths.

It also seems clear that long paths exhibit optimum propagation in one direction only. No doubt due to the fact that the height and density of the F2 layer follows the movement of the sun's ionizing rays from an east to west direction. As a result, the optimum path in an east to west direction precedes the same path in a west to east direction, which simply means that signals, say, from eastern Australia will reach and maintain a peak level into central Europe for some time before the reverse takes place. In other words, watch the path you are interested in to observe when optimum conditions exist. This can come quite suddenly when the station you are interested in working is in QSO with another station in a closer area — his signal rises and he has trouble copying the other station. Many experience this effect without realising what has happened.

Seasoned low power workers are aware of the movement of peak areas, judging the variation in signal reports. In a nutshell — pay attention to signal levels from a given area as an index to when the path to that area will open for you.

When they begin to drop, go after the area until it begins to click. You may only make a couple of contacts, but it will be fun when it does. Don't expect them to last long despite you wanting to chat — resist the temptation. One must persist in making periodic calls during the period a path is apparently open.

Robert VK6NAI's well equipped station

Successful operators develop their own techniques through experience. Some are consciously applied while others are conditioned responses. For it is the operator's knowledge of the multiplicity of factors involved that leads to successful communication. One of the prime considerations is the familiarity with one's own equipment.

The manipulations involved in operating your station should not interfere with the process of concentration. Such matters as tuning should be to the point where it requires little or no attention.

CW: One should be able to tune the desired signal and know exactly which one's signal should be in relation to the station to be called. This is a matter of familiarising oneself with the offset between zero beat and transmit frequency of your equipment.

SSB: A knowledge of one's own voice characteristics, and the ability to use it in its most intelligible range, is important. Attention to enunciation, fluency in the use of standard, effective phonetics. Understanding the speech characteristics of your microphone and the transmitter's audio system — especially if your signal is down in the mud at the other end. Seasoned operators find that effective use of enunciation, speed of delivery, use of phonetics and voice level means a QSO — or no QSO.

The remainder is pure technique. Sometimes it pays to sit back and wait until no one is left. Your call, clearly once or twice if you're sure no one else is there, will be all that's required. Avoid the urge to jump in when others are calling — think of how the other operator will recognise you in a pile-up.

Non-English speaking stations do not always understand rough speech. Use your best spoken English when working these stations. Speak slowly and distinctively. Avoid the use of words that might confuse. Come back to basic English. You will know when they copy. Listen for instructions if he is having difficulty with copy. Whilst he may be QRM free to you, you can be sure that you won't be to him.

The temptation to linger with DX is fraught with problems. Be courteous and time your QSO so that others may share your experience. But recognise signs of the band going out. Don't be left talking to yourself. Many do, and wonder why.

By the return of peak conditions, the QRM factor will be much higher and last longer. Adapt your techniques to the situation as it occurs. With these conditions approaching rapidly, don't create chaos by uselessly calling over the top of

someone else. Take notice of the operating habits of the high density amateur population countries. Don't clear till you are absolutely clear. But make sure you have all the information needed to ensure the successful completion of your QSO. If you request a QSL, nominate and verify the means of QSL-ing.

I trust that you will have great pleasure in meeting many countries in your DX experiences. It's handy to have some up to date reference on your own country should you be asked an awkward question.

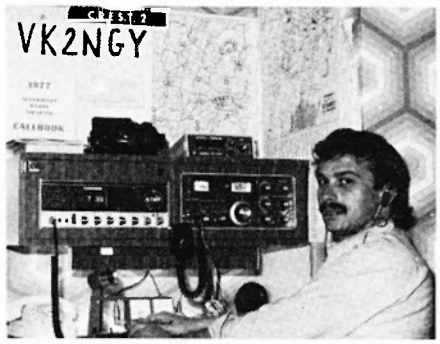
Good DX-ing. ■

WHAT SOME OF SYDNEY'S NOVICES ARE GETTING UP TO

Photos by: Arthur VK2NJL.
Stories by: Sam VK2BVS.

No. 1
John VK2NAR is one of the growing numbers of novice amateurs who are transmitting and receiving photographs as well as live shots of people, animals, scenery or, as you can see, you can even send your own CQ DX call through what is known as slow scan television (SSTV). By using typical amateur transceivers, the only extra equipment required for receiving photos is an SSTV monitor which can be built for $50, for transmitting photos just feed prerecorded audio signals which you can have recorded on a simple cassette tape recorder. In the photo John uses a close circuit television camera which he can use to transmit "live" or which he can use to record photos on to cassettes for the local novices who are getting started in SSTV. John runs a 5 element 15 metre yagi beam and a 5/8th ground plane on ten metres up on a 50 foot tower. John has had SSTV contacts with amateurs in Japan, the United States, Western Samoa and Russia. In the mobile John uses a modified 11-metre Zodiac Taurus transceiver on the new 23 channel system on 10 metres. Using a 3 foot centre loaded whip on 28.5 MHz, John recently worked KZ5BA in the Panama Canal zone while mobiling to work.

No. 2
Frank VK2NGY became interested in amateur radio when he heard them for the first time on channel 9 (now 5) as one of the original CREST monitors. Today Frank is the Secretary of the Sydney Crest and President of the Northside Radio Society. Working to bring a new era between amateurs and CBers, Frank is active not only on channel 9 (5), the bushfire emergency and maritime frequencies, but also on the 80, 15 and 10 metre amateur bands. Frank is really looking forward to some real DX-ing with a proposed 4 element beam on 15 and 10 metres. Being the well known Sydney CREST 2 and the immediate past national secretary for CREST and NCRA, Frank is involved and has directed many fellow CB enthusiasts to the activities of the Novice amateur radio group at the WIA as well as the Amateur and Citizens' Radio (VKCB) Club.



No. 2

No. 3
Mike VK2NEV obtained his novice licence at the age of 13 through the Radio Club at the St. Edmond School for Blind Children. His friend, Paul VK2NFC, obtained his licence at 12 years of age, both being granted a novice licence through a special oral exam conducted by the Department of P. and T. Mike uses a TS520S on 80, 15 and 10 metres and also operates a Gemtronics 11 metre set modified on to 10 metres. His antennas consist of a quarter wave ground plane on 10 metres, a half wave dipole on 15 metres and an 80 metre half wave and fed to an aerial tuner. Mike is currently aiming at the full licence and hopes to put up either a yagi or a quad on to the 15 and 10 metre bands.

No. 4
Simeon VK2NIC obtained his novice licence at the age of 14. He is one of the active club radio instructors who conduct

No. 3

No. 1

No. 4

training courses at his home to assist CB-ers who need to gain 5 hour instructional time to qualify for membership of the Amateur and Citizens' (VKCB) Club. Simeon can be seen in the introduction to amateur radio section of the club training session outlining the 10 metre Sydney craze of bicycle mobile, equipped with a 3 foot centre loaded antenna clamped on the back support, 12 volt wet cell over his shoulder and AM-SSB hygain 5 transceiver (mod.fied) strapped to the front of the bicycle structure. When not mobiling on 28.5 MHz on his bike, he operates a TS520S on 80, 15 and 10 metres and still finds time to talk to the local CBers on 11 metres and have them drop in on a Saturday afternoon to participate in the VKCB club training sessions. On 10 metres and 15 metres Simeon uses a quarter wave ground plane. Simeon is keen to obtain his full licence so that he can use all those other bands on his TS520S. ■

INTERFERENCE

Amateurs living in cities or populous areas have been plagued for many years with problems of causing interference to neighbours' radio, TV, tape recorders, hi-fi equipment and other electronic appliances such as organs.

In general, the subject has been well researched and simple remedies devised. A large bibliography on the subject appeared in the September 1974 issue of the journal of the Wireless Institute of Australia "Amateur Radio" which is unfortunately now out of print.

The greatest problem concerning interference is the attitude of neighbours. This social matter causes more trouble than anything else. The merit of the equipment of the person concerned is always considered to be beyond reproach and interference is regarded as an unwarranted intrusion into the home. Legal suits in the USA and even in Australia reinforce the advice that interference complaints must always be tackled with the utmost restraint and good nature. Defending suits at law is a costly and time consuming business, so do your best to avoid them.

Members of the Institute are most fortunate in being able to obtain advice from the Institute when in strife with interference complaints.

Interference works the other way also. Amateurs suffer from it also, especially on the 6 metre band from Channel O TV stations as an example. (Not forgetting pirates and intruders into amateur bands.) ■

QSP

1978 SUBSCRIPTION

Subscription notices will be mailed to Institute members early this month as usual. Members are requested to send in their payments as early as possible so that the enormous volume of clerical work can be suitably phased over the forthcoming holiday period. Early payment also ensures no automatic suppression of AR address labels from the computer because of being unfinancial.

UPGRADING THE BARLOW WADLEY XCR-30 MARK 2 RECEIVER

Rodney Champness VK3UG

Quite a few newcomers to amateur radio will have bought a Barlow Wadley. The receiver functions quite well and is probably one of the most effective communications portable receivers about. A review of this set has appeared in AR and EA. One problem that has always annoyed me has been the relative ineffectiveness of any external aerial connected to the terminals provided. The set was prone to break-through from television stations on some bands and had a lot more birdies all around than I considered reasonable. I had a chance to try a Yaesu FRG-7 and found this set had few if any birdies. Considering that these sets both use the Wadley loop principle I looked for and found one fundamental difference.

The Barlow Wadley uses a capacitor to couple an aerial to the top of the aerial coil, the Yaesu uses a low impedance link to couple the aerial to the aerial coil. I wound with care low impedance links on all three aerial coils and brought the unearthed end of these coils out to a switch and a coaxial connector on the rear of the set on the main case. The receiver now had stacks of gain on the lower frequencies, in fact the broadcast stations cross modulated at my former residence. The birdies almost disappeared, the set became very different to what I had been used to.

HOW TO DO THE MODIFICATIONS

The aerial coil selector switch is a single pole 3-position Oak switch. It is mounted just above and to the rear of the power and speaker sockets on the left hand end of the set. A coaxial aerial socket such as a BNC, Belling Lee or UHF connector, is mounted on the right hand end of the top of the set alongside the earth socket in the comparable position to the telescopic aerial at the left hand end of the case. This is all the mechanical work involved in the modification. When you drill the holes for these two components be careful that no metal filings get into the work, drill the holes with the set back off and the set lying on its back.

WINDING THE LINK COILS

All of the low impedance links are wound with 24 to 28 gauge enamelled copper wire. The 8-30 MHz coil has 5 turns of wire wound between the turns at the earthy end of the coil which is then connected to one of the switch terminals as shown in the diagram. If desired the tuned winding can be tapped at the 5th turn and the tapping point taken to the switch. The link windings are all painstakingly put on by threading the wire under and over the tuned windings. A pair of needle nosed pliers are needed to accomplish this, there is just enough room between the tuning coils and the circuit board to allow this. Wind 8 turns on the earthy end of the 2-8 MHz coil and 15 turns on the 0.5-2 MHz coil. The exact number of turns on each coil is not particularly important. The earthy end of each link winding is earthed to the same spot as the earthy end of the particular tuned winding.

This modification causes no alteration to the peaking of the aerial coils, and gives you the choice of using either the older capacitive coupled aerial matching system or the newer and better low impedance input. Note that light duty coaxial cable should be run between the wiper arm of the 3 position switch and the coaxial aerial connector. If you follow the attached diagram you should have no problem with this modification.

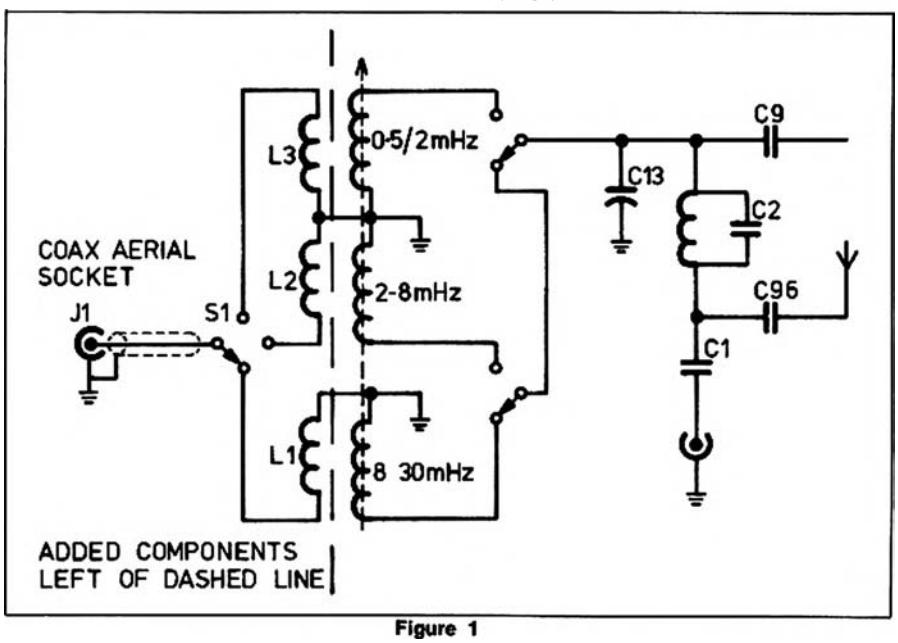


Figure 1

GENERAL

It has been some time since Newcomers Notebook last appeared in AR; it will appear about three or four times per year now.

My article on *Suppression of Electrical Noise Caused by Vehicle Electrical Systems* in February 1977 issue brought a number of letters enquiring where the Ducon PNC51 coaxial capacitors could be obtained. I regret to say that these capacitors are no longer produced. This is a pity because they were good value at around $3, whereas the only others I have been able to locate are imported by Robert Bosch and cost around $10 each. I would be pleased to hear from anyone who knows of a supply of coaxial filter capacitors similar in performance to the now unobtainable Ducon PNC51. Capacitors of this type probably now have the biggest market that they have ever had in this country — the CB market. What about it, manufacturers? ■

UNDERSTANDING MORSE "LANGUAGE"

Dick Goslin VK3NAY
40 Hardwicke St., Balwyn, Vic. 3103

This article is written with a view to assisting newcomers to CW operation who, although conversant with the "Q" code, may not be familiar with the abbreviations generally used, and which enable a good deal of information to be exchanged in a relatively short period.

It is prompted by two recent instances heard on air — (i) "Please send plain language, I do not understand abbreviations". (ii) "Thank you for a very nice contact. I will send you my card through the bureau, could you please send me one of yours? Thank you again and I hope we will have another contact soon." The latter could have been expressed adequately in a fraction of the time as follows — "Tnx fb QSO. QSL via buro? Pse cfm. Tnx agn es hope cul."

An effective way to "learn the language" is to listen to a QSO at about the speed you can copy with reasonable comfort — there are plenty at the lower end of 80 metres. Write down each character exactly as you hear it, just as you did at the exam (?). Do not concern yourself at this stage whether the letters or words make sense.

Later on, with the receiver switched off, read through your copy several times until you can correlate what was **sent** with what was **meant.** Some words may still be vague, possibly through sending or receiving errors, or perhaps because some abbreviations are a little harder to follow than others.

Main thing is to listen often, say 10-15 minutes a night if possible, until you can recognise and understand abbreviations without actually having to think about them. Try to find a QSO in which characters and spacing are well defined — it will make your "read-back" so much easier.

A few final points —

1. Don't be afraid to tackle a QSO above your "normal" speed. There is no penalty for missed or incorrect speed. Give it a go, and you'll be surprised how quickly your receiving ability will improve.
2. Don't "invent" abbreviations. Stick with the generally accepted ones for good understanding by both parties.
3. Upgrade your sending speed **after** increasing receiving speed.
4. Remember that practice up to 14-16 w.p.m. (plain language, code groups and figures) is available for approximately two hours nightly from 0930 GMT on or about 3550 kHz.

abt .... about
agn .... again
ant .... antenna
buro .... bureau
cfm .... confirm
condx .... conditions
cu agn .... see you again
cul .... see you later
es .... and
fb .... fine business
fer .... for
ge .... good evening
gn .... good night
gud .... good
mx .... metres
nite .... night
pse .... please
rx .... receiver
tnx .... thanks
tks .... thanks
tx .... transmitter
u .... you
ur .... your
vy .... very
wx .... weather
xtal .... crystal

These are **some** of the abbreviations in general use — others will become familiar as you listen and put them into context in your "read-back". ■

MODIFICATION TO THE TUNING RATE OF THE FRG-7

Maurie Batt VK3/I3062,
R.S.D. Rokewood Junction, 3351

Most owners of a FRG-7 receiver will agree that it is a very fine receiver and that the only criticism would be in respect to the rather high tuning rate. Below is a guide set out on the procedure on how to carry out the modification to the tuning rate.

All that is required is a Jackson slow-motion drive (this is available from Bail Electronic Services) and two 4 BA countersunk screws. Tools required are:

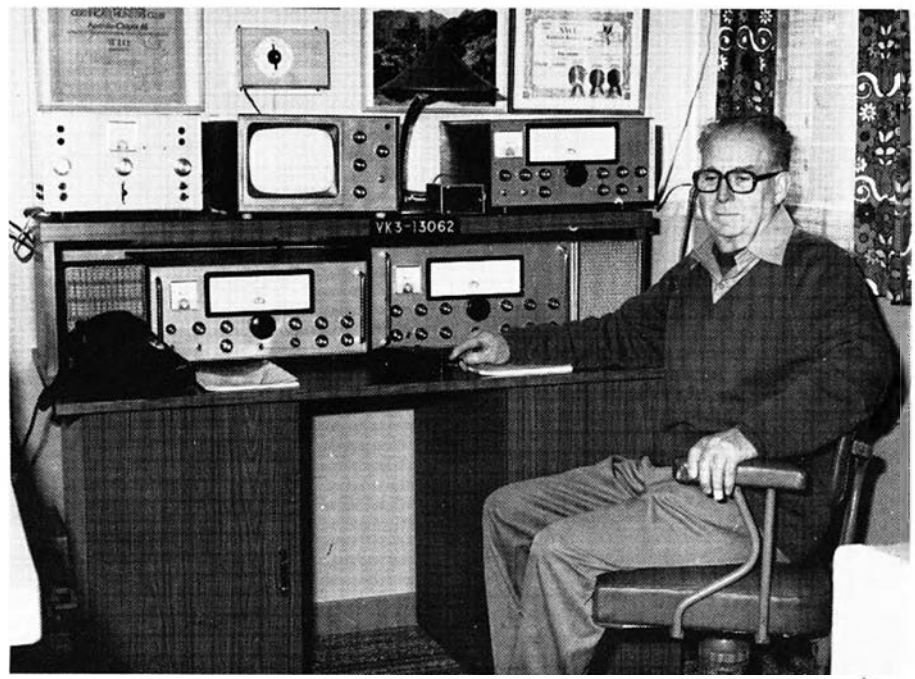
1. Junior hacksaw.
2. 1-1/8 inch chassis punch.
3. No. 32 drill.
4. 4 BA tap.
5. Philips screwdriver.
6. Screwdriver with long thin blade.
7. Pair compasses.

On the assumption that the relevant details of all models of the FRG-7 are the same, proceed as follows.

Remove the six screws around the front of cabinet and the three screws around the rear of cabinet, the chassis can then be withdrawn through the front of the cabinet. Remove all of the control knobs and the locking nut on the Mode switch. Remove the two screws that hold the LED lock indicator; this is situated on the rear of the panel. Remove the three screws from the escutcheon, when removing the escutcheon take care not to foul up the Lock LED. Remove the eight countersunk screws around the edge of the plastic panel surround and the four screws on the front panel. The panel can now be removed but take care in this operation as the foam rubber back on the rear of the panel could be torn off. This completes the dismantling process.

Measure off 5/16 inch from the boss of the main tuning shaft and cut off with Junior hacksaw. As this has to be done with the shaft in situ, it will be necessary to relieve the strain on the tuning mechanism by placing a wooden block under the end of the shaft and grip the end of the shaft with the fingers.

Take the Jackson slow-motion drive, the shaft is about 5/8 inch long, cut off a ¼ inch, and when rough edges are removed the shaft will be just under 3/8 inch long. The hole in the panel must now be enlarged to 1-1/8 inch to accommodate the body of the slow motion drive. This can be done with a 1-1/8 inch chassis punch and with care there is no danger of the panel being buckled. To be sure of cutting the hole concentric with the original hole, set a divider to about 1/8 inch and with one leg on the inside of the hole run the divider round the hole; the scribed circle will indicate the position of the new hole which should be 1-1/8 inch in diameter. When fitting up the chassis punch make sure that the cutting edge is on the scribed circle and with care proceed to enlarge the hole. Refit the front panel, engage the Jackson drive on the tuning shaft and ensure that there is a clearance around the drive unit. Drill two holes as shown in Fig. 1, tap out to 4 BA. Now fit the drive and tighten the grub screws, screw in the two 4 BA countersunk screws just tight enough to hold the body of the drive, fit the tuning knob and check for freedom of movement.



Well known short wave listener Maurie Batt at the controls of his station.
Photo courtesy of the Ballarat Courier Pty. Ltd.

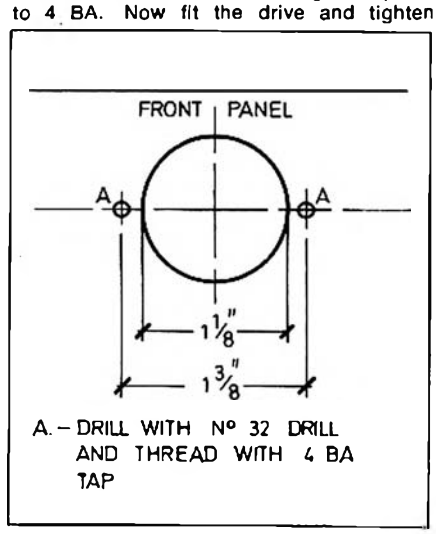


FIG. 1.

Take the escutcheon and enlarge the hole to clear the flange on the drive unit. The material the escutcheon is made of is very pliable and the hole can be nibbled out to size, or better still if a 1 inch chassis punch is available so much the better. When refitting the escutcheon locate the LED in the hole first. To re-assemble, carry out the dismantling procedure in reverse.

When fitting the tuning knob do not replace the large felt washer as this is not required now. If the tuning is too free a thinner felt washer will replace the thick one. With the modification carried out you will have an excellent slow motion tuning rate which will be about 65 turns of the knob to cover the 0-1000 on the dial. This may seem a little tedious with a slow tuning rate but the benefit will be appreciated by the extra DX that can be heard with the slow tuning rate that would otherwise be missed.

At a later date, details of a modification to this system will be published whereby the original tuning rate will be retained and the extra slow speed selected at will. ■

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TRADIPER MODEL TE-15

The Model TE-15 Transistorised Grid Dip Meter is a very accurate instrument operating from a 9 volt battery power supply. Six plug-in coils are supplied with each unit, covering the frequency range of 360 kHz to 240 MHz.

The Model TE-15 can be used for a number of useful purposes. With the most common use as a Grid Dip Meter, can also be employed as a relative field strength meter. It is ruggedly constructed and very light in weight. Because of transistorised circuit employed there is no need for an AC power supply as used in many other models. The Model TE-15 will certainly prove invaluable to radio amateurs.

NETT PRICE $55.00
Postage $2.40

TE-20D RF SIGNAL GENERATOR

Frequency Range: 120 Kc to 500 Mc in 6 bands. Band A 120-320 Kc, Band B 320-1,000 Kc, Band C 1-3.4 Mc, Band D 3.2-11 Mc, Band E 11-38 Mc, Band F 36-130 Mc (Fund.) — F' 100-500 Mc (Harm.).
Output (RF): High 100,000 uV max.), Low 100 uV max.).
Output (Audio): 400 cps., approx. 8V (adjustable).
Modulation: 400 cps., internal.
Power Requirements: 105-125 volts, 220-240V AC, 50-60cps.
Tube Complement: 1 — 12BH7, 1 — 6AR5, 1 — Silicon Rectifier.
Dimensions: 140 (h) x 215 (w) x 170 (d).
Shipping Weight: 2.8 kg.

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Accessories: Battery UM-3, Wind screen, Adjusting screwdriver, reinforced antenna line, microphone stand.

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HANSON SWR6

POWER METER & FIELD STRENGTH INDICATOR

Handy for checking transmitter operation. Uses bridge method for SWR measurements. Simple and accurate operation. CM method employed for RF power measurement.

NETT PRICE $22.00
Postage $1.80

MODEL 110 POWER METER & STANDING WAVE BRIDGE

The Model 110 is a handy, compact device for the Amateur Radio or CB station in checking transmitters and antenna performance.

NETT PRICE $28.50
Postage $2.00

MODEL 95-130 3-FUNCTION TEST INSTRUMENT

The 95-130 test instrument is a compact 3-function test meter to indicate the condition of any 52 ohm CB antenna system and transmitter by testing for Standing Wave Ratio, relative RF power or field strength. Tuning of transmitters is possible when using this meter as a field strength meter. Also handy for comparing antennas. Designed to be used for base stations or mobile operations and can be permanently installed in antenna systems without any measurable loss of power.

NETT PRICE $22.50
Postage $1.50

MODEL 151 LOW POWER TVI LOW PASS FILTER

The 151 is designed to be installed in low power communications equipment such as CB radios, in the antenna transmission line to reduce the interference caused by the CB radio in other high frequency receivers such as television receivers. This is accomplished without reducing the power of the CB radio with special tuned circuits inside the filter.

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Postage $1.40

MODEL 140 ANTENNA MATCHER

This model combines the function which enables simply to match the transmitter to the impedance of the antenna on CB or amateur radio stations.

Specifications — Frequency: 25 to 40 MHz; RF Power: 100W max.; VSWR: under 1 : 1.05; RF Power Loss: under 5 per cent.

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CRYSTALS

Channel No.	Freq. MHz	Channel No.	Freq. MHz
1	27.015	11	27.135
2	27.025	12	27.155
3	27.035	13	27.165
4	27.055	14	27.175
5	27.065	15	27.185
6	27.085	16	27.195
7	27.095	17	27.205
8	27.105	18	27.225
9	27.115	27	880
10	27.125	27	240

$7.50 PAIR — Postage 25c

CRYSTALS MADE TO ORDER
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ARLEC PLUG-IN BATTERY CHARGER

A high performance charger for batteries used in cars, caravans, boats, motor cycles, etc.
Delivers 1 amp output at 12 volts. Designed to run continuously over long periods, will maintain a fully charged battery in peak condition or recharge flat battery. Double insulated for max. safety, electrically protected by fully automatic circuit breaker. No mains leads to get tangled, plugs directly into power socket. Comes with 3 metre battery leads fitted with clips. For use on 240V, 50 Hz supply.

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MODEL YWI

STANDING WAVE BRIDGE, FIELD STRENGTH AND POWER INDICATOR

YW-1 is a handy, compact device for the amateur radio station in checking transmitters operation. For measurements, it uses the bridge method of comparing the power supplied to and reflected from the antenna system. Continuous monitoring of the transmitter output is possible by having the instrument in the circuit at all times. The model can be used as a simple field strength meter by disconnecting it from the feedline and attaching a small pickup antenna.

Meter Sensitivity: 200 uA on DC current (at full scale; **VSWR Meter Range:** 1 : 1 — 1 : 3; **Power Meter Range:** 0 — 10W; **Impedance:** 50; **FS Meter Range:** 0 — 10 dB; **Accuracy:** 1.5 MHz — 50 MHz 10 per cent; **Dimensions:** 5¾ (h) x 2-3/8 (w) x 3 (d) in.; **Weight:** 16.58 ozs.

NETT PRICE $22.00
Postage $1.50

100 METRE ROLLS SPEAKER WIRE

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2 STN INTERCOM and battery 9V $12.90
3 STN INTERCOM and battery 9V $18.90 ea.
4 STN INTERCOM and battery 9V $26.90 ea.
Complete with 60 ft. wire, ideal for garage, baby room, etc. — **Postage $1.50**

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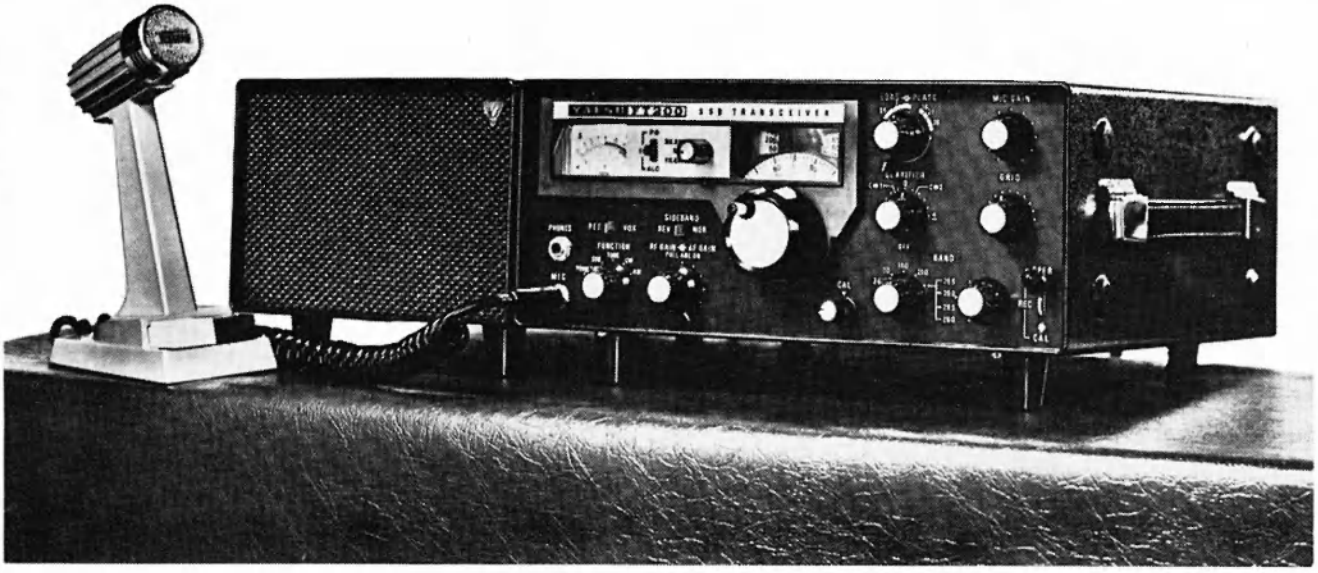
FT-200 FIVE BAND TRANSCEIVER

ECONOMICAL SSB! from YAESU



GENERAL DESCRIPTION

A superb quality, low cost, versatile Khz transceiver. Covers 80-10 mx, tuning range 500 Khz each band. On 10 mx, crystal supplied for 28.5-29 Mhz. (Crystals available optional extra for full 10 mx coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator, 16 valves, 12 diodes, 6 transistors. PA two 6JS6C pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning ±5 Khz. Uses a 9 Mhz crystal filter with bandwidth of 2.3 Khz at —6 db. Selectable sidebands.

Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 234 volt 50 Hz AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet and panel finished in black.
If required for novice use, the power can be easily reduced. If a separate external crystal oscillator (not supplied) is used then fixed C.C. transmit operation would be possible, with tunable reception.

Hand Held or Desk Mic. Optional Extra.

TECHNICAL DATA

Mode of Operation:	**SSB (A3J), Phone (A3H), CW.**
Frequency Range:	**3.5 ~ 4.0, 7.0 ~ 7.5, 14.0 ~ 14.5, 21.0 ~ 21.5, (28.0 ~ 28.5), 28.5 ~ 29.0, (29.0 ~ 29.5), (29.5 ~ 30.0 Mhz).**
Frequency Stability:	**After Warm-up, 100 CPS/30 Min.**
Spurious Response:	**Better than — 40 db.**
Antenna Impedence:	**50 ~ 100 Ω Unbalanced.**
Carrier Suppression:	**Better than —40 db.**
Side Band Suppression:	**—50 db at 1000 CPS.**
3 RD Harmonic inter-modulation Distortion:	**—30 db (P.E.P.)**
Transmission Bandwidth:	**3 Khz.**
Receive Sensitivity:	**0.5 μV S/N 10 db.**
Filter Selectivity:	**2.3 Khz (—6 db) 4 Khz (—60 db).**
I.F. Mixing Beats:	**50 db Down.**
Image Interference:	**50 db Down.**
AGC Characteristic:	**Amplified AGC.**
Receiver Output Power:	**1W (at 10% Distortion).**
Weight:	**17.6 lbs.**
Dimensions:	**13¼" Wide, 5½" High, 11" Deep.**

Price, including sales tax, excluding freight:
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FV-200 — $149.00 • DC-200 DC P S $239.
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	MITCHELL RADIO CO., 59 Albion Rd., Albion. 4010	Ph. 57 6830
A.C.T.	QUICKTRONIC. Jim Bland. Shop 11. Altree Crt., Phillip. 2606	Ph. 81 2824 82 2864

160 METRES FOR THE REALISTIC AX-190

Gary Hambling VK5AS,
c/o Post Office, Cowell, 5602

Although an excellent receiver for its price, the Realistic AX-190 does not cover the 160 metre band. To overcome this limitation a simple converter can be fitted as described, converting 1.8 MHz to 14 MHz or another band if preferred.

The local Tandy store had a special offer on the AX-190 at half-price, so I acquired one of these beauties. I considered various ways of modifying it to cover 160 metres and decided that the simplest was to fit a converter.

CONVERTER

The converter circuit is shown in Fig. 1, and its general layout is indicated in Fig. 2. It is built on a printed-circuit board about 75 by 50 mm (3 by 2 inches). None of the components is critical, and some possible alternatives are suggested on the circuit. The coils are broadcast band oscillator coils from two Tandy coil packs. They resonate at 1.8 MHz with a capacitance of about 10 pF. Pin numbers for the coils are printed on the cardboard packages in which they are supplied.

The wide-band IF output transformer is of 2 : 1 ratio using two 7 turn bifilar windings of about 26 to 30 SWG on a small ferrite toroid obtained from the WIA components service. The oscillator crystal frequency is 12.2 MHz, as one was on hand, and it conveniently translates 1.8 MHz to 14 MHz. Any crystal may be used, providing the resultant output is on a band covered by the receiver.

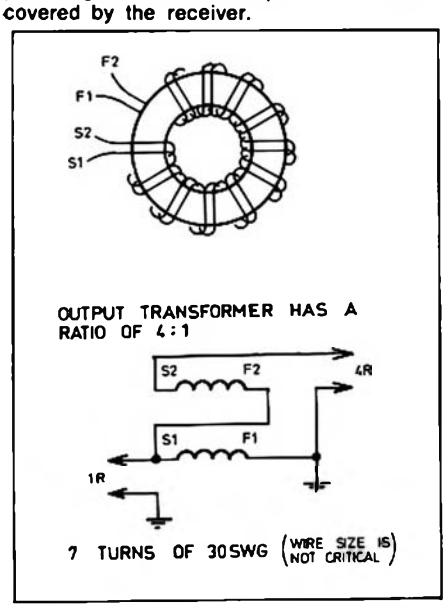


FIG. 3 (left) — Wide Band Output Transformer Details

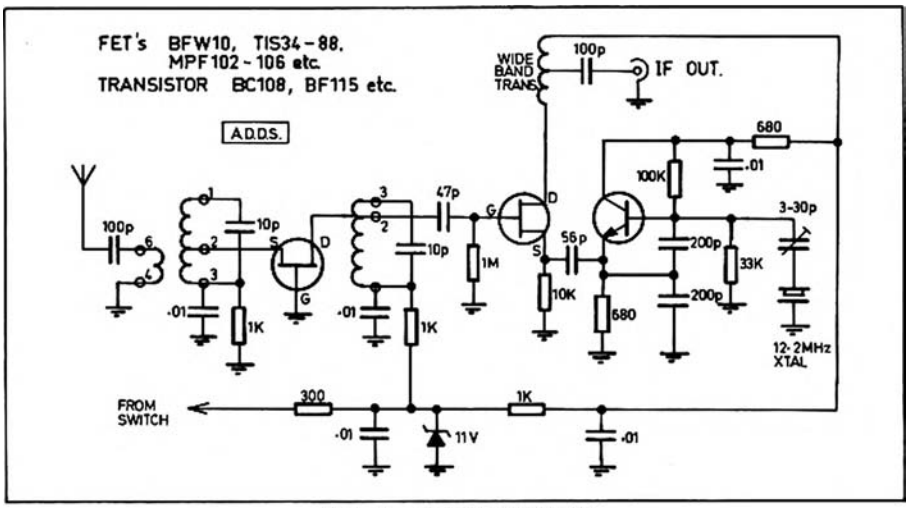


FIG. 1 — Converter Circuit

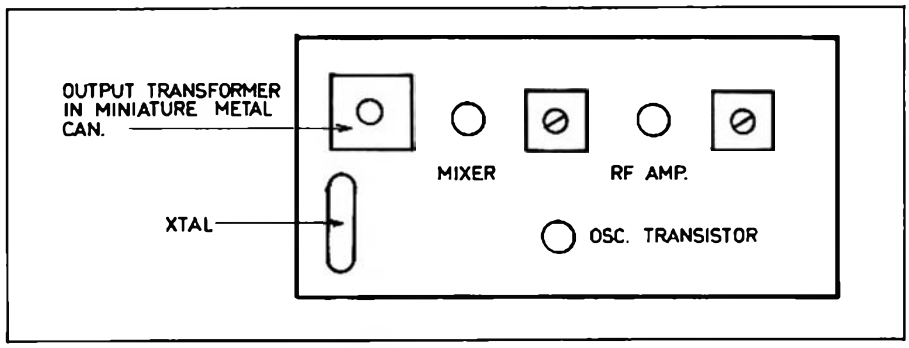
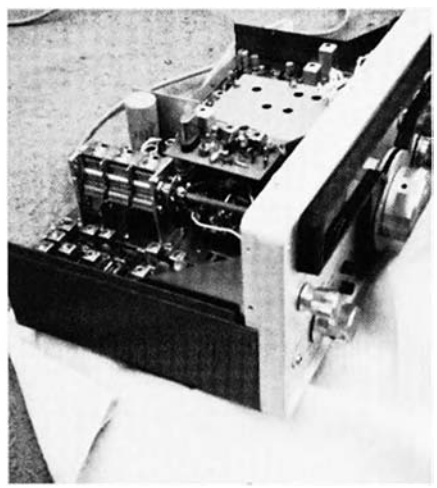


FIG. 2 — PCB layout

INSTALLATION

A double changeover miniature 12 volt relay was fitted near the antenna socket. It is wired so that when energised it connects the antenna to the converter input, and the converter output to the receiver input. The converter itself is mounted on top of the VFO cover (using existing screws) as shown in the photograph.

On the front panel of the AX-190 there are two calibrator push-buttons, one for 100 kHz spots and one for 25 kHz. I thought that 100 kHz only was an unnecessary feature, so I used this switch to operate the converter. The two wires to the 100 kHz switch were disconnected, and transferred to the 25 kHz switch. Thus freed, the 100 kHz switch is now used to feed unregulated DC supply to the converter and the relay coil. ■



The 160 Mx Converter is mounted on top of the VFO Cover

AN HF TVI SUPPRESSION TECHNIQUE

A popular and effective method of suppressing TVI from HF transmissions is the use of an isolating transformer in the TV feedline. This isolating transformer is used to suppress longitudinal currents in the feedline. The desired TV signal being a transverse current.

The TV feedline can approach a resonant condition at HF and is often closely coupled to the amateur antenna as it is only a couple of wavelengths away on higher bands. On the lower bands it is within a wavelength.

Due to the close coupling a considerable RF voltage may be induced longitudinally in the TV feeder. The use of an isolating transformer wound on a balun core or similar will isolate this voltage from the TV set. This isolating transformer must be connected as close to the TV set terminals as possible.

A suitable transformer may be made for other 75 ohm coax. systems or for 300 ohm ribbon systems by winding a pair of 2 turn windings through a balun core. One winding is corrected to the antenna and the other to the TV set. The transformer so formed has a 1 : 1 impedance ratio and very little coupling for the longitudinal component.

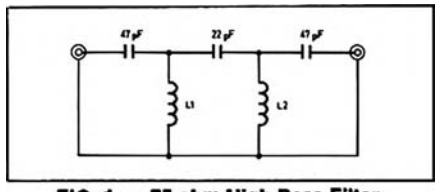


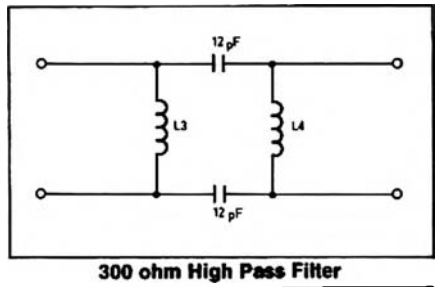
FIG. 1 — 75 ohm High Pass Filter

The frequency range of such a transformer extends from the region of 3.5 MHz to 200 MHz with very little variation in attenuation. Thus only the longitudinal voltage will be attenuated and any pickup by the TV antenna will need further filtering.

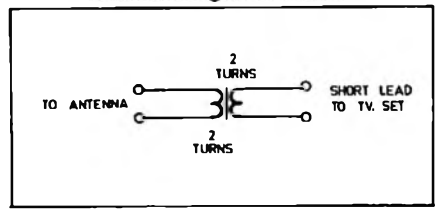
If the TV antenna is picking up some HF as a transverse signal then this can be simply filtered out by a simple high pass filter after the balun core transformer.

SIMPLE HIGH PASS FILTERS

Simple high pass filters can be made using a double neosid assembly. The can of the assembly provides a simple and neat container for the filter. A shim or circuit board shield between the inductors may be soldered inside the assembly to a couple of base pins. ■



300 ohm High Pass Filter



Longitudinal Isolation Transformer (wound on TV Balun Core)

L1 and L2 are 9 turns of 28 SWG wound on Neosid 722 formers with no slugs in a Neosid type B assembly (double can).

L3 and L4 are 20 turns of 35 SWG wound on Neosid 722 formers with no slugs in a Neosid type B assembly (double can).

TRAP THOSE COLOURED TENNEESSEE VALLEY INDIANS

Gil Sones VK3AUI.

Before colour TV and the widespread use of coax. TV feeders, interference from 52 MHz operation could be cured by simple ribbon "suck out" traps. These were made up of 50 cm of 300 ohm ribbon shorted at one end and tuned to 52 MHz by a 3-30 pF trimmer across the other end. The whole trap was taped to the TV set ribbon feeder and tuned for elimination of the TVI.

Nowadays, coax. feeder is very popular and a somewhat different approach is needed. The easiest is to use open-ended quarter wave stub traps. The single stub is the simplest and should prove reasonably effective provided it doesn't unduly upset the SWR of the feedline on the TV channels. This can show up a nasty set of ghosts or maybe a reduction of the channel 0 signal below the level necessary for colour reception — an unpardonable sin in the eyes of the TV set owner. So if you use the simple quarter wave stub as shown in Fig. 1 adjust it with care and check the effect on all channels.

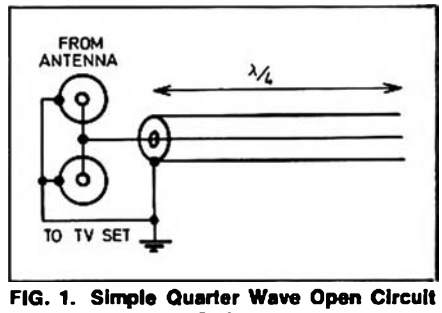


FIG. 1. Simple Quarter Wave Open Circuit Stub.

Cut to quarter wave length, allowing for the velocity factor of the coax. Adjust by starting a little too long and snipping off 5 mm at a time (¼ inch). The length should be 0.96 m for RG59C/U for 52.1 MHz operation.

If the simple stub is not effective enough improved rejection can be had by using two stubs spaced a quarter wave apart. This works by the first stub effectively shorting the line as before but now the line appears as an open circuit a quarter of a wavelength further along. This point is where we have cunningly placed another stub to effectively short the line here. The effect is much greater attenuation at the stub frequency. Although this arrangement, shown in Fig. 2, has a somewhat narrower bandwidth it is very effective.

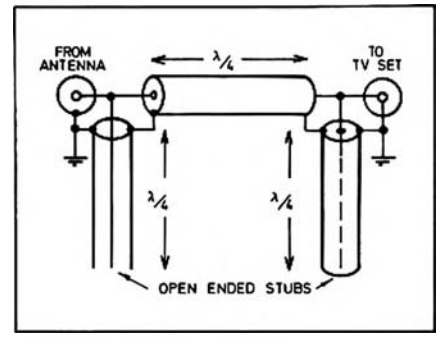


FIG. 2. Quarter Wave Spaced Stubs.

All stubs 0.96 m long for 52.1 MHz operation. Trim open circuit stubs 5 mm at a time for maximum attenuation of TVI.

Whilst the transmission line stubs are very simple their effects can be felt on

other frequencies which may not be acceptable. An alternative which gives very good results is the combination of series and parallel tuned circuits.

In both the series and parallel tuned traps shown in Figs. 3 and 4, the trimmers should be tuned for least 52.1 MHz interference. The values used may appear odd but have been carefully chosen to minimise funny effects on the TV channels due to their effect on the TV feeder's impedance. These can show up as a variety of distortions and will result in the TV viewer or his serviceman discarding them.

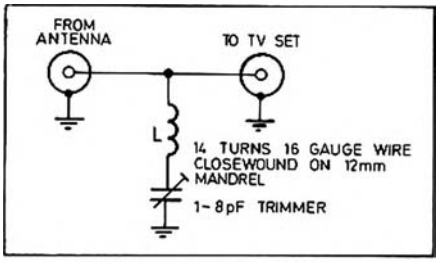


FIG. 3. Series Tuned Trap.

If these simple series and parallel traps are ineffective then the combination of series and parallel circuits shown in Fig. 5 can be quite useful.

A combination of series traps and a quarter wavelength of coax. is a very effective performer but can be more complex and bulky. See Fig. 6. It does not suffer as much from quaint off frequency effects as its all transmission line mate of Fig. 2.

This trap makes use of a quarter wavelength of 75 ohm line as an impedance transformer between the two series resonant traps thus producing a high attenuation. Since the transmission to the set

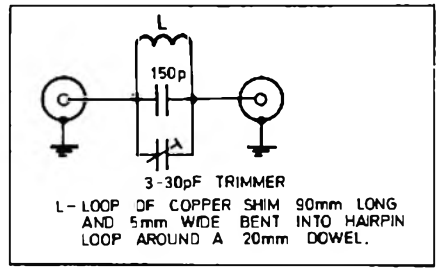


FIG. 4. Parallel Tuned Trap.

has only two shunt traps which appear highly inductive on the higher channels their effect is light. The 6 metre signal is very greatly reduced as the low impedance of the first trap attenuates the interference and this low impedance is transformed to a high impedance at the point where the second trap is connected by the quarter wave line. This results in more attenuation of the interference.

With all these circuits it must be remembered that the reduction of the amateur signal present at the TV set is the

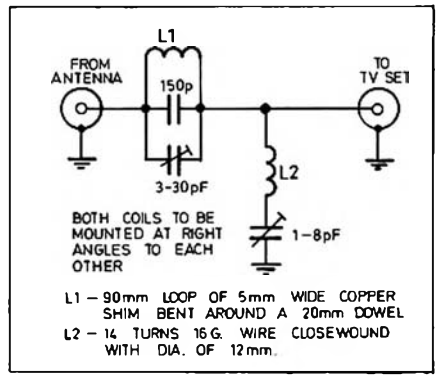


FIG. 5. Combined Series Parallel Trap.

objective and the TV traps must not be expected to act alone. The other means of reducing the signal should be applied. These include cross polarisation which is worth 20 to 30 dB. Separation of the TV and amateur antennae is worthwhile. The TV antenna should be efficient and provide a strong signal on all channels, however too strong a signal will push the TV set close to overload and the amateur signal may give it the final push.

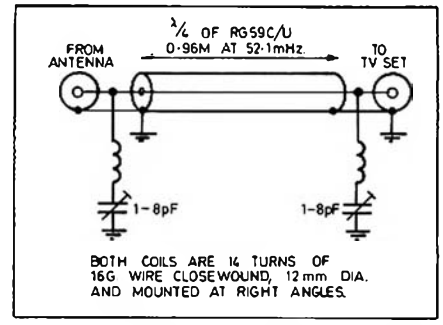


FIG. 6. Combined Quarter Wave and Series Resonant Traps.

Another aspect is that of separation in frequency which allows the TV circuitry and the TVI traps to work more effectively.

Lastly the power level should be kept down to the minimum necessary to make the contact with the other amateur rather than him and all your neighbours.

All the traps described here may be adjusted prior to insertion in the TV feeder by firstly using a GDO and then by listening to a strong 6 metre signal with the trap in your feedline and tuning for a null. When inserted in the TV feeder only a minor tweek will be required thus avoiding covering the neighbour's carpet with solder blobs and 5 mm bits of coax. ■

A CHRISTMAS TREE LAMPS PROJECT

N. Cooper VK4ZNC
5 Cahill St., Strathpine 4500

This circuit may interest those who have had little to do with logic circuits. Most basic logic projects seem to have little use when completed. This one has an unusual use which can be enjoyed by anyone.

What does it do? Any number of lights up to 16 placed on the Christmas tree may be made to come on in order from top to bottom or vice versa. After all lamps have come on in order they will stay on for a period, which is adjustable, and then they will all extinguish together and stay off for

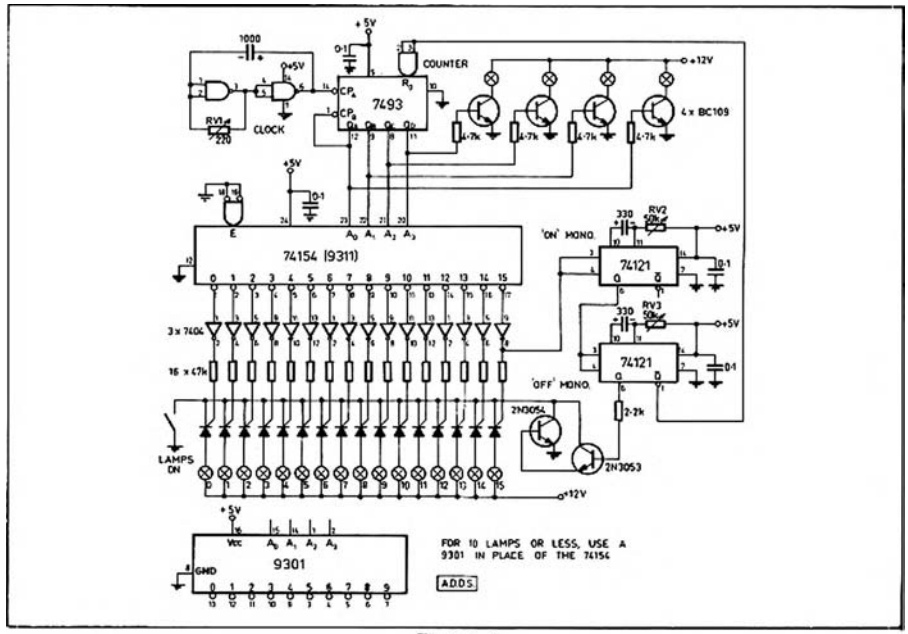


Figure 1

a period which is also adjustable. If desired another four lamps can be connected which will count to 16 in binary notation. Normal commercial type 12V lamps are used on the tree.

OPERATION

Two nand gates connected as inverters form a clock which produces a low frequency square wave. RV1 adjusts the frequency. The pulses from the clock are fed into the binary counter which produces binary on its output ABCD leads. The binary turns on transistors TR1 to TR4 each time a logic 1 appears on any of the bases. Thus the lights in the collector circuits follow the binary code. The BCD output of the counter is also fed into the decoder which decodes the binary into decimal. The outputs of the decoder are normally high and go low in turn with BCD applied. To fire each of the SCRs in turn a positive has to be applied to the gates. Since the decoder outputs are normally high, inverters are necessary on all outputs so that they go high in turn, which is what is required. As the SCRs fire in turn they lock on until the 2N3054 transistor is turned off so removing the anode potential and thus releasing the SCRs. When the last decoder output goes high after going low (count 17), the "on" monostable receives a trigger pulse. Its Q outputs change over and after a delay, determined by components C2 and RV2, revert back to the stable state. Its Q output in going from a 1 to 0 then triggers the "off" monostable which changes its Q outputs over. In so doing the two transistors are turned off, releasing the SCRs and off go the lamps. The change on Q also resets the counter. After a delay the "off" monostable reverts back to its stable state so everything is back to the starting point again and the procedure repeats itself.

Note that the circuit shows pin connections for both 9301 and 74153 decoders. This is in case 10 or less lamps are required. If so the 9301 should be used.

The unit was built on a PCB and boards will be available to anyone who is interested in building the unit. ■

THE JIGGLER DANGLER

Bruce L. McCubbin VK3SO,
3 Kildare Street, Burwood, 3125

This is a gadget to assist in the etching of one-off PC boards by maintaining agitation of the etchant bath. VK3SO calls it his "jiggler dangler".

The gadget consists of a 500 ohm BPO relay with an extension attached to the armature. The armature travel has been increased to about 3 mm, and a set of break contacts is arranged so that as soon as the relay actuates it drops out again. A 500 uF electrolytic in series with a 100 ohm resistor is connected in parallel with the coil to slow down the release action, and the usual arc-suppression components are connected across the contacts.

The armature extension consists of a scrap of PC board material about 80 mm long and 12 mm wide, attached to the armature by means of the residual gap adjusting screw. This extension has several holes along its length to accommodate a plastic stud which supports the board to be etched. The choice of hole depends on the degree of agitation required and the armature loading. Large boards will need to be supported nearer to the pivot point.

The device is supported above the baseboard by a pair of wooden uprights about 25 by 12 mm with about 12 mm separation and about 30 cm high. These allow the relay to be adjusted up or down as required, and also to be swung out sideways if needed to inspect the progress of the etching. I use a 0 to 30 volt regulated DC power supply to energise the relay, and this allows adjustment of the jiggling rate.

METHOD OF USE

The board is attached by selecting a suitable spot, preferably fairly central in an unused section of the board, and drilling a small hole in it. This is then used to attach the board to the stud by means of a small self-tapping screw or other convenient method.

A fairly deep dish should be used for the etching bath. Adjust the height of the board so that it is just clear of the bottom of the bath and pour in the etchant until it covers the board by about 3 mm. Then switch on the supply and adjust the volts until a steady agitation takes place. The reason for using a deep dish is that considerable turbulence occurs, and with a shallow dish there may be spillage.

The advantage of this gadget is that you can set the board up in the bath and go on with another job while the etching takes place. But he warned, the etching process is much quicker than the old method of rocking the bath. Don't get too deeply involved in some other project and over-etch your board! ■

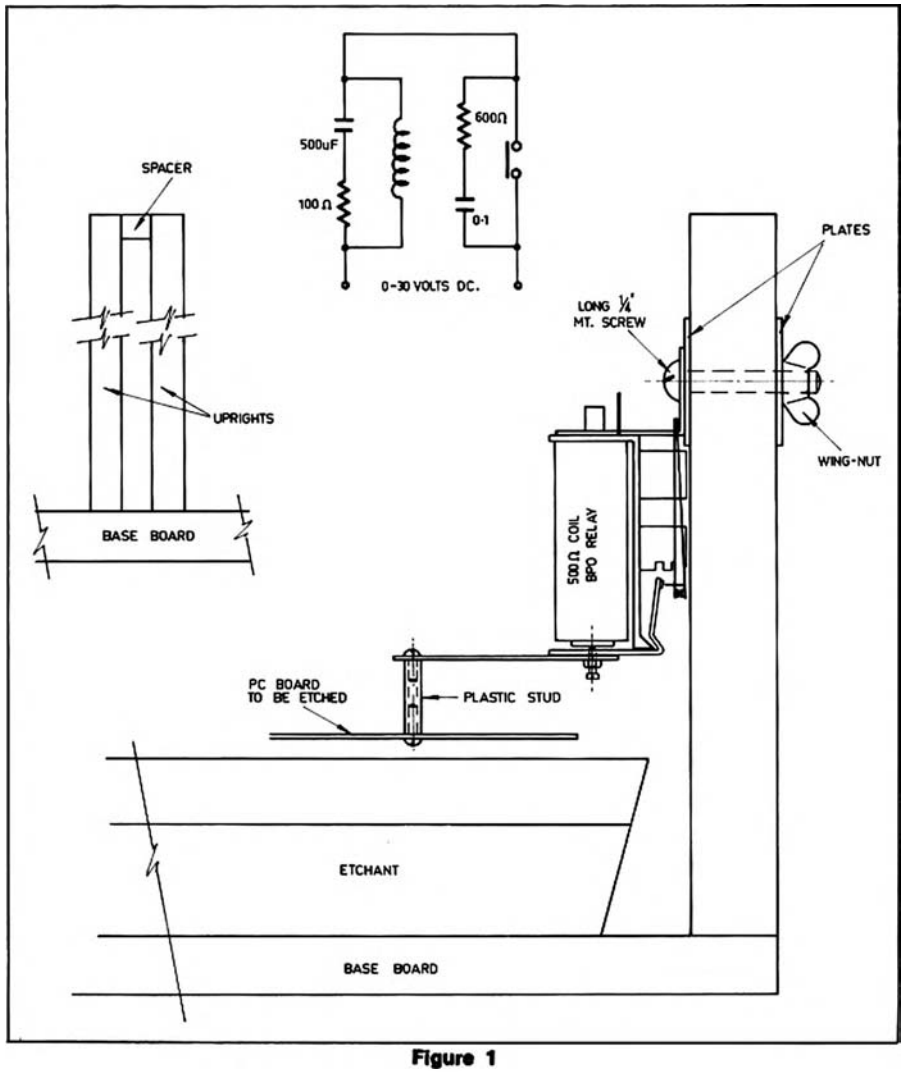


Figure 1

FACETS OF AMATEUR RADIO — A PICTORIAL ROUND-UP

Amateur Television

Radio Teletype

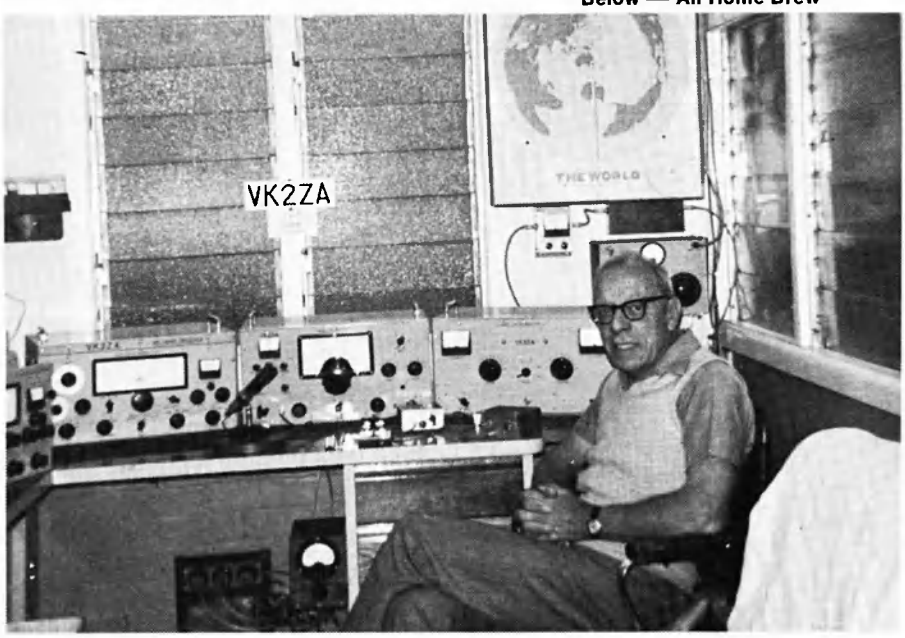
Discone — won't keep out rain

Below — All Home Brew

Left — "At Hamfests"

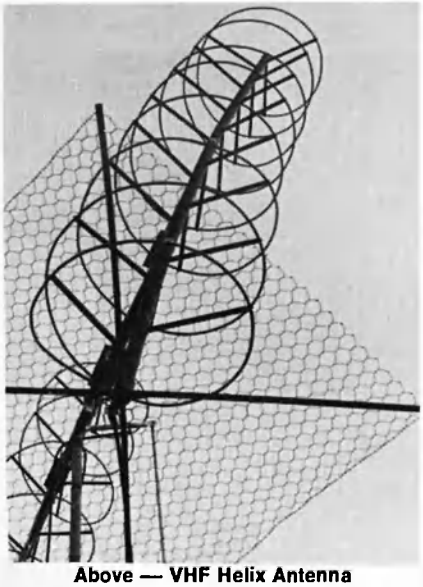
Above — Involving Youth

Below — Even Ice Skating (Roy VK3AOH)



Meeting Old Friends

Little Willy Didn't Do It — Boy, Oh Boy, He Really Blew It!!



Above — VHF Helix Antenna

Mobile — XYL in Back Please

Lett — In the Bush (beware of snakes)

Dick VK2AHR

Above — Operating Portable

Left — Russell VK3NT, Co-Ordination during Cyclone Tracey

Above — Slow Scan TV

Left — Some Old Friends to start off with??

Above: 9M2CJ — Mobile Personalised Number Plate

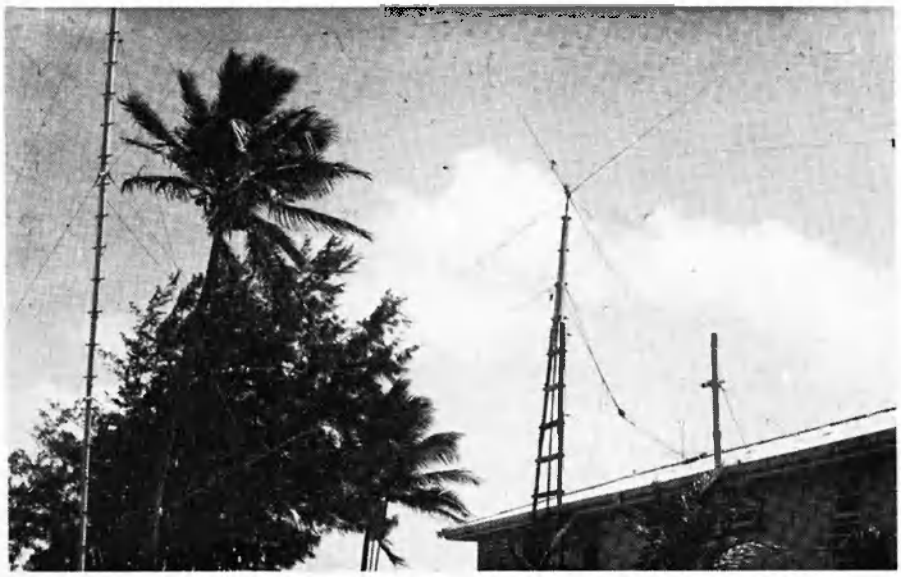
Left — Mellish Reef, Dx-pedition

Royal Patronage

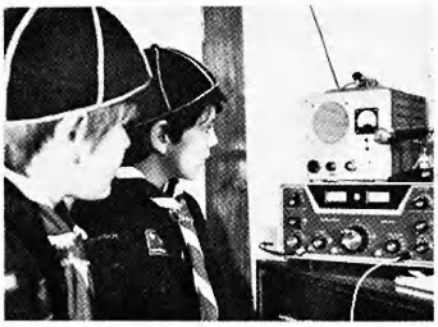
Above — Bruce VK3BM — Shack at Swan Hill, Vic.

Right — Annual WIA Convention

Below — Willis Island, VK9ZC — Lonely Outpost



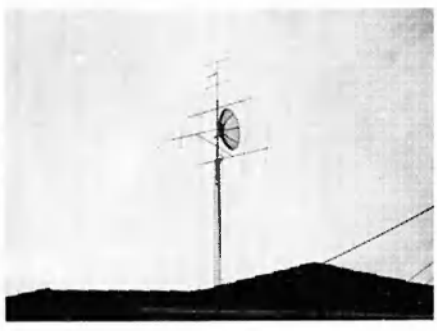
Below — Which Plug?



Above — Jamboree of the Air

Left — HF Link, Darwin Disaster

Below — VHF Antennae



YAESU

ADVANCED AMATEUR COMMUNICATION EQUIPMENT

FROM A WORLD LEADER —

FT-901 De-Luxe HF transceiver with pair 6146B PA, Dig. readout frequency memory, electronic keyer, a host of new unusual features. Availability early 1978. $TBA.

FT-101E TRANSCEIVER: 160-10 Mx, SSB, AM, CW, PA two x 6JS6C, 260W PEP Input SSB. Built-in Dual AC/DC power supply. BUILT-IN RF SPEECH PROCESSOR. Solid state except for Tx. PA and driver. IF noise blanker, FET Rx RF amplifier, clarifier, built-in speaker. Export Mod. 240V AC, 12V DC **$859.**
M-101 MOBILE MOUNT for FT-101E. **$34.50.**

FT-301S 160-10mx, fully solid state Tcvr suitable for Novice use. 25W PEP max. **$699.**

FT-301 160-10mx. Fully solid state Tcvr, built in RF Speech Processor, 200W PEP Input. **$949.**

FT-301D DELUXE DIGITAL Tcvr. Similar to FT-301, **$1149.**

* **FP-301 MATCHING POWER SUPPLY.** 20 Amp 12V suit all 301 Transceivers. **$178.**

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Programmed IC for FP-301D ident. $35.00.

YO-301 MATCHING MONITORSCOPE for FT-301 Series. **$389.**

FC-301 ANTENNA COUPLER, inc. SWR & Pwr meters, ant. switch and connectors. **$195.**

R-301 RELAY BOX for FT-301 to FL-2100B. **$23.**

FT-200 TRANSCEIVER: 80-10 Mx, PA two x 6JS6C, 260W peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator. Can be modified for novice use. AC Power supply and transceiver. **$628.**

* **DC-200 DC POWER SUPPLY** 12V for FT-200. **$239.**

FT-75B TRANSCEIVER: SSB and CW. VXO, noise blanker, squelch. Very small size, transistorised, valve PA, a superb little rig. 80W PEP. Microphone and five crystals included. **$388.**

* **FP-75B AC POWER SUPPLY:** 230V for FT-75B/BS. Built-in speaker, power cable and plug. **$88.**

* **DC-75B DC POWER SUPPLY:** 12V for FT-75B/BS. Includes built-in speaker, mobile mount, power cable and plug. **$92.**

FL-101 TRANSMITTER: Solid state 160-10m, PA two 6JS6C, all facilities. Companion unit to FR-101. **$675.**

FL-101 SPEECH PROCESSOR: For installation in FL-101 **$79.**

FRG-7 WADLEY LOOP RECEIVER: All solid state, 0.5-29.9 MHz in thirty 1MHz bands. Electronic band selection. **$338.**

FR-101D RECEIVER: All solid state, 23 bands incl. all amateur bands 160-10m plus 6 and 2m, FM, CW, etc., etc. **$915.**

FR-101D DIGITAL: Has all the options of the FR-101D as well as DIGITAL READOUT. **$1099.**

FL-110 SOLID STATE LINEAR AMPLIFIER. Companion unit to FT-301S. 10-15W drive, 200W PEP Input, 160-10mx. **$249.**

FL-2100B LINEAR AMPLIFIER: 80-10Mx, uses 2 x 572B triodes in G.G., twin fan cooled, styled to match FT-101E. **$578.**

FT-620B SIX METRE SSB AM, CW, TRANSCEIVER: 10W solid state, AC and DC operation. **$577.**

FT-221R TWO METRE TRANSCEIVER: Features all mode operation — SSB/FM/CW/AM — with repeater offset capability. 144-148 MHz coverage using advanced phase-locked loop circuitry. AC and DC operation. **$659. ($749** with Dig. Readout adaptor, a few only.)

M-620/221/301 MOBILE MOUNT for FT-620B, 221R & 301, **$34.50.**

QTR-24 24 HOUR WORLD CLOCK: At a glance the time anywhere in the world can be read. **$33.**

FTV-650B SIX METRE TRANSVERTER: Converts 28 MHz. SSB to VHF, and includes receiving converter. 50W PEP. Primarily designed for coupling with Yaesu transmitters **$249.**

FTV-250 TWO METRE TRANSVERTER: Similar FTV-650B. 10W-15W cutput, but all solid state and built-in AC PS. **$249.**

FT-223 TWO METRE TRANSCEIVER: 10W, 23 Channels, plus one priority channel. Inc. 40, 50 & 51, **$189.**

FT-227R 2mx, FM Tcvr, 800 Ch, with Dig. Readout, memory, rev. etc. **$375.**

YC-500E 500MHz FREQ. COUNTER: Accurate to .02ppm. **$574.**

YC-500S 500MHz FREQ. COUNTER: Accurate to 1ppm. **$446.**

YC-500J 500MHz FREQ. COUNTER: Accurate to 10ppm. **$319.**

YO-100 MONITORSCOPE: Matches the FT-101E, but can be used with other Yaesu equipment. (IF kits 455 kHz and 9 MHz optional extra). **$285.** (IF Kits **$12.00 each**).

YP-150 DUMMY LOAD/POWER METER: For use over the frequency range 1.8-200 MHz. Three power ranges, 0-6W, 0-30W, 0-150W with built-in cooling fan. **$108.**

FF-50DX 3-SECTION L.P. FILTER for TVI reduction. **$39.**

F-101 FAN. $38.

SP-101 MATCHING EXTERNAL SPEAKER for FT-101, FR-101, FRG-7. **$49. SP-120, for 301/221. $49.**

OPTIONAL CRYSTAL FILTERS. $63.

MATCHING VFOs: FV-101B, FV-200, each. **$149,** FV-301 **$159.**

YC-601 DIGITAL READOUT ADAPTOR for FT-101E, inc. built-in AC PS. **$256.**

YC-221 DIG. READOUT ADAPTOR for FT-221R. **$120.**

YD-844 DESK MICROPHONE: Yaesu De Luxe PTT Dynamic type with stand, spring and lock PTT switches. PTT also actuated when lifted from deck. **$49.**

HAND MICS. FOR YAESU, YD-846 etc., **$18.50,** plus connector.

RS SERIES HF GUTTER MOUNT MOBILE ANTENNAS: RS Base and Mast (doubles as ¼ wave on 2m). **$22.50.** Coil and Tip Rods: RSL-3.5, **$20.00.** RSL-7, **$19.00.** RSL-14, **$18.00.** RSL-21, **$16.50.** RSL-27/28, **$16.00.**

*Power Supply Price applies only with purchase of matching transceiver.

As the sole authorised Yaesu agent and factory representative for Australia since 1963, we provide presales checking of sets, after-sales services, spares availability and 90-day warranty.

Quote type of set, serial number, date of purchase, and inv. no. when ordering spares. All prices include sales tax. Freight is extra. Prices and specifications subject to change without notice. Allow 50c per $100 for insurance. Availability depends on stock position at time of ordering.

LARGE RANGE OF ACCESSOR

YAESU

SAHI ANTENN

HIDAKA

Cush Craft

STANDARD VHF and UHF TRANSCEIVERS

SR-C146A. 2m hand held 5 chan. 2W transceiver, inc. carrying case and 3 chns.	$248.00
SR-C432A, 70cm hand held 6 chan. 2W transceiver, inc. carrying case and 1 chn (435 MHz)	$285.00
SR-C430 70cm 12 chan. 10 watt mobile transceiver inc. 1 ch (435 MHz)	$342.00

STANDARD ACCESSORIES

CMP08 Hand mic. for SR-C146A and SR-C432	$25.00
CAT08 Rubber antenna (helical) for SR-C146A	$10.00
Heavy Duty Carrying Case for hand held units	$16.50
AC Adapter and charger for hand held units	$45.00
Mobile Adapter for hand held units	$14.50
AC Charger only	$11.00
Ni-CAD Penlight Cells, type AA	$1.90

MONITOR RECEIVERS

MR-2, Mini Monitor. 12 ch. pocket receiver VHF	$137.84
MS-2, Mini Scanning Receiver 4 Ch. inc.	$186.35

MARINE NOVICE/11 METRE TRANSCEIVERS

GTX-3325, SSB/AM 23 Ch. Inc. N.B.	$149.00
CBR-9000 6 Ch. In-dash mount. B.C. 2 FM	$129.00
606CB 23 Ch. AM/BC/FM MPx/Cassette stereo	$229.00
GTX-3336 AM 23 Ch. Transceiver	$41.00

ANTENNAS AND ANTENNA ACCESSORIES

HF MONOBANDERS

204BA, 4 element 20m. Beam	$254.00
203BA, 3 element 20m. Beam	$239.00
VS-20CL 3 elem. W.S. 20m beam, **inc. Balun**	$199.00
VS-11CM 3 element 10/11m **inc. Balun**	$85.00
VS-15CM, 3 element 15m. **inc. Balun**	$128.00
CB-5 5 element 10/11m.	$105.00

HF DUO BAND

VS-22 3 element 15-11/10m, **Inc. Balun**	$173.00

HF TRIBAND BEAMS

TH6DXX, 6-element trap Beam	$345.00
TH3Mk3, 3-element trap Beam	$299.00
TH3Jr, 3-element trap Beam	$210.00
HY-QUAD 2-element Quad Beam	$310.00
VS-33 (Equiv. TH3Mk3), **Inc. Balun**	$265.00
DX-33 Western (UK) similar TA-33	$240.00

HF VERTICALS

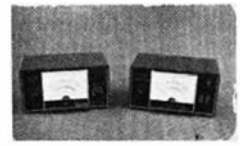
VS41/80KR 10m thru 80m, inc. 11m	$115.00
VS-RG Radial Kit for VS-41/80 KR	$33.50
18AVT, 10m thr 80m trap Vertical	$145.00
18V 10m thru 80m base loaded vertical, exc. portable ant.	$49.00
Million V1 10/11 metre ½ wave 3.75 dB	$49.00
VS-10 GH ⅝ wave 10m G.P.	$65.00

HF MOBILE WHIPS AND FITTINGS

AS27MCE 102" S.S. Whip	$14.00
HOPE-10R 10 metre adjustable gutter mounted helical inc. cable and connector	$48.00
HOPE-10B 10 metre adjustable helical equipped with ball mount and spring	$44.00
THUNDERSTICK 108" fibreglass whip	$25.00
GUTTER CLIP for whip tops	$2.90
HOPE-15R 15 metre adjustable gutter mounted helical incl. co-ax and connector	$49.00
HOPE-10RE 10 metre whip top only (as used in Hope-10R	$29.00
HOPE-15RE 15 metre whip top only (as used in HOPE-15R)	$32.00
CIT-1H 10 metre base loaded, boot or rooftop mount, incl. co-ax and plug	$15.00
CIT-2H 10 metre centre loaded gutter mounted whip, incl. co-ax and plug	$25.00
AS-303 HF Mobile antenna set, centre loaded, incl. heavy duty ball mount and spring	$139.00
AS-NK matching SS Bumper Mount for AS-303	$20.00
DUCK 27 MHz Replacement Ant for 11m Walkie Talkies (12" Flex Helical)	$9.00

FT-7 New model novice and mobile transceiver, 80-10 m, 20 W, all solid state.

$TBA



IES FROM BAIL ELECTRONICS

SCALAR ANTENNAS

HI-MOUND

YAESU

SR

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FITTINGS: (Suit all makes with ⅜" x 24 thread)

BPR, bumper mount	$22.00
BDYF, heavy duty adjustable body mount	$24.00
VS-BM Ball Mount & Medium Duty Spring	$20.00
VS-BPM Bumper Mount	$18.00
VS-LBM Ballmount & H.D. Spring	$25.00
H.D. Spring	$18.00
AS-GM Guttermount	$18.00
VS-NGM Guttermount inc. M ring and Co-ax.	$24.00

SWR AND POWER METERS

†**SWFS-2, SWR-40, single meter type,** combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2¼". 3-150 MHz, UHF connectors	$23.00
†**SWR-2, FSI-5, dual meters,** 50 ohms. Simultaneous reading of forward and reflected power, 5" x 2" x 2¼". 3-150 MHz, UHF connectors	$32.00
RS-101 Small size SWR meter, with brackets to mount under dash for mobile	$19.50
SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kW in three ranges. A very elegant instrument. 7⅝" x 2¾" x 3¾"	$75.00
FS-600A Peak Reading Wattmeter SWR meter 20, 200, 500 and 1000 watts 230 VAC operation. 3.5-30 MHz, very accurate	$78.00
FS-301 Wattmeter/SWR meter 20, 200 and 1000 watts 3.5-30 MHz	$55.00

† Type numbers may vary.

ANTENNA COUPLERS

HC-75 Tokyo Hy-power labs. Trans-match 75w PEP	$75.00
HC-250 Tokyo Hy-power labs. 250w	$92.00
HC-500 Tokyo Hy-power labs. Trans-match 500w PEP	$112.00
HC-500A Tokyo Hy-power labs. inc. 160mx 500w PEP	$119.00
HC-2500 Tokyo Hy-power pep trans. Trans-match 2.5 kw PEP	$256.00
KW E-Zee Match	$109.00
KW-107, inc. SWR, dummy load and switch.	$268.00
KW-109, inc. SWR, dummy load and switch, 1.5 kw	$360.00

VHF ANTENNAS

23, 3-element 2m Beam	$25.00
VS-2GH 2m ⅝ wave ground-plane	$39.00
VS-6D 4-element 6m Beam	$63.00
VS-6GH 6 metre ⅝ wave G.P.	$43.00
ARX-450, 435-450 MHz three half wave 6dB Ringo	$45.00
432-15H 15-element 430-440 MHz Beam	$47.00
VS-2GL 7 element 2m Beam	$42.00
VS-21L 9 element 2m Beam	$58.50

VHF MOBILE ANTENNAS

AS-2HRF ⅝-wave cowl mount type	$54.00
AS-6RD 6m centre loaded SS whip with gutter mount	$24.00
VS-07MG 70cm Mag Mount ¼ wave	$19.00
HOPE-2R 2 metre gutter mounted helical, only 22 cms long, incl. co-ax 2 connector	$26.00
VS-TOWN 2 metre flexible helical	$19.50
HU-2HR 2 metre Hidaka ⅜ wave gutter mount incl. co-ax and connector	$44.00

SCALAR MOBILE WHIPS

M-22T ¼ wave 2m whip top	$6.50
M-25 ⅝ wave 2m whip top	$16.50
M27-R60T 5ft. 11m. C.L. whip top	$21.05
M-40T 4.5 dB Gain, 435 MHz	$19.80
M.B. Standard base	$4.70
M.B. UHF base	$5.80
MAGBASE inc. 12ft. of RG-58/AU	$49.00

ANTENNA ACCESSORIES

LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs.	$76.00
LA-2, smaller size co-ax arrestor	$4.95
BN-86, ferrite Balun, 2 kW, for Beams and Doublets	$30.00
VS-BN ferrite Balun 2 kW for Beams and Doublets	$26.00
VS-BN4, similar VS-BN, 300 ohms	$26.00
BA-1 ferrite Balun 2 kW 1:1, light weight	$22.00
HN31 Dummy Load Cantenna Kit 1 kW oil cooled (oil not included)	$45.00
FF-50DX Low Pass Filter, 3 Section, 1 kW	$39.00
LP-7 TVI Filter low power	$14.00
KW Electronics L.P. Filter, 5 Section, 1 kW	$59.90
TV-3300 Drake L.P. Filter, 3 Section, 1.5 kW	$39.00
TV-42 Drake L.P. Filter, 3 Section, 300 W	$25.00
TV-476 Hy-Gain L.P. Filter, 150 W	$19.00
TV-75 Drake High-pass filter	$22.00
Porcelain Egg insulators	**50 cents**
WIDE RANGE of Co-axial cable and connectors in stock. K-20 70 ohm Twin feeder	**36 cents** per yd.
Multi-band dipole traps centre insulator, 80-10m bands per pair, complete with insulator, KW **$38.00**, Western	$35.00
590G B & W co-ax. switch, 5 posn., rear entry	$39.90
CX-3, 3 position co-ax. switch, side entry	$12.00
KW 3 position co-ax. switch, side entry	$28.00
ASW-1, Western 5 position co-ax. switch, side entry	$33.00
RS-107 Transceiver tester	$68.00
RS-501 Ant. Impedance bridge, inc. 1 osc.	$72.00
Extra Osc. for RS-501	$16.00

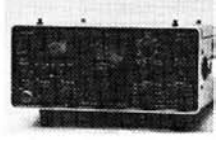
ROTATORS

Emotator:

103LBX Similar to CD-44	$148.00
502CXX Similar to Ham II	$219.00
1102MXX Heavy duty	$325.00
1211 Mast clamp for 103LBX	$18.00
1213 Mast clamp for 502CXX	$29.50
300 Mast Stay bearing for above	$32.00
301 Tower top bearing	$32.00

VCTF-7, 7 core cable (for 1100 series)	**$1.20** per m
VCTF-6, 6 core, for 102 & 501	**$1.00** per m
1103MXX Extra Heavy Duty	$339.00
1215 Mast clamp for 1102/3	$45.00
Flexible coupler	$32.00

bail



YAESU AMATEUR EQUIPMENT

Now an addition to YAESU'S range of measuring instruments . . .

QTR-24

24 hour World Clock

QTR-24

Yaesu has now made an addition to their already well known range of measuring instruments, it is the QTR-24 a 24 hour World Clock. With a glance the time in any principal city or time zone can be simultaneously co-ordinated with local time on a 24 Hour basis. The QTR-24 is powered by a 1.5V dry cell, which has a normal life of approximately one year. No amateur or SWL station could be complete without one.

Also shown in the photograph is the YO-100 monitorscope, FT-101E transceiver, YC-601 digital readout adapter and YP-150 dummy load-power meter.

OTHER ACCESSORIES

EKM-1A Audio Morse CP Osc with speaker, one transistor, and tone control, requires one UM3 cell, in metal case 3⅜" x 2½" x 1⅛" **$14.00**

TC-701 Morse Practice Osc. with built-in key and spkr. Inc. battery and auxiliary earpiece. Copy of morse code on case. Two can be wired together to form a practice communication set **$19.00**

Model 703 24 hr. Digital Alarm Clock, 230V AC (Copal) **$26.50**

Servicing facilities for our Amateur and Novice equipment. We check all sets before sale and provide a 90 day warranty.
All prices incl. S.T. Postage and freight extra. Add Ins., 50¢ per $100. Prices and specifications subject to change without notice. Availability depends on stock position at time of ordering.

MORSE KEYS

EK-127 Electronic Keyer **$99.00**

EK-150S Single Paddle Electronic Keyer **$136.00**

EK-150D Double paddle electronic keyer **$136.00**

MK-1024 Programmable Keyer, 1024 bit memory . . **$233.00**

HI-MOUND

HK-710 De luxe heavy duty morse key. Heavy base. A really beautifully constructed and finished unit. Fitted with a dust cover, standard knob and knob plate. Ball bearing shaft **$45.00**

HK-808 Similar HK-710 but with full miniature ball race bearings and more precise adjustments **$75.00**

HK-707, Similar to above but with dust cover and standard knob. On standard base **$19.00**

MK-701 Side Swiper key to actuate an Electronic keyer **$45.00**

BK-100 (BUG) Semi-automatic bug key, fully adjustable **$49.00**

VALVES, 572 B **$55.00,** 6KD6 **$10.50,** 6JS6 **$9.50,** 6JM6 **$9.50,** S2001 (6146B) **$13.50,** 12GB7 **$8.50,** 7360 **$14.50,** 6GK6 **$6.00.**

A TWO-TONE OSCILLATOR FOR SSB TESTS

N. Cooper VK4ZNC
5 Cahill St., Strathpine 4500

Most amateurs these days have SSB equipment for the HF and VHF bands. Because of the way SSB power is measured it is not really easy to check the true PEP output of a transceiver. But it is not really difficult to build a test oscillator as described, and the measurement then becomes quite simple.

The figure for output power quoted in the transceiver handbook may be incorrect or misleading, e.g. my FT620 six metre unit handbook quotes the output power as 20W DC input on SSB. That doesn't mean very much to me. The only way to measure the power correctly on SSB is to apply two tones, non-harmonically related, to the transmitter. Then measure the RMS power produced at the output, ensuring that the output waveform is not distorted due to overdriving of the linear amplifiers. This RMS power is then doubled, after applying a correction factor, to give the peak envelope power. The reason for the correction factor is that the waveshape being measured is not a sine wave and most power meters are callbrated to read sine wave power only. The correction formula is:—

PEP (in watts) = TWO TONE RMS POWER $(\pi/2)^2$
= TWO TONE RMS POWER $\times$ 2.467

So the RMS power meter only reads 0.81 of the true 2 tone RMS power.

Another method of measuring the true two tone RMS power is to insert an RF ammeter in series with the load. Then apply the formula P(RMS) = I^2R. This figure is then doubled to give the PEP. Thermocouple type RF ammeters read the RMS current irrespective of waveshape.

Most of us probably don't own a CRO so it is difficult to know when maximum undistorted output power is being obtained. A compromise method is to increase the tone drive until the output power starts to flatten off as read on a power meter. Back off the drive a little and then read the power. Then apply the previous formula to obtain the PEP.

THE OSCILLATORS

The circuit shown produces two tones with frequencies of about 800 Hz and 1.8 kHz. The two oscillators are the phase shift type. This circuit was chosen for simplicity. The Wien bridge requires more components and two transistors. Any form of LC type oscillator requires bulky transformers or coils. Two 100 ohm potentiometers are inserted in the emitters of the oscillators to adjust the gain of the stages so that oscillation just occurs. At this point minimum distortion will be produced. I measured the distortion at the output amplifier stage at about 1.5 per cent, which is good considering the simple oscillator circuits used.

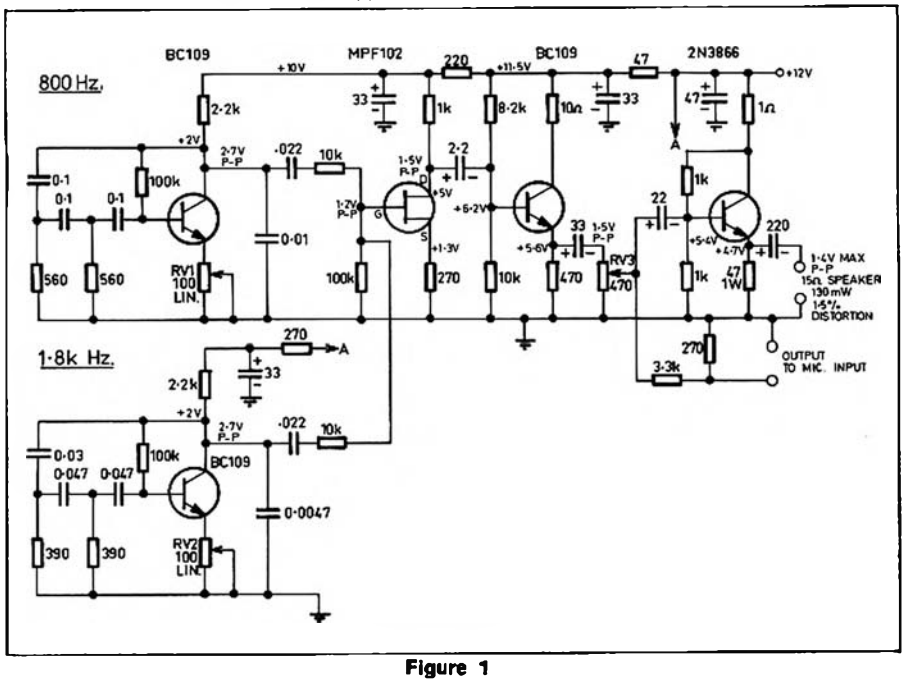


Figure 1

THE MIXER STAGE

The outputs of the two oscillators are combined on the high impedance input of the MPF102. This enables high values (10K) of isolating resistors to be used. The FET has an unbypassed source resistor which keeps distortion low due to negative feedback. The overall gain of the stage is low but little gain is required.

THE AMPLIFIER STAGES

The modern thing to do would be to use an IC, but most ICs require quite a few external components. The circuit chosen uses discrete components and is probably no more complex to build than an IC type amplifier. Both stages are emitter followers. The first provides a low output impedance to drive the PA stage and also gives an output via a pad to insert into the microphone socket of the transmitter, the drive level being adjusted by RV3. The PA stage provides enough power to drive a speaker to monitor the tones. Because it would have complicated the circuit more I avoided complementary symmetry in the output stage. A transformer could be inserted in place of the 1 ohm collector resistor to obtain more power out if required. The emitter resistor would then have to be bypassed of course. More output power may be required if you wish to inject the tones acoustically into the microphone. I wouldn't recommend this way of doing it myself. The PA transistor requires a small heat sink.

CONCLUSION

With this little device and a power meter you should be able to measure the PEP output power of all your SSB rigs.

PCBs will be available from me for anyone interested in constructing the unit. ■

THE WIRELESS INSTITUTE
OF AUSTRALIA
HOPES THAT ALL READERS
AND MEMBERS
WILL HAVE A SAFE AND
HAPPY CHRISTMAS
AND A PROSPEROUS
NEW YEAR
ESPECIALLY IN THE FIELD OF
AMATEUR RADIO

BOX HILL TECHNICAL COLLEGE DISPLAY AT EASTLAND (VIC.)

The Box Hill Technical College staged a major display in the Eastland Shopping Centre at Ringwood from Monday to Saturday, 1st-6th August. The display showed all departments of the College and the work covered in all of the courses offered.

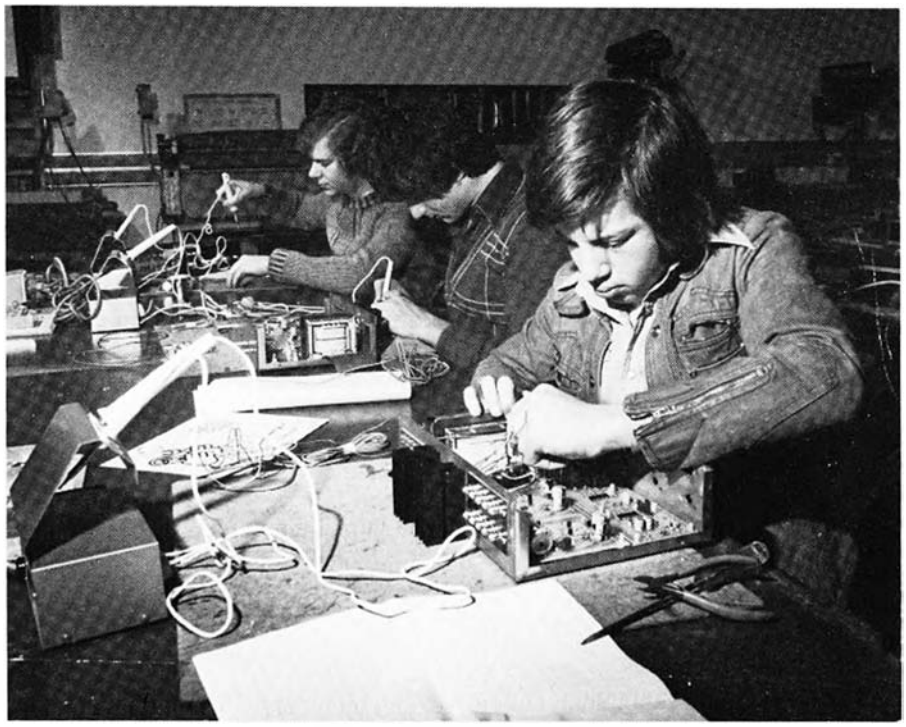
Whitehorse Girls' Technical College combined with Box Hill in the display and staged, among many other exhibits, a mannequin parade, showing off clothes that the girls had made.

The College Radio Department set up a portable amateur radio station at the display. An FT200 was used with a 14 AVQ trap vertical to cover 40, 20, 15 and 10 metres and an IC22a was used with a 5/8th ground plane to cover 2m FM. Many contacts were logged and the best DX was with some K5 stations in the USA. We proved a trap vertical antenna works well if it is mounted on a good ground plane — the building is 100 ft. high and is aluminium sheet! A large pile of Amateur Radio magazines were taken by the public so a fair amount of positive promotion of our hobby must have been made.

Many CB operators learned how orderly operation on amateur frequencies is, and this can only enhance the prospect of more potential amateurs graduating up from CB operation.

Beside the amateur station was a display of kits which students build in various classes conducted by the Radio Department. The kits, which sparked a lot of public interest, include a 25W stereo amplifier, an AM/FM tuner with four push button pre-selcted FM channels, a multimeter, and a "testmaster" — universal test instrument.

Incidentally, the FT200 caused TVI in a TV store in the Centre and the old faithful high pass filter inserted into the store's antenna system cured all TVI. ■



Attentive Students assembling 25W Stereo Amplifier

Graeme Scott VK3ZR, and Helen Gardner manning the Display

HISTORICALS

The Institute is very interested in acquiring and preserving documents and equipment of historical interest.

The Federal Historian, Mr. Maxwell Hull, possesses a great amount of books, papers and other documents acquired over the years and from time to time endeavours to research the material to write articles of historical interest. Each Division also has arrangements to preserve items of historical interest.

The trend these days is that all such items are deposited in suitable local museums for future preservation. The problem of data retrieval needs to be overcome though.

Institute members are strongly urged to persuade older amateurs to go through their radio amateur material for donation to the Institute before it is too late. In many cases valuable items are thrown on to the garbage tip by estate executors possessing no knowledge of amateur radio or interest in it.

Another area of preservation relates to old recordings, which are being collected by Mr. Chris Long. ■

MAGPUBS

A SERVICE FOR WIA MEMBERS

☆

— **OVERSEAS MAGAZINE** subscriptions (Rates subject to change — copies mailed direct to you from overseas suppliers) —

$A	1 yr	2 yrs	3 yrs
QST	13.90	27.80	41.70
Ham Radio	12.00	—	30.50
Radio Communications*	12.30	—	—
CQ	8.00	13.80	—
Break-In	8.00	—	—
CQ-TV*	4.50	—	—
VHF Communications	6.00	(airmail $8.00)	

*New subscribers please ask for RSGB or CQ-TV membership from beforehand.

(Overseas magazines subs only available direct from Magpubs, not Divisions).

— **BACK ISSUES** of VHF Communications are normally available from stock (see separate advertisement) but not of other overseas magazines.

— **BACK ISSUES OF AMATEUR RADIO** are normally available from stock.

— **AMATEUR RADIO** is available to overseas subscribers and to Australian libraries, schools, Government Departments and the like at $10.80 per annum surface mail post paid.

— **OTHER ITEMS** normally available from stock:

- — Membership badges
- — Ties
- — ITU Std. Morse Cassettes
- — Great Circle Map (Project Australia — Melbourne centre)
- — Log books
- — Call boosk
- — Reference publications.

☆

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OR ASK YOUR DIVISION

BAND PLANS—INTERNATIONAL AND LOCAL

Bands	(All frequencies in MHz) CW only	CW & Phone
80m	3.5-3.535	3.535-3.7
40m	7.0-7.03	7.03-7.15
20m	14.0-14.1	14.1-14.35
15m	21.0-21.15	21.15-21.45
10m	28.0-28.2	28.2-29.7†

† Beacons 28.2-28.25.

RTTY 3.62, 7.04, 14.09, 21.09, 28.1, 52.075, 144.075, 432.075.

WICEN Nets, identified — 3.6, 7.05, 14.100 **primary.**

WICEN Nets, identified. **Secondary**—CW: 3.575, 7.025, 14.075. Phone: 3.625, 7.075, 14.125.

6m	52-52.01	EME.
	52.01-52.1	DX (52.01-52.05 CW only).
	52.1-52.3	All narrow band modes.
	52.3-52.5	Beacons (Pri. and Sec.).
	52.5-53.1	Simplex nets.
	53.1-54.0	General.
2m	144-144.01	EME.
	144.01-144.1	DX (144.01-144.05 CW only).
	144.1-144.4	All narrow band modes.
	144.4-144.6	Beacons (Pri. and Sec.).
	144.6-145.7	General.
	145.7-146.0	Satellites.
	146.0-148.0	FM simplex and repeaters.
70cm	420-432	ATV (Sound on 431.75) (Video 426.25).
	432-432.01	EME.
	432.01-432.05	DX-CW.
	432.05	Meteor scatter.
	432.05-432.1	All narrow band modes.
	432.1-432.4	Tunable, all modes.
	432.4-432.6	Beacons (Pri. and Sec.).
	432.6-433	Tunable, all modes.
	433-435	FM repeater inputs (433.75-434.25 FM simplex).
	435-438	Satellites (International).
	438-440	FM repeater outputs (438.75-439.25 FM simplex).
	440-443	Experimental.
	443-450	ATV (Sound on 449.75 (Video 444.25).

NOTES:

1. **FM** calling frequencies — 146.5, 439.0.
2. **CW** calling frequencies — 52.025, 144,025, 432.025.
3. **SSB/AM** calling frequencies — 52.1 (52.2), 144.1 (144.2), 432.1 (432.2).
4. SSTV — 3.735, 7.040, 14.230, 21.340, 28.670 Calling frequencies — 52.3, 144.3, 432.3.
5. **Satellite** frequencies — 29.4-29.55 (downlink), 145-146, 435-438.
6. **Meteor Scatter** — 52.05, 144.05, 432.05.
7. **Novice Licensees** —

CW only	Phone & CW
3.525-3.535	3.535-3.575
21.125-21.15	21.15-21.2
28.1-28.2	28.2-28.6

8. The following frequency channels have been approved for use in stations of the Citizens Band Service —

Channel	Freq. MHz	USA Channel No. equivalent	Comments
1	27.015	5	
2	27.025	6	
3	27.035	7	
4	27.055	8	
5	27.065	9	Emergency calling
6	27.085	11	Calling
7	27.095	—	
8	27.105	12	
9	27.115	13	
10	27.125	14	
11	27.135	15	
12	27.155	16	
13	27.165	17	
14	27.175	18	
15	27.185	19	
16	27.195	—	
17	27.205	20	
18	27.225	22	

The emissions permitted are A2, A3, A2H, A3A, A3J, A3H and the Tx output power 4W (Pm) and 12W (Pp). All transmissions on the above frequencies are to cease on 30th June, 1982 (para. 1.1 of the CB Conditions, Form RB14).

9. The Citizens Radio Service UHF frequencies begin as channel 1 on 476.425 MHz increasing by 25 kHz steps to channel 40 on 477.400 MHz. The emissions permitted are F2 and F3 and Tx output power 5W (Pm). Channels 1 to 10 (476.425 to 476.650 MHz) and 36 to 40 (477.300 to 477.400 MHz) may be used without restriction but the remaining channels 11 to 35 will be available at a date to be announced. There is no expiry date for UHF channels. ■

TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE or ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.
A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output.

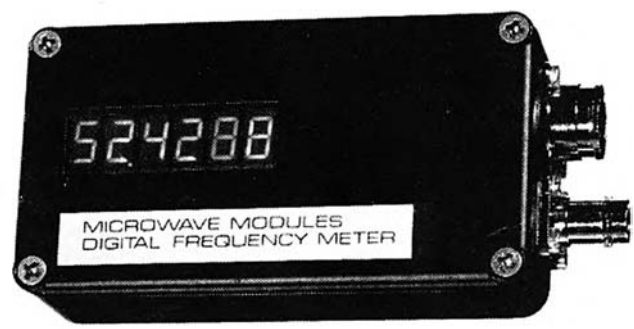
MODEL MMT432/144 — Price $260

NEW RELEASE – TRANSVERTER MODEL MMT432/28S

Features extended coverage for Oscar 8.

Second Crystal Oscillator gives two ranges: Low, 432-434 MHz — High, 434-436 MHz. Programming available to either Transmit/Receive both Low, both High, or a mixture of the two. Adjustable Drive Level is now provided by an input potentiometer. Optional RF VOX.
Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to 500 mW ★ Aerial Changeover by PIN diode switch ★ Modern microstrip Techniques ★ Power requirements 12 volt nominal at 750 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432/28S — INTRODUCTORY PRICE: $235.



MMT432 TRANSVERTER

500 MHz COUNTER

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD050/500 — 500 MHz Counter, $175

LINEAR AMPLIFIERS

FOR 70 CM — 90-100 WATT

AVAILABLE SHORTLY

New Release — 6 METRE MOSFET CONVERTER

FEATURES 24 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

Input Frequency: 52-54 MHz
I.F. Output Frequency: 28-30 MHz
Typical Gain: 30 dB
Noise Figure: 2.5dB
Typical image rejection: 65dB
Crystal Oscillator Frequency: 24 MHz
Power requirements: 12 volt ± 25% at 35 mA.

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HIGH SPEED MORSE

G. Thompson VK3AC
78 Illawarra Road, Hawthorn, 3122

The morse keyboard has added a new dimension to amateur radio. It was inevitable that computer technology would eventually find applications in the field of amateur radio. It has in fact been responsible for a major breakthrough in CW telegraphy.

Several commercially built keyboards are available in the United States. For VK hams the main source of morse keyboards has been Alan VK2BF, who developed the first home-brewed keyboard to be built in Australia. During the past year Alan has been responsible for about eighteen enthusiasts becoming keyboard operators.

Alan has also been the main inspiration behind the CW Net which operates on the 7 MHz band every Sunday morning between 10 a.m. and midday. The Net Control Station will be found on 7025 MHz and an average of about 25 CW operators participate to produce a net which, after two hundred and eighteen session, has become a very efficient team.

Those who have graduated from the PMG type key through various types of side-swipers and bugs to the electronic keyer have been able to reach sending speeds of up to 38 words per minute. But at that speed we still need to make considerable demands on our reflexes, which tend to slow down as the years go by for us. The arrival of the morse keyboard has lifted operating speeds to as high as 70 words per minute for several groups of American hams.

It was mainly as a result of listening to a 50 words per minute net of W stations and then reading what appeared to be authentic reports about speeds of up to 70 words per minute being used that I decided to try to bring my own receiving speed up to something approaching 50 words per minute. With a Barlow Wadley receiver I searched the entire HF spectrum looking for suitable signals to copy for practice but could find nothing. It wasn't like the old days when one could copy KTK which every day sent press to the Robert Dollar line of ships at sea. It appeared that I would have to produce my own fast morse for receiving practice.

This was done by recording text at 25 words per minute and playing it back on a two speed recorder at twice the recorded speed. This 50 words per minute material was for convenience re-recorded on cassette to produce two solid hours of fast morse. With this quantity of copy there wasn't much chance of memorising the text. I have found that the tapes could be used for several months to bring up the receiving speed until one hundred per cent copy was possible. When recording at 25 words per minute the pitch of the audio source should be one octave lower so that the pitch of the fast replay does not go an octave higher.

For several months whenever any spare time was available the tapes proved their worth. Jack VK2YK has since reported, six months later after having a QSO with one of the American speedsters, that this has been the method used by them also to reach 70 words per minute. But in addition some have been using video readout. The result has been to produce a number of operators who can send at 70 words per minute on their keyboards and copy at the same speed in their heads.

I have satisfied myself about the 70 words per minute claims because I am at the moment listening to 60 words per minute tapes, having broken through the 55 words per minute barrier.

High speed keyboard morse has been an exciting development for the CW enthusiast, but it brings with it a number of problems which are not apparent at slower and more conventional speeds.

The question of weight becomes important and this must be light enough to permit each character to be formed at high speed with sufficient clarity to be read at the other end. Keying shape should be adjusted with suitable filters to achieve rise and decay times of about five milliseconds when the keying circuit is closed and opened. The ARRL handbook shows oscilloscope photographs of dots generated at a speed of 46 baud. Such a shape will be free from clicks and thumps and will be sharp enough to reproduce keyboard created morse up to 70 words per minute.

If the keyboard is equipped with a memory or "buffer", as it is called, the process of learning to use it will be greatly simplified, as the letters and words are automatically spaced correctly. Without the buffer, the differences in the duration of the various letters of the alphabet require a considerable amount of skill when typing to achieve accurate spacing. On the other hand, when my XYL tried out my keyboard, fitted with a buffer, for the first time she was able immediately to send perfect morse at 40 words per minute despite the fact that she does not know the morse code.

High speed morse begins to approximate a sideband QSO when full break-in is used. Some operators are using partial break-in by keying with the VOX circuit holding the relay in for groups of words or even for single words. With full break-in it is possible to hear the break immediately between the dots and dashes of one's own transmission regardless of the speed being used.

To achieve full break-in an independent receiver is essential. Using a Drake 2B receiver and two relays I was able to convert to full break-in. A 12AU7 was used as a relay control tube. This was biased to cut-off. Keying removes the bias and actuates the relays. One relay is a miniature type which has a make speed of 2 milliseconds. This relay removes the antenna connection from the receiver and also shorts the receiver antenna terminal to ground. A second pair of contacts brings in a potentiometer which is adjusted to match the level of one's own signal to that of the station being worked. This potentiometer is connected to the receiver's AVC circuit. The second relay is a miniature

reed type with a make speed of one millisecond. This relay is mounted near the receiver third mixer stage and it switches a capacity across the 50 kHz intermediate tube plate circuit inductance to detune the circuit reducing the signal to a level that can be handled by the product detector and AVC circuit regardless of the transmitted power being used. If the miniature relay fails to function there is always the possibility of receiver damage by RF from the transmitter. But according to the maker's specification for the relays they should operate for many years without replacement. The miniature relay is a plug-in type which is easily replaceable at a present cost of about $4. The relays key well up to 72 words per minute, which is the maximum speed of the keyboard being used.

When listening to high speed morse, earphones should be used preferably because room reverberation and the phase differences of sounds picked up by the two ears can result in a blurring of the characters. Moving away from a loud speaker when copying 50 words per minute Morse a point is reached where the characters will merge and become almost a continuous sound.

It has been quite surprising how often QRQ keyboard QSOs have been deliberately jammed. It's difficult to imagine what must be going on in the minds of the jammers, but giving them the benefit of the doubt, my only conclusion is that the high speed morse signals have been mistaken for commercial intruders.

In setting a speed goal for increasing morse receiving speed the source material should always be about 5 words per minute faster than the present maximum readable speed. As each goal is achieved the speed should be advanced another 5 words per minute. By the time you reach 45 words per minute you will be recognising the shape and sound of complete words rather than the dots and dashes with which they have been formed.

When sending QRQ morse abbreviations should preferably be avoided. If you are sending at 50 words per minute there should be no real need to abbreviate and it is always easier to copy a complete word at high speed than an abbreviation.

There's not much fun in QRQ morse rag chewing if you have to write it all down. At the high speed now achievable with the keyboard the morse really becomes another language which has to be learned over a period of time. So eliminate the pencil and set out to learn the new language.

If you want to go keyboard you can make a good start by putting together some QRQ tapes and setting out to bring up your receiving speed. Cassette recorders suitable for CW practice can be obtained for as low as $35. Don't need a high fidelity job for this purpose. Even if you cannot yet copy at QRQ QSO on the bands, you can tape it and use it for future practice. At the same time you can learn the keyboard technique by borrowing a typewriter and practising ordinary typing. By the time you reach forty words per minute on the "mill" and have brought your receiving speed up to the same level you will be able almost immediately to go on the air with a buffered keyboard.

So here's to the future success of the keyboard revolution which is helping to keep CW telegraphy alive in the amateur bands. ■

EDISON AND HIS CONTRIBUTIONS TO WIRELESS

M. R. Haskard, VK5BA
Karwin Rd., One Tree Hill, 5114

Thomas Alva Edison (1847-1931) was one of the greats in experimental technology. Even though he had only three months schooling and had an acute hearing problem, he devised and perfected many items that we take for granted today. In fact he still holds the record for taking out the largest number of patents by a single individual (over 1000).

It is therefore not surprising that Edison made a number of contributions towards the field now known as broadcasting. This would include his efforts in recording sound (1977 being the centenary of the phonograph), in producing motion pictures and in the generation of electric light (the last two items being relevant to TV). However in this paper, let us examine in some detail three contributions which have been of importance to wireless. They are: (1) the use of a raised antenna; (2) the discovery of a phenomena later to be called the Edison effect and (3) the invention of the carbon microphone.

During the nineteenth century man dreamed of sending electrical signals from one place to another without using wires. For example Sir Samuel Morse in 1840 sent electrical impulses for a mile or so through water and for several hundred feet through the earth without wires.

In November 1875, Edison claimed to have discovered a "new force" which he later named "etheric force" because it seemed to diffuse itself through the air. There was considerable discussion in engineering and scientific journals of the day on this discovery. Fig. 1 shows diagrammatically the "equipment" used in one of Edison's experiments demonstrating this discovery. On operating what we might today call the "buzzer", sparks could be seen in the black box showing the passage of a current and yet there was no return path for the current. Edison and Dr. George Beard independently showed that it was due to a very high frequency oscillation.

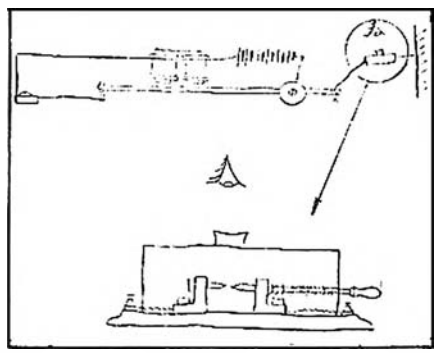

FIG. 1. Edison's etheric force experiment. Bottom sketch shows details of the black box with micrometer adjustment.

It was not until 12 years later in 1887, when Prof. H. Hertz proved the existence of electro-magnetic waves in free space, that the situation became clear and Edison realized that the fundamental principle of aerial telegraphy had been within his grasp. Without reducing the importance of Hertz's work it has been noted that Edison's staff demonstrated the "etheric force" experiment at the Paris Exposition in 1881 and that Hertz used equipment similar to Edison's, especially his dark box with micrometer adjustment.

However, two years before Hertz, Edison, with Ezra T. Gilliland, devised a device to allow someone travelling across the Western Prairies by train to telegraph out and receive messages whilst still in motion. This they called the space telegraph or grasshopper telegraph. The system was shown to work, patented on May 14th, 1885, but never put to any practical use.

A variation of this system allowed Edison to send telegraphic messages without wires a distance of 2½ miles. (His notes indicate that as far back as 1880 he had used a similar inductive telegraph to send messages 580 feet.) He used 100 feet high masts to overcome the curviture of the earth, with large metallic plates located at the top (Fig. 2). The system has been called an electro-static generator, the plates on the masts acting as a condenser for the air in between the dielectric. Confusion exists today as to whether the system worked or not — the problem lying not on the transmitter side but in the receiver. it is interesting to note that in May to July 1901, an engineer E. Guarini took Edison's system, replacing the telegraph receiver by a coherer and worked distances of 26 miles or so between Brussels, Mechlin and Antwerp. (Comparing Edison's transmitter with Marconi's, apart from the fact that Edison used very much lower frequencies, there is very little difference between them.)

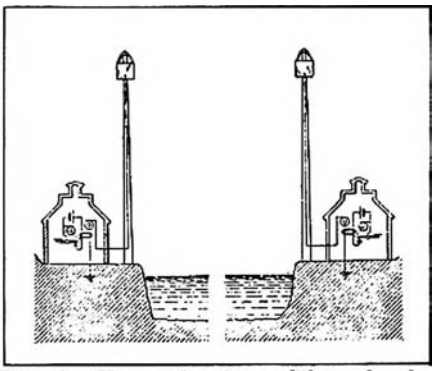

FIG. 2. Means for transmitting signals electrically.

Perhaps the important aspect of Edison's system and patent, was the aerial masts. Marconi in 1903, along with other opposition experimenters, approached Edison to buy his patent. Edison, who had a deep admiration for Marconi, stipulated that the patent was to go to Marconi rather than any others, and so in 1904 the patent was sold to the Marconi Radio Company.

Turning now to Edison's second contribution. Whilst studying the physical and chemical reactions which took place in an evacuated glass bulb containing a glowing carbon filament, Edison noted a blackening of the bulb by a deposit. This he records on February 13th and 18th, 1880. Further, he also noted that the bulb in the plane of the filament connected to the positive side was not blackened, leaving a clear patch as if a shadow had been cast.

Following the matter further, Edison, in July 1882, designed a 2-element bulb where he inserted a platinum wire between the horseshoe shaped filament. This wire was brought out separately so that the electrical condition of the inside of the bulb could be examined. To his surprise he found a current flowed when this wire was connected to the positive polarity but not to the negative (see Fig. 3 (a)). Other shaped electrodes were used giving the same result. This was a discovery of great importance, that a current could flow through a vacuum. In true Edison fashion he immediately set out to apply his discovery and designed an electrical regulator. This he patented on 15th November, 1883 (see Fig. 3 (b)). The device was not really successful, probably due to difficulties in producing consistent vacuums, and being over-worked with his electric light system, he had no time to follow things through. However, his device was the first electronic instrument — a voltage regulator, and it was exhibited at the International Electrical Exposition in Philadelphia in September, 1884. The British engineer, Sir William H. Preece, saw the display and out of curiosity took back to England several models. In 1885 he presented a paper to the Royal Society calling the phenomena discovered by Edison the "Edison Effect".

Prof. Ambrose Flemming, in London (it appears Edison may have asked his help at this time), tried to improve Edison's 2-element bulb so that it could reliably be used as a regulator. In 1888 he replaced the metal plate electrode with a cylinder surrounding the filament. It worked far better as a rectifier, but again it appears problems in achieving a consistent vacuum limited its uses as a regulator and Flemming gave up.

Marconi, in the years 1895-6, when experimenting with his primitive wireless, used the coherer of Edouard Branly to detect his signals. The discovery of the electron and work by Sir J. J. Thompson in 1897 gave Flemming, who was now a consultant to Marconi, the idea of using Edison's device or the Flemming valve as he himself called it, as a detector. It proved to be a far more sensitive and reliable detector than the coherer and so after 1904 the Marconi Telegraph Company standardise on this detector, obtaining a greatly increased range of communication.

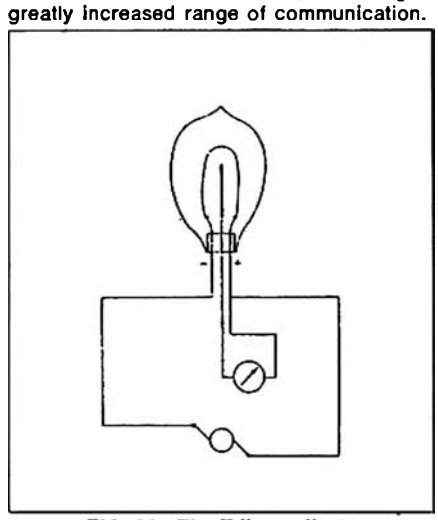

FIG. 3A. The Edison effect.

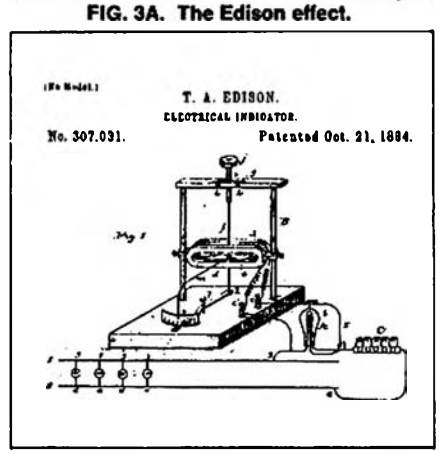

Fig. 3B. Edison's "electronic" regulator.

In just 20 years Edison's 2-electrode bulb had come into its own and until the advent of the transistor in 1948, was the basic element in all electronic communications.

Edison's third major contribution to wireless — the carbon microphone — was really developed for the telephone industry. In June 1875, Alexander Graham Bell first heard the feeble voice of his assistant from his telephone. He patented it and made it public in March 1876. At this time, Edison re-examined a similar device that he had made. (In fact he had lodged a note of intent to patent on January 14th, 1876), and found that it was capable of transmitting sound, though crudely. If only he had had good hearing he would have heard the faint sounds as Bell did. (To "hear", Edison used to bite the instrument with his teeth, allowing the vibrations to be conducted through the bones of his head to the inner hearing nerve.)

Bell's magneto telephone (similar to our dynamic microphones and earphones) had no amplification and so was limited in the distance that it could be used to about two miles. Edison, who had been approached by Western Union to devise an alternative telephone, looked at ways in which the telephone volume could be raised. On 20th January, 1877, he succeeded, using platinum points into carbon granules. From here he produced the carbon microphone and by including a step up transformer he found that he was able to increase the volume still further. The patent was filed on April 27th, 1877. Using the Edison transmitter and a Bell receiver a conversation was undertaken in March 1878 over a distance of 107 miles — in front of the Western Union directors. All were impressed with the loudness of the signal.

With the advent of wireless telephony, it was quickly discovered that the carbon microphone was ideally suited for modulating a valve oscillator. Even with the development of more exotic electronics, the carbon microphone stayed and it was not until the 1950s that this type of microphone was finally superseded in communication systems.

Whilst Edison will always be remembered for his inventions of the phonograph and electric light bulb, I believe his contributions made to wireless are no less significant.

ACKNOWLEDGEMENT

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CA3079	CD4044	LM114H	LM567CN	SD425A	74C20
CA3080	CD4045	LM301AN	LM709N	SL437D	74C85
CA3081	CD4046	LM301CN	LM710CN	SL440	74C86
CA3082	CD4047	LM304H	LM710CH	SL442	74C90
CA3083	CD4049	LM305AH	LM723H	SL447	74C154
CA3086 LM3086	CD4050	LM307N	LM723N	SL449	74C160
CA3089E	CD4051	LM308V	LM725N	SL610C	74C162
CA3090Q	CD4052	LM309K	LM733CH	SL612C	74C174
CA3091	CD4053	LM310N	LM733N	SL613C	74C192
CA3120E	CD4066	LM311A	LM741CH	SL620C	74C901
CA3127E	CD4068	LM311H	LM741CN	SL621C	74C925
CA3128E	CD4069	LM312H	LM747CH	SL623C	80C95
CA3130T	CD4070	LM317K	LM747CN	SL622C	**MISC**
CA3140T	CC4071	LM318N	LM748CN	SL624C	AL5352
CA3600	CD4072	LM319H	LM1303N	SL630C	GL4484
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CD4001	CD4076	LM320K	LM1458N	SL641C	OL31
CD4002	CD4078	LM320T	LM1488N	SL645C	RL4484
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CD4012	CD4503	LM340K	LM3900	TAA300	NSN71
CD4013	CD4510	LM340T	LM3905	TBA570	NSN74
CD4014	CD4511	LM349N	LM3909	TBA700	TIL306A
CD4015	CD4514	LM358N	MC1035P	TBA810A	11C90
CD4016	CD4515	LM370H	MC1312P	TB1750A	95H90
CD4017	CD4516	LM371N	MC1314P	TCA220	2102-2
CD4018	CD4518	LM372H	MC1315P	TCA290A	2513N
CD4019	CD4519	LM372N	MC1350P	TCA420A	S1883
CD4020	CD4520	LM373N	MC1351P	TCA580	S50242
CD4021	CD4528	LM374N	MC1454G	TCA730	MA1002
CD4022	CD4539	LM375N	MC1458 LM1458	TCA740	7805CP
CD4023	CD4555	LM377N	MC1468L	TDA1005	7824CP
CD4024	CD4556	LM379	MC1488 LM1488	UAA170	
CD4025	CD4720		In some cases pin for pin substitutes will be supplied.		

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7403	7489	8281A	74LS191	BF173	2N3638
7404	7490	82S90	74LS192	BF180	2N3638A
7405	7491	74LS00	74LS193	BF194	2N3642
7406	7492	74LS01	74LS194	BF200	2N3643
7407	7493	74LS02	74LS195	BFY50	2N3694
7408	7494	74LS03	74LS196	BFY51	2N3731
7409	7495	74LS04	74LS221	BPX25	2N3819
7410	7496	74LS08	74LS253	BSX19	2N3866
7411	74100	74LS09	**SEMICONDS**	BU126	2N4037
7413	74107	74LS10	AC125	MFE131	2N4249
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7417	74123	74LS14	AC128	MJ4502	2N4356
7420	74132	74LS20	AC132	MPF102	2N4360
7422	74141	74LS21	AC187	MPF103	2N5245
7425	74145	74LS22	AC188	MPF104	2N5457 MPF103
7426	74150	74LS27	AD149	MPF105	2N5458 MPF104
7427	74151	74LS28	AD161/62	MPF106	2N5459 MPF105
7430	74153	74LS30	AS322	MPF121	2N5485 MPF106
7432	74154	74LS32	AT1138 2N301	MPF603	2N5590 MPF603
7437	74157	74LS37	ASY17	TIP31C	2N5591
7438	74160	74LS38	BC107	TIP32C	2N6027
7440	74164	74LS40	BC108	TIP120	2N6084
7441	74165	74LS42	BC109	TIP125	BA102
7442	74174	74LS73	BC177	TIP141	OA47
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7451	74191	74LS92	BC337	2N706A	40673
7453	74192	74LS93	BC547	2N918	40822
7454	74193	74LS95	BC548	2N2222A	40841
7460	74194	74LS109	BC549C	2N2646	BZX61
7470	74195	74LS113	BC559	2N2869	BZX79
7472	74196	74LS114	BC639	2N2904A	BZX70
7473	74S00	74LS151	BC640	2N2905	BZY93
7474	74S10	74LS153	BD131	2N3053	BZY91
7475	74S20	74LS157	BD132	2N3054	PA40
7476	74S74	74LS163	BD139	2N3055	PB60
7480	74S112	74LS163	BD140	2N3564	MEL12
7482	74S251	75LS164	BD237	2N3565	FCD820

PC BOARD

FIBREGLASS —

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16 PIN
24 PIN
40 PIN

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T-37
T-50
T-68
T-80
T-94

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* Indent only.

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LOW POWER MORSE TRANSMITTER USING VALVES!

Dave Jeanes VK2BSJ,
822 Old Northern Road, Dural, 2158
(or MM)

Here's a little two band 12 watt CW rig that features an absurdly easy chassis technique and a simple band changing system. The delights of QRP are many; low cost — in this case around $20, reduced BCI and TVI problems, easy portability and the added pleasure when DX-ing. Everyone will give a QRP station a go; you even become a desirable station to work, especially if you are portable or mobile.

This project started some months ago when an old four valve mantel radio was converted into a two valve CW transmitter. This mantel radio transmitter worked fine and I had many QSO's on 40 and 20 metres with it. However, band changing entailed re-soldering and took half an hour or so. At first opportunity I purchased a cabinet and the hardware necessary for building the rig into an easy to use form, incorporating some improvements I had dreamed up.

The rebuilding job took about twelve hours, and this period would be all the time required for someone starting from scratch.

I chose for the cabinet a mild steel instrument case, 9 x 7 x 6½ inches high, because it was about half the price of more splendid items, and opened at the top only, this aspect suiting the plan for chassis mounting. Although the case is rather big, it allows plenty of room for components and for heat dissipation. The power transformer is mounted on the bottom of the case at the rear centre. This keeps the centre of gravity low. The silicon rectifiers and other power supply components are fitted to a tag strip screwed to the bottom of the case.

If you can come by an old valve radio, a type that uses a 6X4 rectifier will have a very suitable power transformer, which will provide about 300V DC for HT, when rectified by diodes instead of the valve.

As the drawing indicates, the chassis is mounted upside down above the power supply and this inverted position gives total access to all necessary components, for making final adjustments and perhaps for later modifications or trouble shooting. The chassis is a sheet of copper clab fibre board, very cheap to buy, being about $1 per square foot. It is ideal for the job, provides screening of components, is easy to drill and file, and is a delight to solder to, even using a lightweight iron. All tag strips and valve socket lugs can be soldered directly to the copper surface, or items can be re-positioned with absolutely no trouble. The only components below the chassis are the two valves and the coil cans. The coils of course are adjustable from above when the chassis is fitted with the case.

CIRCUIT

In the circuit I wanted a triode oscillator, which would provide plenty of feedback for the old crystals I had. The tuned anode circuit would reduce harmonic output. When switching crystals it is sometimes advisable to have one side of the switch earthed, and the oscillator provides the facility. Twin triodes are easier to come by than single triodes, and in the case of the 12AT7 series, have 12V heaters, a good point when looking at possible battery operation. The fact that I had a spare triode section unused in the original mantel radio transmitter, gave me the idea of using the second triode section as a frequency doubler, so allowing two band operation. It would not require neutralising, being a frequency multiplier, this

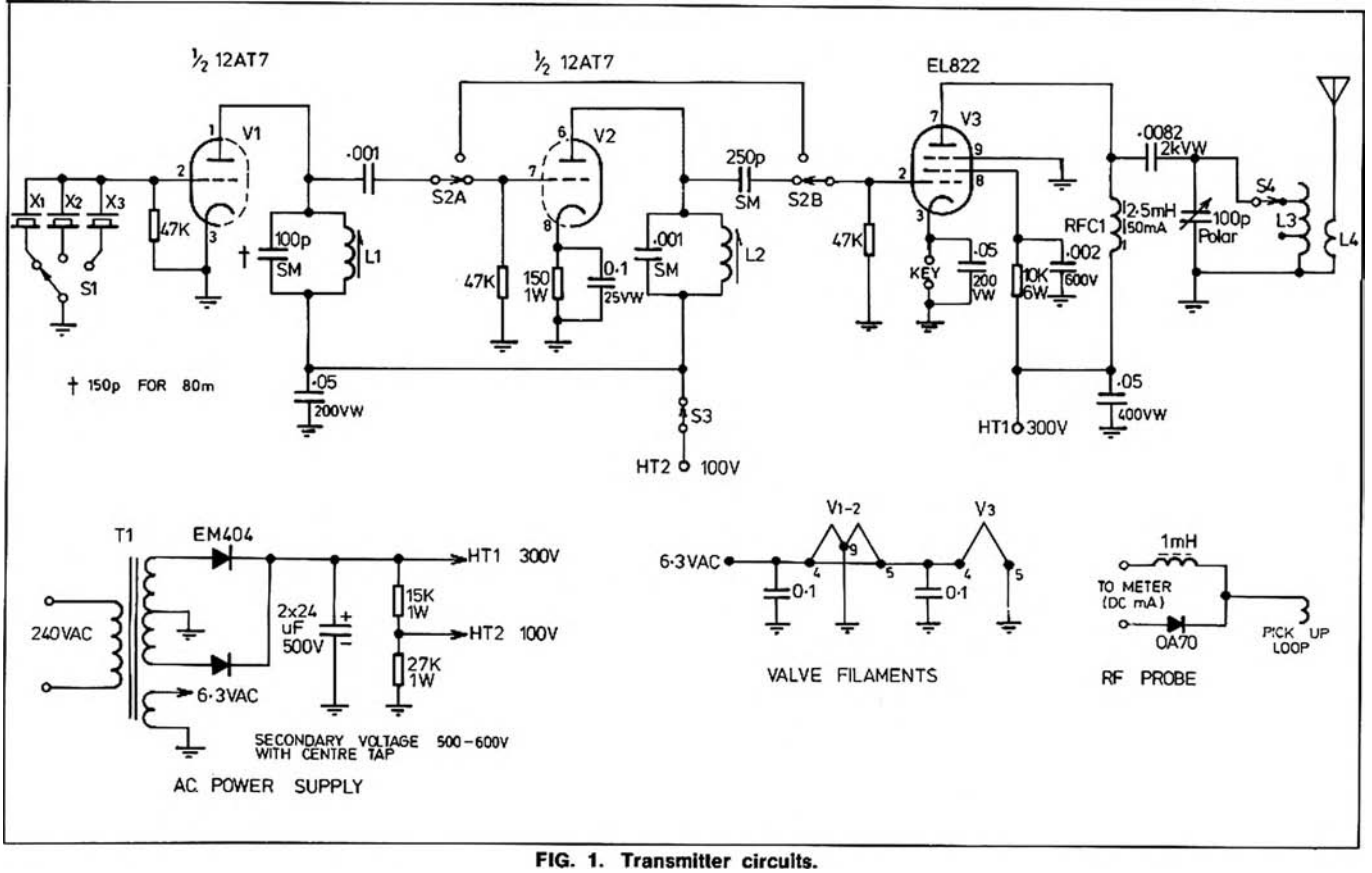


FIG. 1. Transmitter circuits.

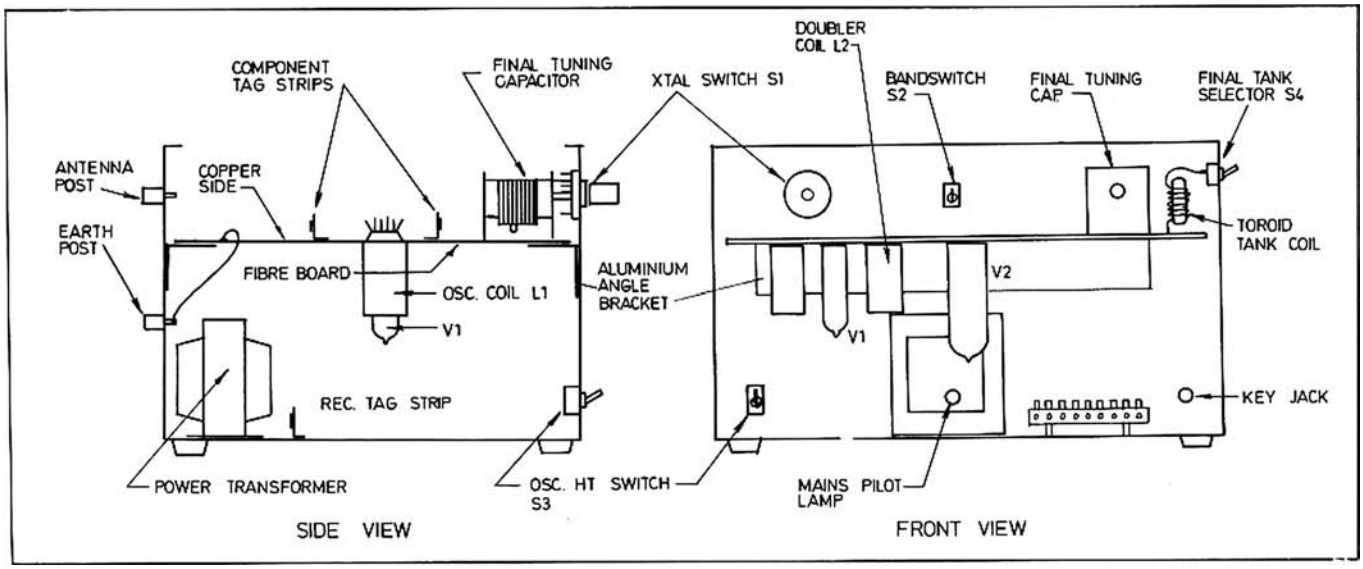
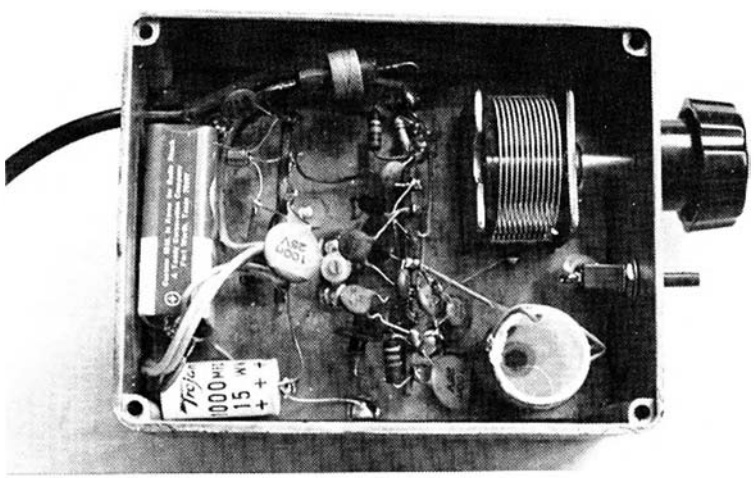


FIG. 2. Side and front views of chassis.



FET VFO.

aspect lending stability to the design. Simplicity being the keynote of this rig, one couldn't get a more simple oscillator.

On the fundamental band (described thus because the rig can be either 80 and 40 or 40 and 20 metres) the output of the oscillator stage is coupled directly to the grid of the final amplifier. I have used an EL822 pentode for the final; this is not a common valve but is similar to the 12BY7 which is easily obtainable and would preserve the 12V heater arrangement if battery operation was desired. Grid leak is adequate for the final, and because of the low power, circuit protecting cathode bias is not necessary. The cathode of the final is keyed, with a shaping capacitor across the key. Pentodes generally do not require neutralising, and good layout plus the use of a ferrite toroid for the plate tank circuit gives a stable output. Shunt feed of HT to the final amplifier is used because the tank circuit tuning capacitor is grounded to the chassis.

To provide a simple matching into an end fed antenna, such as would be used in a portable situation or some home stations, a two turn link is wound around the earthy end of the plate tank coil. This system gets plenty of power into indifferent antennas and requires only one tuning capacitor. End fed antennas of course require a good earth system.

For doubling up to the second harmonic band, the second triode of the 12AT7 is used as a frequency doubler. A DPDT toggle switch performs the band switching here, and as the circuit shows, simply feeds the oscillator output into the grid of the second triode. Its plate is tuned to the harmonic frequency and provides adequate drive for the final amplifier. The toroid tank coil is tapped and a small toggle switch mounted close to the coil change bands.

The oscillator and doubler stage HT is switchable; HT ON allowing netting and transmission — HT OFF is the receive position. No Tx/Rx relay is needed if a separate receive antenna is used. Just turn down the receiver gain during transmit and you will have good sidetone from the beat note.

Band changing is accomplished simply by operating two toggle switches and repeaking the final tank circuit. Going to the receive mode requires only switching off the oscillator HT and turning up the receiver gain.

TUNING

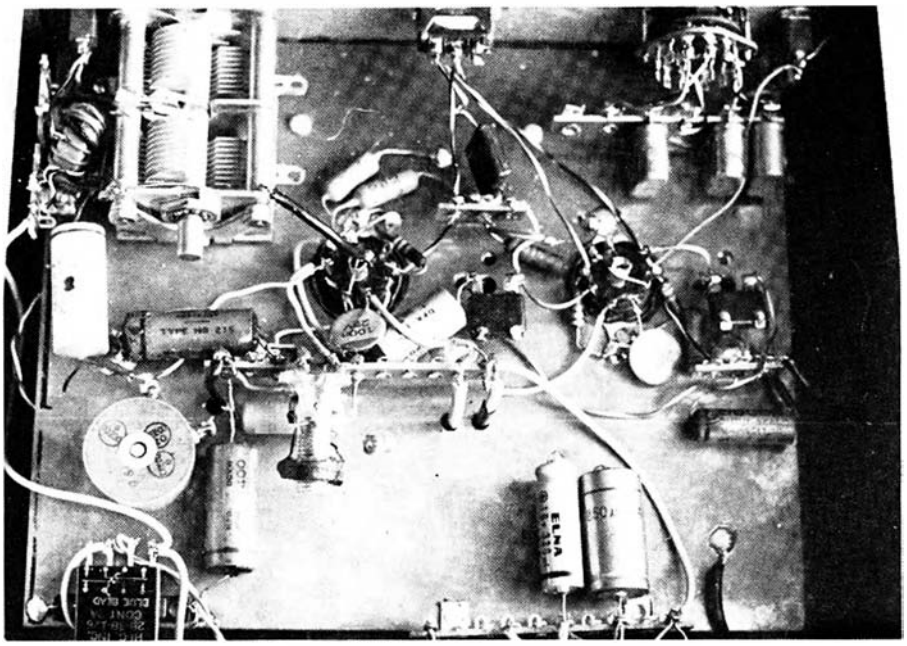
No metering is necessary for tune-up except the RF probe feeding into your multimeter. This is also the only test equipment required for initial tune-up after construction. Couple the RF probe to the oscillator output and tune the coil slug for maximum output on the meter. Back off this reading slightly to ensure reliable oscillator start-up. The doubler tuned circuit is adjusted similarly, using the probe. For tuning the final amplifier, couple the probe to the antenna wire as far away as consistent with reading the meter. Only one or two turns of coupling are needed, insulated wire of course, to get a healthy reading on the 0-1 mA or 0-10 mA scale.

For final tank tuning I have used a 100 pF Polar variable. However on the mantel radio rig the broadcast tuning capacitor worked quite well. The small number of turns on the toroid tank coil amazed me initially and I assumed that I was tuned to a harmonic, but this was not the case. On-air reports from a station less than ten miles away gave me 599 plus on 40 metres and no sign of radiation on 20 metres.

The note has a very slight trace of pulling on 40 metres, but is as clean as a whistle on 20 metres. The keying is clean and sharp, and I have had nothing but flattering reports of the transmission. Input to the final will be about 40 mA at 300 volts giving 12 watts DC in for

perhaps 6 to 8 watts output. If a 12BY7 is substituted in the final, performance should be similar. For 12V DC operation, a DC to DC inverter is the only additional requirement, providing HT. Current drain at 12V would be about 2½ amps on key down, just over ½A with key up. This is surely a good proposition for portable operation, from even a motor cycle battery.

The rig is very rugged and will take all sorts of abuse on tune-up. My transmitter worked "first pop" with no signs of instability. The cheapness and ruggedness of small valves still makes them an attractive proposition for low power transmitters, and the techniques are generally better understood than for RF power transistors. I have been using this transmitter maritime mobile around the Australian coast with excellent results.



Top view of chassis. Oscillator, right; power amp., left.

PARTS LIST

V1-V2 12AT7, 12AX7, 12AU7, etc.
V3 EL822, 12BY7, etc.
S1 3 to 6 position rotary.
S2 DPDT toggle, miniature.
S3 SPST toggle, miniature.
S4 SPDT toggle, miniature.
L1 40m 30 turns on ¼ in. slug tuned former about 1 in. high.
80m 50 turns on ¼ in. slug tuned former about 1½ in. high.
L2 40m 30 turns as for L1.
20m 14 turns on ¼ in. slug tuned former.
L3 On ferrite toroid core 25mm x 4mm (Colour purple, type unknown).
80/40m 15 turns tap at 7 turns.
40/20m 8 turns tap at 4 and 7 turns.
L4 2 turns earth end of L3.
T1 Any 240V AC receiver type with 250-300V each side of centre tap and 6.3 VAC secondary.
X1-X6 Any 40m and 80m amateur band crystals.
Case — Grey hammertone, mild steel, from J. H. McGrath, Melbourne.

NOTE: 80m coil data is approximate only as rig not operated on this band. ■

LOOK INTO THE ULTIMATE

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NOISE BLANKER: Crystal filter circuit is highly efficient in eliminating pulse noises.

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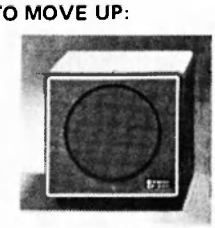

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TV502: 2MTR band transverter

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WECAR1

WIA INFORMATION CORNER

THE WIRELESS INSTITUTE OF AUSTRALIA — SA DIVISION INC.

Postal address: Box 1234, GPO, Adelaide, 5001.

Headquarters: Burley Griffin Building, Thebarton Council Depot, West Thebarton Road, Thebarton, S.A.

Telephone: 352 3428 (Headquarters), 258 7442 (Membership Secretary).

Officers for 1977-78:
- President: Colin Hurst VK5HI.
- Secretary: Clive Pearson VK5PE.
- Treasurer: David Adlam VK5QL.
- Membership Secretary: Rhondda Holker.
- Federal Councillor: Ian Hunt VK5QX.
- WICEN Controller: Gerry Preston VK5PI.
- Programme Organiser and Broadcast Officer: Allan Holker VK5ZRF.
- Education Co-ordinator: John Mitchell VK5ZJB.
- Headquarters Supervisor: Mike Hart VK5ZMH.
- Immediate Past President and Repeater Committee Chairman: Garry Herden VK5ZK.

ACTIVITIES

Monthly Meetings

The General Meeting of the South Australian Division of the WIA is held on the fourth Tuesday of each month at 8.00 p.m. at the Burley Griffin Building, West Thebarton Road, Thebarton (at the rear of the Thebarton Council Depot).

Typical programmes for the monthly meetings include technical lectures, buy and sell nights, equipment displays and social events.

Visitors are welcomed at all Divisional functions.

Divisional Journal

All members and affiliated clubs receive copies of the SA Divisional Journal of news, notes and technical articles. The Journal is published on alternate (even months).

Equipment Supply Committee and Publications Committee

The Equipment Supply Committee and Publications Committee offer surplus equipment, components for projects and technical books, at attractive prices, to WIA members each month on the regular meeting night.

Mail order facilities are available for country and interstate members of the WIA, who should address enquiries to:—

The WIA ESC,
C/- 274 Diagonal Road,
OAKLANDS PARK, 5046.

Wireless Institute Civil Emergency Network

Members of the Institute throughout Australia offer their services to provide communications in times of emergency. Regular training sessions are held and the WICEN organisation, with the approval of the Postal and Telecommunications Department, also assists voluntary organisations at major public functions.

This activity is open to both transmitting and non-transmitting members and provides a valuable community service.

The WICEN Officers in South Australia are Gerry Preston VK5PI (Controller) and Alan Raftery VK5BW, David Brown VK5ZT and Brian Roberts VK5VI (Co-ordinators).

Microprocessor Group

The Microprocessor Group meets on the second Friday in each month at 8 p.m. at the Burley Griffin Building.

The Group, first formed in September 1976, organises technical lectures, construction projects and computer programming courses. Bulk-buying facilities are available to Group members and a newsletter is circulated approximately every two months.

The Group Chairman/Meeting Organiser is Clive Pearson VK5PE, and the Secretary/Treasurer is John Moffat VK5MG.

Youth Radio Club Scheme

The Institute sponsors and supports the Youth Radio Club Scheme, which provides knowledge and practice of radio communication to persons of school age.

For Adelaide residents, the YMCA Electronics Club (YRCS) meets on Fridays at 7 p.m.

Other Youth Radio Groups are active elsewhere in the Adelaide metropolitan area and at centres throughout Australia. For information of the nearest YRCS Club to your address, apply to the WIA, Box 1234, GPO, Adelaide, 5001.

Scout Radio Clubs

Many Scout Groups have their own radio clubs. For those Groups which do not normally provide this facility, members of the WIA assist by participating in the annual Jamboree-on-the-Air and by inviting Scouts to their transmitting stations.

The Scout Liaison Officer in South Australia is Geoff Taylor VK5TY.

Ladies' Amateur Radio Association (LARA)

Licensed lady amateur radio operators and short-wave listeners have formed the Ladies' Amateur Radio Association, which holds regular transmitting schedules on the 80 metre band at 8 p.m. CST on Monday nights.

LARA also supports other amateur radio and social activities through the WIA. New members are welcome. The South Australian representative of LARA is Myrna Marnie VK5YW.

WIA Amateur Satellites (Project Australis)

This is a national amateur radio project for the provision and administration of amateur satellite communications facilities. The Project Committee is actively involved in AMSAT, the Amateur Satellite Corporation, which is an international radio amateur group based in Washington.

AMSAT co-ordinates the planning, construction and launching of the OSCAR (Orbiting Satellite Carrying Amateur Radio) series of satellites.

Using OSCAR, radio amateurs are able to engage in long distance VHF radio communications by satellite and to take part in basic research using satellite communications systems.

The SA OSCAR Co-ordinator is Colin Hurst VK5HI.

QSL Card Bureau

The Division provides a service, at a very nominal rate to members, for the receipt and forwarding of QSL cards. These colourful and interesting cards are exchanged all over the world to confirm two-way radio contacts and to provide short-wave listener reports.

Associate Members of the WIA are allocated listener station identification numbers for their use when submitting listener reports to amateur stations. Listeners regularly participate in a number of international radio contests.

The SA QSL Bureau has been operated for almost 40 years by George Luxon VK5RX.

Divisional News Sessions

The transmitting station of the SA Division of the WIA (VK5WI) provides a session of news and notes for members, each Sunday morning at 9.00 a.m. local time.

The session originates on 1.820 MHz and is relayed in the amateur bands on 3.550, 7.125, 14.175 and 28.5 MHz. For VHF listeners, the session is relayed on 53.1 MHz and in the 2 metre band through the Channel 8 repeater at Mt. Lofty and through the Channel 2 repeater near Port Pirie.

Local relays are also provided in Darwin, Alice Springs and Mt. Gambier.

Training Courses

The SA Division of the WIA and the Department of Further Education, with the sponsorship and support of the WIA, run regular courses of instruction to prepare intending applicants for the amateur radio licence examinations.

Several Divisions of the WIA provide nightly slow-morse practice sessions in the 80 metre amateur band on approximately 3.550 MHz.

Membership of the Wireless Institute of Australia

In the case of the SA Division, we solicit a $1 nomination fee with each application and ask that forms should be addressed to the "Membership Secretary". (Please complete the coupon printed elsewhere and mail as directed so that an application form may be forwarded.) ■

RADIO CLUBS IN TASMANIA

SOUTHERN BRANCH OF WIA

Postal Address:
PO Box 123, Sandy Bay, 7005.

Phone Contact:
(002) 43 9192.

Meetings:
On the first Wednesday of each month at 2000 hrs. at the SES Building, Melville St., Hobart.

Secretary:
Richard Rogers VK7RO, Huon Rd., Hobart.

Equipment Store:
Allan Ruthven, Old Beach. Ph. 72 8393.

Instructional Classes:
At both AOCP and Novice levels are held in conjunction with the Adult Education Board. Contact Andrew Boon VK7AW, 7 Flint Ave., New Town, 7008. Ph. 28 5807.
A Ladies' Auxiliary Group, "WAGS", arranges social functions. Contact Dot Noble, 32A King St., Bellerive.

NORTHERN BRANCH OF WIA

Postal Address:
PO Box 1010, Launceston, 7250.

Phone Contact:
(003) 39 1863.

Meetings:
In the club rooms at 34 Bourke St., Launceston, on the second Friday of each month at 2000 hrs.

Secretary:
John McCulloch VK7CCC, Evandale. Ph. 91 8288 (ex. 64).

Equipment Store:
Mike Wilson VK7ZWW, 11 George Town Rd. Ph. 26 3588.

Instructional Classes:
Both AOCP and Novice level are available. Contact Brian Yeoman VK7ZBY, Launceston Airport. Ph. 91 8218.

Club Call Sign:
VK7NB.

Club Publication:
Monthly Newsletter "QRM".

NORTH-WEST BRANCH OF WIA

Postal Address:
27 Hogg St., Wynyard, 7325.

Phone Contact:
(004) 27 8946.

Meetings:
Second Tuesday of each month at Lakins Hall, Ulverstone.

Secretary:
Kirby Cunningham, 27 Hogg St., Wynyard. Ph. Kirby Cunningham VK7ZKC, 27 Hogg St. Wynyard. Ph. 42 2862.

DIVISIONAL INFORMATION

VHF Officer:
Joe Gelston VK7JG.

Repeater Co-ordinator:
Peter Frith VK7PF.

QSL Bureau Postal Address:
GPO Box 371B, Hobart, 7001.
Outwards cards for members cost 2 cents each.

QSL Manager:
Chas Harrison VK7CH, 34 Wentworth St., Bellerive, 7018.

WICEN:
An affiliation exists with the State Emergency Services and WICEN also co-operates with Police Services. State Co-ordinator, Brian Morgan VK7RR.

Educational Services:
Self-instructional materials and assistance to clubs is available. State Co-ordinator, Reg Emmett VK7KK, 111 New World Ave., Launceston, 7250. Ph. (003) 31 2090.

News Broadcast:
Each Sunday at 0930 hrs. Originates from each branch in rotation. State Co-ordinator, Brian Yeoman VK7ZBY. Ph. (003) 91 8218.

On 3.170 MHz, 7.130 MHz Repeater 8, Launceston, 2m and 6m Hobart and Devonport.

Intrastate Contest:
Athol Johnson Memorial VHF Contest. Date to be decided each year.

QUEENSLAND DIVISION

DIVISIONAL INFORMATION .....

Enquiries:
Enquiries about ony of the following can be addressed to The Secretary, Box 638 GPO, Brisbane, 4001. Please use a separate sheet of paper for each item of business to facilitate distribution of work to the officers concerned.

Grades of Membership:
Full membership is open to successful examinees of the AOCP, AOLCP, AONCP. Applicants should supply their call sign or licence certificate number. Subscription: City $20; Country $18.

Associate membership is open to all others. Subscriptions as above.
City members are defined asthose who live inside the Brisbane Telephone District, which includes the zones of Redcliffe, Samford, Ipswich, Beenleigh and Cleveland.

Pensions who are, or have been, members of the Institute and whose sole income is from the aged or similar pension or income of similar level may, on a recommendation from Divisional Council, be eligible for a subscription rate approximately 2/3 of the regular subscription.

Family members. Where there are two or more members of the one household who belong to the WIA, only one issue of "Amateur Radio" and "QTC" may be required. One member of the family pays full subscription and receives the magazine in his name, while the other member has his subscription reduced by $7.

General Meetings:
Third Friday of each month, except December, at the YCWA rooms, opposite the Girls' Grammar School, Gregory Terrace, Spring Hill, at 8 p.m. Visitors are welcome. Publications, disposals items, and QSL services are usually available. For club meetings refer list.

News Broadcasts from VK4WIA
Queensland Division news is broadcast each Sunday at 2300Z, 0900 EST, on 14.342 MHz, 7.146 MHz, 2m channels 48 and 42, by Harold Bremmerman VK4HB.
The news is rebroadcast on 3.580 MHz, 21.175 MHz, 28.550 MHz, and 2m by clubs throughout the State.

News items should be posted to Box 638, GPO, Brisbane.

Late items may be phoned to VK4HB on 263 1930 up ta Saturday evening.

QTC:
This bulletin of the Queensland Division is circulated monthly as a supplement to "Amateur Radio", and contains news of local interest, details of meetings, disposal sales, etc.

Disposals:
Useful equipment becomes available from time to time and is advertised for disposal to members, by ballot, in QTC.

Publications:
A number of well known radio books are kept in stock. Call books and log books are also available. Refer QTC.

QSL Cards:
Members may obtain QSL cards for their own use from the Inward QLS Officer, C/o Box 638, GPO, Brisbane, by forwarding 86 cents city or $1.20 country, to defray postage. Cards are supplied by the Queensland Government Tourist Bureau and provided free to members.

Inward QSL Bureau:
C/o Box 638, GPO, Brisbane, 4001. Cards are available at general meetings or will be posted direct to members who have a postal credit with the Bureau.

Outward QSL Bureau:
Fred Lubach VK4RF, 21 Bovelle St., Camp Hill, 4152, will receive cards direct or cards fay be forwarded to Box 638. All cards must carry QSL stickers which are available from the Secretary. Remarks on cards must not exceed five wordh to qualify for reduced postal rates overseas.

Intruder Watch:
Organiser Murray McGregor VK4KX. Reports should give times, frequency, matter broadcast, for identification, location or direction, etc., of the intruder. Reports are appreciated.

Slow Morse:
Transmissions are on 3580 kHz, 9030Z, GMT, Tuesday, Wednesday and Thursday nights.

Class Notes for Amateur Licence Examinations:
Available to members, who may obtain details from The Secretary, Box 638.

Conventions:
A Divisional Convention is held annually in the Moreton district and regular conventions are held in the Rockhampton and Townsville areas. Early details are published in QTC.

Country Net:
A net, on approximately 3610 kHz at 0930Z, is conducted each Wednesday night, usually by someone in touch with Divisional Council, mainly for country members, but all are welcome. Please join in.

Contests:
The Sunshine State - Jack Files Memorial Contest, for VK4 operators, is usually held in July as a warm-up for the Remembrance Day Contest. All bands. Details in QTC.

WICEN:
State Co-ordinator: George McLucas VK4ZBG, C/o Box 638, GPO, Brisbane, 4001.
North Queensland Co-ordinator: Ted Gabriel VK4YG, C/o Box 1426, PO, Cairns, 4870.

Active Groups:
BEN — Brisbane Emergency Net. C/o Box 638.
Cairns ARC.
Townsville ARC.
Mackay ARC.
Gold Coast RC.
Ipswich and District RC.
Redcliffe ARC.

OSCAR Co-ordinator:
Mr. L. Murray VK4LO, C/o Box 638.
A reminder that the Hon. Secretary,

Queensland Division WIA,
Box 638, PO,
Brisbane, 4001,

will be pleased to assist you in any way related to amateur radio.

WESTERN AUSTRALIAN DIVISION

WA VHF Group:
VK6WH, PO Box 189, Applecross, WA, 6153.

Dept. of Electrical Engineers' Radio Club:
VK6XE, WAIT, Hayman Rd., Bentley, WA, 6102.

Aust. Amateur Radio Teleprinter Group:
Box N1002, GPO, Perth, WA, 6001.

WA Repeater Group:
Box N1002, Perth, WA, 6001.

Bunbury Cathedral Grammar School Radio Club:
VK6OT, Box 534, Bunbury, WA, 6230.

Slow Morse Transmissions:
VK6AWI, 3550 kHz approx., 1200 hrs. UT, Monday to Friday inclusive.

QSL Bureau:
Box N1002, GPO, Perth, WA, 6001.
QSL cards inwards and outwards.

WICEN:
Wednesday evenings, 1200 hrs. UT, 3600 kHz ± 5 kHz, plus all national WICEN frequencies

Operational Repeaters:

Channel 2 — Perth	VK6RAP
Channel 4 — Perth	VK6RAH
Channel 4 — Mount Barker	VK6RAA
Channel 6 — Bunbury	VK6RBY
Channel 8 — Wagin	VK6RAW
Channel 8 — Kalgoorlie	VK6RKG

Monthly Meetings:
Held on Third Tuesday of each month at 1130 hrs. UT Science House, 710 Murray St., West Perth, WA, 6005.

Council Meetings:
Held at the QTH of the Secretary, 388 Huntris Rd., Woodlands, WA.
Observers welcome.

PRINCIPAL AMATEUR BAND ALLOCATIONS

From "Novice Amateur Radio" publications.
Sam Voron VK2BVS

MEDIUM FREQUENCY (MF) ALLOCATION

1.60 Metres — 1.8 to 1.860 MHz
1.800 to 1.815 MHz morse section.
1.815 to 1.860 MHz voice section.
1825 MHz national call channel.
1820 kHz also a popular crystal net.

160m provides the longest ground wave coverage, about 150 miles. Reliable local day time coverage using mobile equipment. Especially popular in the UK as a local mobile and base operation. Several thousand miles can be covered at night. Under certain ionospheric conditions, especially when solar activity is low, 160 metres is the only amateur allocation which will support communications with interstate areas. Being the highest wavelength available to amateurs, it is also the best band for communications within limestone caves.

AM home-made simple rigs are popular on this band. DX-ing at sunset into the USA and South America, at midnight into Asia and before sunrise into Europe. Morse and LSB voice are best for DX-ing. WIA broadcast on 1825 kHz AM.

HIGH FREQUENCY (HF) ALLOCATION

80 metres — 3.5 to 3.7 MHz
3.525 to 3.575 MHz is the Novice Band in Aust.
3.5 to 3.550 MHz morse section.
3.550 to 3.7 MHz voice section.
3.7 to 3.75 MHz is the US Novice Band.
3.565 MHz is a popular Novice listening and working channel as is 3.555 MHz.

Ground wave distance is about 90 miles on this band, however, at low solar activity periods day time coverage of 200 miles is common due to Ionosphere E layer propagation. Night time provides Australia and New Zealand reliable coverage. Some AM stations but mainly LSB and morse operation. DX-ing also popular as is mobile interstate working.

40 metres — 7.0 to 7.15 MHz
7.1 to 7.150 MHz is the American Novice Band.
7.00 to 7.035 MHz morse segment.
7.035 to 7.150 MHz voice segment.
7.050 MHz national listening channel.
Some AM stations but mainly morse and LSB.

Reliable day time skip interstate, when solar activity is high stations within the State can be worked. During evening and night world-wide coverage is possible using SSB and especially morse to get through the interference from broadcast stations.

Some AM stations but mainly morse and LSB.

20 metres — 14.0 to 14.35 MHz
14.0 to 14.1 morse, 14.1 to 14.35 voice.
14.1 to 14.2 popular into Europe.
14.2 to 14.35 popular into the USA.

At high solar activity provides world-wide day and night coverage. Whereas 160 and 80 metres provides a "blanket coverage", on 40 and 20 metres there is usually a skip zone. It is the most popular international DX amateur band using morse and USB.

15 metres — 21.0 to 21.45 MHz
21.125 to 21.2 is the Novice Band in Australia.
21.0 to 21.150 is morse.
21.150 to 21.450 is voice.
21.1 to 21.2 is the US Novice Band.
In the US voice is 21.25 to 21.45 MHz. Morse is 21.0 to 21.25 MHz.

Sometimes this is the only band which can be used to contact stations in the US, especially when only Europe can be contacted on 20 metres or when only Pacific Islands can be reached on 20 metres.

21.210-21.440, 24 ch. Japanese mobile band in 10 kHz spacing.

15 metres is more variable during the low solar activity periods but becomes more reliable at high solar periods. The variability of this band makes

DX-ing quite popular. During mid-summer and winter interstate contacts are possible using sporatic E propagation. Morse and USB are popular. South American AM signals can be heard at times.

10 metres — 28.0 to 29.7 MHz

28.1 to 28.6 MHz is the Australian Novice Band.
28.1 to 28.2 MHz is the US Novice Band.
28.0 to 28.5 is the American morse section.
28.5 to 29.7 is the voice section.
28.5 is the national calling frequency in Australia.
28.55 MHz is a popular international channel.
28.6 MHz is the International DX listening frequency.

A 23 channel systems is being organised for modifying 11 metre rigs on to 10 metres. The range will be from 28.3 to 28.590 MHz using the same channel spacing as on 11 metres.
28.3 to 28.5 will be for AM and SSB.
28.5 to 28.590 for SSB.
28.5 to 28.65 MHz is the International DX-ing segment for voice.
28.0 to 28.1 MHz is the International DX-ing segment for morse.

During high level of solar activity 10 metres supports world-wide low power communications. Each summer and winter, Pacific wide excellent sporatic E communications is possible independent of the solar activity.

28.7 to 29.4 many AM nets operate in the USA.

29.45 to 29.55 is the amateur satellite band — satellites can be heard three times daily for 20 minutes as they orbit overhead. They relay amateurs from thousands of miles away.

29.6 MHz is the American FM national calling frequency.

29.5 to 29.7 MHz, sixteen American repeaters for FM mobile use.

Morse, AM, USB are all popular. A popular local base and mobile band.

28.2 to 28.25 is the International amateur 10m beacon band. These beacons transmit 24 hours daily providing an indication of propagation conditions for the 10 metre DX enthusiast.

OA4VHF — Peru	28.185	MHz
9J2BBB — Zambia	28.2025	MHz
DL0IGI — West Germany	28.205	MHz
W4 — USA	28.2075	MHz
3B8MS — Mauritius	28.210	MHz
ZD9GI — Gough Isl.	28.2125	MHz
VK2WI — NSW, Australia	28.2175	MHz
5B4CY — Cyprus	28.220	MHz
YU — Yugoslavia	28.2225	MHz
F3THF — France	28.2275	MHz
VE3TEN — Canada	28.225	MHz
ZL3MHz — New eZaland	28.230	MHz
VP9BA — Bermuda	28.235	MHz
PY1CK — Brazil	28.24	MHz
A9XC — Bahrain	28.245	MHz
WA1IOB — USA	28.250	MHz

Some of the above beacons such as Sydney are planned, others are changing to the above new frequencies.

VHF (VERY HIGH FREQUENCY) ALLOCATION

6 metres — 52 to 54 MHz

(1) **List of 50-54 MHz Beacons:**

VK0MA — MAWSON	53.100
VK2WI — SYDNEY	52.450
VK4RTL — TOWNSVILLE	52.600
VK5VF — MT. LOFTY	53.000
VK6RTV — PERTH	52.300
VK6RTU — KALGOORLIE	52.350
VK6RTW — ALBANY	52.950
VK7RNT — LAUNCESTON	52.400
VK8VF — DARWIN	52.200
JD1YAA — JAPAN	50.110
KH6EQUI — HAWAII	50.104
ZL2VHP — PALMERSTON NTH	52.500

(2) **6 Metre Band Plan:**

MHz	
52.000-52.010	"Earth - Moon - Earth" (moon-bounce) operation only, any mode.
52.010-52.100	DX operation only; subdivided according to mode as follows:
52.010-52.050	CW operation only.
52.050-52.100	Narrow modes only (e.g. CW, SSB, DSB, AM, FSK).
52.100-52.300	All narrow band modes, DX and local tunable operation.
52.300-52.400	Beacons only; secondary beacon segment.
52.400-52.500	Beacons only; primary beacon segment.
52.500-53.100	Simplex net operation, primarily FM.
53.100-54.000	General operation; DX, local, and experimental operation, and modes; "private" nets; future linear translators and repeaters.

Calling frequencies are as follows:

52.025	CW
52.050	Meteor Scatter — any narrow band mode.
52.075	RTTY (FSK).
52.100	Primary SSB/AM calling frequency.
52.200	Secondary SSB/AM calling frequency.
52.300	SSTV(F4) slow such television.
52.525	FM national call channel.
52.656	FM secondary channel.

Low power long distance sporatic E propagation in mid summer and winter. Covering a range of 400 to 2500 miles with extremely strong signals. An excellent mobile band giving a reliable range of 75 to 100 miles. DX-ing can also take place as a result of Tropospheric weather conditions causing signals to be propagated between different air layers.

FM, USB and morse popular. USB and 52.525 MHz FM.

2 metres — 144 to 148 MHz (VHF)

(1) **List of 144 to 148 MHz Beacons:**

VK1RTA — CANBERRA	144.475
VK2WL — SYDNEY	144.010
VK2RHR — MITTAGONG	144.120
VK3RTG — VERMONT	144.700
VK4RTT — MT. MOWBULLAN	144.400
VK5VF — MT. LOFTY	144.800
VK6RTW — ALBANY	144.500
VK6RTV — PERTH	145.000
VK7RTX — LONAH	144.900
ZL1VHF — AUCKLAND	145.100
ZL2VHF — WELLINGTON	145.200
ZL2VHP — PALMERSTON NTH.	145.250
ZL3VHF — CHRISTCHURCH	145.300
ZL4VHF — DUNEDIN	145.400

(2) **2 Metre Band Plan:**

MHz	
144.000-144.010	EME operation only, any mode.
144.010-144.100	DX operation only; subdivided according to mode as follows:
144.010-144.050	CW operation only.
144.050-144.100	Narrow band modes only (e.g. CW, SSB, DSB, AM, FSK).
144.100-144.400	All narrow band modes, DX and local tunable operation.
144.400-144.500	Beacons only; primary beacon segment.
144.500-144.600	Beacons only; secondary beacon segment.
144.600-145.700	General operation; DX, local, and expirmental operation, all modes; "private" nets; future linear translators and repeaters.
145.7 -146.0	Satellite and space communication.
146.0 -148.0	FM net operation; simplex and and repeater.

Calling frequencies are as follows:

144.025	CW calling frequency.
144.050	Meteor scatter calling frequency, any narrow band mode.
144.075	RTTY (FSK calling frequency.
144.100	Primary SSB/AM calling frequency.
144.200	Secondary SSB/AM calling frequency.
144.300	SSTV calling frequency (F4).
146 & 146.5	Popular FM listening channels (146.5 national FM calling channel).

Tropospheric long distance propagation of up to 500 or even 2,000 kilometres is more marked on 2 metres than on 6 metres, but sporatic E long distance propagation is less evident on 2 metres than on 6 metres. 2 metres is a very popular short range mobile band especially on FM.

ULTRA HIGH FREQUENCY ALLOCATION (UHF)

70 centimetre band — 420 to 450 MHz

(1) **List of 24 hr. 420-450 MHz Beacons:**

VK4RBB — BRISBANE	432.400
VK7RTW — LONDON	432.475
ZL2VHP — PALMERSTON	431.850

(2) **70 Centimetre Band Plan:**
The full 70cm band plan as amended is as follows:

MHz	
420 -432	Amateur Television (ATV) Primary Channel DSB or VSB (ATV-1) Video at 426.25 MHz Sound at 431.75 MHz.
432 -432.0	EME only — any mode.
432.01-432.05	DX only — CW portion (with CW calling frequency at 432.025 MHz).
432.05	Meteor scatter calling frequency.
432.05-432.1	DX only — all narrow band modes (including CW) (with RTTY calling frequency at 432.075 MHz and SSB/AM primary calling frequency at 432.1 MHz).
432.1 -432.4	Tunable operations both DX and local, all modes (with SSB/AM secondary calling frequency at 432.2 MHz and SSTV calling frequency at 432.3 MHz).
432.4 -432.6	Beacons only.
432.6 -433	Tunable operation — any mode. NOTE: Calling frequencies should be used solely for monitoring, calling or establishing contacts. Calling frequencies should not be used for net operations.
433 -435	FM Repeater Inputs.
435 -438	Internationally reserved satellite allocation.
438 -440	FM Repeater Outputs.
440 -441	FM Simplex.
441 -443	Experimental.
443 -450	ATV secondary channel. VSB only (ATV-2). Video at 444.25 MHz. Sound at 449.75 MHz.

Over a 1,000 miles has been covered on tropospheric propagation. UHF has been found to provide coverage into areas VHF signals cannot reach. 70cm is becoming a popular mobile short range band especially on FM.

23 centimetres — 1215 to 1300 MHz mobile antennas on this band are only an inch or two. 23cm signals have been found to reach into areas not accessible to 2m or 70cm coverage. DX via tropospheric propagation has covered as far as 1,500 miles with this distance being pushed further as more operators make up equipment for this band.

Other bands in the super high frequency and microwave amateur allocations are found to propagate over long distance as a result of surface weather conditions (e.g. over 200 miles on 10,000 MHz using only a few milliwatts of power). Much home made equipment is used on these bands.

CHF (576-585 MHz) and 2300 to 2450 MHz.
SHF 3300 to 3500 MHz, 5650 to 5850 MHz, 10,000 to 10,500 MHz and 21,000 to 22,000 MHz. ■

IARU NEWS

At its October meeting the Executive voted in favour of the admission of ORARI to IARU membership. ORARI is the Indonesian Amateur Radio Society.

The Federal President together with Mr. Michael Owen VK3KI, a Director of the IARU R3 organisation will be visiting New Zealand towards the end of November for discussions with NZART officers on the subject of WARC 79. A copy of the NZART WARC 79 submissions to their Administration has been received. ■

INTRUDER WATCH

Alf Chandler, VK3LC

The objectives of Intruder Watch are to observe, identify and report on unauthorised signals appearing or remaining on the amateur bands causing harmful interference to radio amateur operations. We need help in this respect from as many observers as possible because intruders come in all shapes and sizes.

The Federal Intruder Watch Co-ordinator is Alf Chandler VK3LC. At the moment Ivor Stafford VK3XB is standing in for him. Alf Chandler is also the IARU Region 3 Co-ordinator and is in close contact with IARUMS and world-wide Intruder Watch activities.

The 40m band is rendered almost useless at night by broadcasters — amateurs must keep on reporting these intruders otherwise they can claim their signals are not causing harmful interference to the lawful users of the band. Our 20m band has been plagued world-wide by Russian pulse transmissions apparently emanating from over-the-horizon radar tests — numerous and repeated Government-to-Government protests have been made on this. The Russians say this was a test series and steps were being taken to reduce the interference caused to many services in that part of the spectrum; estimates have put the power output as high as 40 MW.

Intruders appear on all bands. Some may be pirates, some may be military stations, some may be various fixed or mobile stations working FSK and other modes. An Intruder Watch column in "Amateur Radio" reports a few details from time to time.

Amateurs must protect their frequency bands and should regard it their only duty to report intruders to their State Intruder Watch Co-ordinator regularly in as much detail as possible — date and time, accurate frequency, mode, identification details and so on. If you do not know your local Co-ordinator write direct to VK3LC. In your observation be careful to eliminate deficiencies (etc.) in your own receiver causing signals to be logged erroneously.

What happens in the system is this. Your reports are checked and compared with others to ensure reliability. The necessary details are processed on to special ITU forms (see AR May 1976, p. 28) for reporting to the Postal and Telecommunications Department. These should, after verification, then go forward as complaints to the Administration of the country concerned. Usually this occurs only when enough reports/complaints are received and when their own monitoring stations confirm the interference.

The message is clear. More Intruder Watch observers (they need not necessarily be transmitting members) are always needed. ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

December		
	3/4	Spanish Phone Contest
	10/11	Spanish CW Contest
	10/11	ARRL 10 Metre Contest
	10/11	Hungarian CW Contest
	10/Jan. 8	ROSS HULL VHF/UHF MEMORIAL CONTEST
January		
	7/8	YU 80 Metre Contest
	14/15	DL QRP CW Contest
	27/29	CQ WW 160 DX Contest
February		
	11/12	JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

I would like to mention a few things about contests that are taken for granted by people who are used to entering them. Contests are held for a variety of reasons, such as memorials, commemorating special events, anniversaries, and just to create activity. They can be enjoyed by young and old alike, and are good for fostering international goodwill.

Australian contests include the National Field Day, which is a good opportunity to combine a club outing with a contest. Other contests are the Remembrance Day contest, which for many is the event of the year, and the Ross Hull VHF/UHF Memorial, specially for the VHF enthusiasts.

It is not essential to have high power rigs and big beams to be successful, although sometimes it helps. Operating skill will overcome many equipment deficiencies. I have heard a number of people who are under the impression that if they give a number in a contest, they will be obliged to submit a log. This is not true, although the organisers of the various contests do appreciate as many logs as possible.

There are contests on just about every weekend, although many are confined to a particular area and not of great interest to VK. Those that are likely to be of interest to VK, I attempt to include in the contest calendar, and for some, the rules as well. It is not possible to include complete rules of every contest, as space and time does not permit.

Also, when notified, VHF field days and other more local activity can appear in the list. One contest which has not been mentioned so far is the VK/ZL/Oceania, which is organised alternatively by VK and ZL. This is an international contest with world-wide participation, unlike the other Australian contests.

Well, that's about all for this month — I had better get back to checking logs for the RD contest. About 900 hundred logs were received this year. Results will be presented as soon as possible.

VK5 VHF GROUP FIELD DAY CONTEST

Time: 0600Z 3/12/77 to 0700Z 4/12/77.

Details: VK5 looking for all VK. The contest is open to portable, mobile and fixed stations. Fixed stations may contact only portable or mobile Stations for scoring purpose.

Bands: 6 metres and above, plus OSCAR (both modes).

Scoring: The scoring system is a litle complicated and owing to printing deadlines, the exact details were unobtainable. However, all logs will be scored by the VK5 VHF group and the results published in AR in due course.

Contact with the same sttaion each two hours is permitted.

Logs: Entrants to forward logs to VHF Group, PO Box 1234, GPO, Adelaide, 5001. Closing date for receipt of logs is 6th January, 1977.

The usual RS(T) plus serial and commencing from 001 to 999 must be included for each contact, together with location of station worked to validate contacts. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

The Wireless Institute of Australia issues a number of awards to operators of amateur stations and short-wave listeners. They are available at no cost to members of the WIA. A small charge to cover handling and processing is made to non-members. Sufficient postage to cover the cost of returning QSL cards and/or certificate (and registration if required) should be enclosed with your application.

The most popular of these is the DX Century Club (DXCC), for which several hundred amateurs have qualified. It is open to any VK amateur station or a station operating in a previously Australian administered territory. A copy of the rules of the Club and of the Australian DXCC countries list appears in the 1977 Call Book, or will be sent on application to me at the above address on receipt of an s.a.s.e.

The Worked All VK Call Areas Award is open to licensed amateurs operating anywhere in the world except Australia. VK amateurs are not eligible for the award. To date 696 certificates have been issued.

VHF operators are catered for by the VHF Century Club, Worked All States (VHF) and Worked All VK Call Areas (VHF) Award. Copies of the rules of these awards will be forwarded on request (s.a.s.e. please).

You might like to have a go at the following between festivities:

SCORPION GROUP AWARD

1. All contacts after 1/7/71 count.
2. SWLs are eligible for the award. The requirements are similar.
3. Stations in Oceania, Asia and Africa require contacts with two of the following stations — any band, any mode. Valid stations: HI8CAB, CDS, CRO, EDS, EJH, EVA, FED, HAM, LC, LPC, SRH, MOG; HI8LPN silent key 1974.

Send QSLs, copy of log and 10 IRC to DX Scorpion Group, PO Box 1722, Santo Domingo, Dominican Republic.

The Awards Manager and his staff (XYL Marlene) extend their best wishes for a Merry Christmas and fruitful (DX-wise) New Year to everyone.

WEST AUSTRALIAN DIVISION CONTESTS AND AWARDS

Over the last four or five months after numerous requests there has been a series of annual transmitting contests organised for the West Australian members, with a certificate for the winners and a plaque which will be held for a period of one year.

The contests are held on 3.5 MHz CW and SSB also on the VHF bands 52 MHz and up all modes these being held over a week-end and being of 3 hours' duration on a Saturday and Sunday evening from 1100 GMT to 1400 GMT, i.e. 6 hours in all. Reports need to include a code for the shire in which the station resides and the last two numbers of the corresponding postcode.

On the basis of this two awards will be available which will be known as:

(a) Worked all West Australian shires Award.
(b) Worked all West Australian Postcodes Award.

To become eligible for these it is necessary to work for (a) 80 shires and (b) 150 postcodes respectively with proof of the QSOs, to be forwarded to the contest committee c/o Post Box N1002, Perth, 6001. These awards are open to all amateurs on a world-wide basis, all bands 3.5/28 MHz, as from the 30th June, 1977.

Copies of the shires map are available from the contest committee at a cost of $1.50 Australian, post paid.

ZONE 29 AWARD

The Zone 29 Award is issued by the West Australian Division of the Wireless Institute of Australia to licensed amateurs and SWLs throughout the world. To qualify for this award, the following conditions must be satisfied:

1. Establishment of two-way communication with any twenty-five different amateur stations situated in Zone 29. Communication to be made after 0001 WAST January, 1952.
2. The total of 25 different stations may be obtained by operation on one or more of the amateur bands.
3. Any types of emission which are permitted by the local licensing authority may be used.

The Certificate will be endorsed when issued as confirmation of fulfilment of the following special conditions:

(a) All 25 stations obtained from operation on one band only. (OPEN.)
(b) All 25 stations obtained from operation of phone transmission. (SSB, AM, FM, etc.)
(c) All 25 stations obtained from operation of CW transmission.
(d) All 25 stations obtained by one band operation and phone only.
(e) All 25 stations obtained by one band operation and CW only.
(f) 25 stations heard by SW listener, in (a)-(e) of above.

Confirmation in writing of all contacts must be submitted to:

The Secretary,
WIA (WA Division),
Box N1002, GPO,
Perth, WA 6001

together with $1(A) or 5 IRC. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

In the early 1950s there was a little interest with completely home made gear as in those days there was no television at all in Australia. Some demonstrations were conducted by some VK3s at some exhibitions. I am not aware of the call signs involved and I would appreciate finding out, and from what we have been able to find, most of the ATV history has been lost. These demonstrations caused a fair amount of interest with the general public.

It is of interest to note that to build a picture monitor involved importing a picture tube from overseas, this caused some political problems and the import request was refused. One of the local Melbourne newspapers came to the rescue with some adverse publicity and the import was eventually allowed.

The next known activity was in VK6 and a series of articles appeared in AR in 1957 or 1958 about building your own camera and equipment. There was some more activity in VK3 with the advent of these publications.

The next people to come on to the scene were the VK5s, VK5ZEY transmitted pictures in the now extinct 288 MHz band. Films of his transmissions are still in existence. The VK5s were very active with their publicity and did many Outside Broadcasts, including sporting events with relays to the Royal Shows. This was conducted for many years with very good results. Home made video gear with some ex commercial TV gear performed the functions. A colour telecine was built and so were colour monitors, and colour films were transmitted closed circuit well before colour was ever introduced commercially into Australia. In VK3 there were a number of cycles of activity over the next few years ending up with the current cycle. At present there are about 70 to 80 receiving stations, and of these about 25 capable or have transmitted pictures. All VK3 activity is on 426.25 MHz with an occasional transmission on 444.25 MHz. Only one station is transmitting on the 576 MHz band and there are also video transmissions on the 1296 MHz band.

VK1 has had an occasional transmission and at this stage one station is known to be capable of putting out pictures.

VK2 has pockets of activity in Sydney, Gosford and Lismore.

VK3, besides Melbourne, has activity in Ballarat, Bendigo, Geelong and Northern Victoria. One or two stations are also active in Gippsland.

VK4 has activity in Brisbane and one or two stations further north.

VK5 has a very active group in Adelaide and also Mt. Gambier. The Adelaide group are using the secondary video channel as their primary and the primary channel as their repeater input. The Adelaide repeater is now in operation and under test.

VK6 has activity in Perth and soon to be in Albany.

VK7 has activity in Hobart with a couple of stations and Northern Tasmania with a few more.

There are a number of avenues to pursue with ATV. Some stations concentrate on the video production side. This involves perfecting their camera operations also their lighting, radio, recording and video efforts. Colour also can come into this section. Other stations concentrate on improving their transmission with various antennae and various transmitters.

Another avenue is using digital equipment and seeing what video and effects can be constructed.

Other stations are quite happy to use the video medium as a TV telephone and use either a simplex transmission or work crossband.

A much larger number of stations, including SWLs, are quite happy to watch the happenings, and in some cases the characters who appear on camera are more interesting to watch than normal commercial transmissions.

Well, I hope that this gives the newcomers an insight of amateur television. ■

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Syd Clark, VK3ASC

BREAK-IN August 1977
Ramblings on "Q" of tuned circuits; Aerials for Portable VHF Equipment; A Simple Variable DC Power Supply; A Small Club's Answer to AREC Communications; The Home-brewer; World Problems in Radio Communication.

CQ July 1977
Touch Control for the Curtis Chip Keyers; CQ World-Wide WPX/SSB Contest All-Time Records; Basic Radio; The WB2DCX Plumbicon SSTV Camera, Part 2; Coherent CW — The CW of the Future, Part 2; How Rare Is that Country; New Life for Old Meters; Reply to a YL; FB OM, UR SOLID COPY; Practical uses for SSTV; Multiband Antennas and an Unusual 40m Beam; Optical Fibres; Amateur Radio Signal Reports.

CQ August 1977
Who's got the 20½ Million Dollars?; 1976 CQ World-Wide DX Contest Phone Results; It's not Just Hot Air; Basic Radio, Static Electricity; Super Modified HW-8 Contest Machine, Part 1; An RTTY Primer; Low Pass and High Pass Filters; Antennas: 160m; The Ham's Environment: Aesthetics, Interference, or Whatever; Novice Third Party Traffiic; Herbert S. Brier: 1914-1977

HAM RADIO June 1977
432 MHz Kilowatt Power Amplifier; High Performance Spectrum Analyser; RTTY Tape Editor; Top Coupled Bandpass Filters; Gate-Dip Meter; Toroid Permeability Meter; How Many Signals Does Your Receiver See?; 7 MHz Short Vertical; 1270 MHz ATV Power Amplifier; Micro-processors; The Register Pair Instructions.

HAM RADIO July 1977
1296 MHz Transverter; CW Transceiver for 80 and 40 Metres; SSB Spectrum Analyser; Balanced Mixer for 1296 MHz; Self Supporting Coils; Integrated Circuit for Audio Processing; High Dynamic Range Two-Metre Converters; SSTV Captioning Device; Continuity Bleeper; Simple Antenna Instrumentation; Sync Generator for ATV; Microprocessors: Logical Instructions.

RADIO COMMUNICATION September 1977
A Channel Scanning Arrangement for Quartz Crystals; Simple Circuits for the Beginner; Some Experiments with High-Frequency Ladder Crystal Filters.

RADIO ZS June 1977
Tuned Circuits for Multi-band Antennas.

RADIO ZS July 1977
Roll Your Own Insulators in Epoxy; Protection of Radio Equipment Against Lightning; Department of Posts and Telecommunications Exam. Paper for Blind Candidate; Transmitting Valves — How to Use and Abuse Them; Phase Three Satellites.

SHORTWAVE July 1977
A Versatile Cabinet System for Home-Built Equipment; FM — Some Basic Principles, Part 1; Aspects of Radio Coommunications Receivers, Part 3; Measurement of the Gate-Source Cut-Off Voltage of a Junction FET; Improving the Eddystone 888A Receiver; Aerial Tuning System for the SWL.

SHORTWAVE August 1977
A Plain Man's Guide to Use of the 4CX250 Series at VHF and UHF; Triode 3 — Input and Gate for Transmitter Power Supply Sequential Switching; An Interesting New Construction Aid; Another Mast Idea; Some Basic Principles, Part 2; Alloat on 28 MHz and Other Matters.

73 July 1977
Motorcycle Mobile; Inside the Bird; Introducing Autotrack; A Battery Voltage Monitor; The Morse Clock; Hunting Noise; CMOS Oscillators; A Dial for the FM-DX; Robot Scan Converter Details; Bounceless TT Decoder; Hams Profit from CB; Patch Up Your 101; The History of Ham Radio, Part 4; Dipole Designer Program; Software Control; QSL Tips; CB to 10; World's Smallest Continuity Tester; Open New Frontiers; Digital Synthesiser; Selecting a Frequency Counter; Build a Multiplying Prescaler; Phone Patch Tips; Impedance Matching; Digital Clock Fail-Safe; Interest in the Mail Order. ■

WICEN

The abbreviation for Wireless Institute Civil Emergency Network in which radio amateurs are encouraged to enrol so that they will be prepared to assist in natural disasters occurring in their vicinity — bushfires, cyclones, floods, etc. Membership in WICEN, which costs nothing, also assists in training for less extensive emergencies, accidents and the like which amateurs may experience in daily affairs.

Practice WICEN exercises are held from time to time. These include Victorian WIA members providing communication links for the Murray River canoe marathon every New Year. Basically WICEN is not activated until brought in by the police or emergency services. The procedures are simple and quite easy to understand.

If you are interested in forming part of a very worthwhile organisation join the Institute and enrol with your local WICEN State Co-ordinator. These are (check the Call Book for addresses) — VK1RH, VK2NL, VK3AED, VK4YG, VK4MG, VK5BW, VK6DD, VK7RR, VK8DA. The Federal WICEN Co-ordinator is Rex Roseblade VK1QJ. ■

AMSAT-OSCAR 7 ORBITAL DATA CALENDAR
In co-operation with AMSAT, Skip Reymann W6PAJ has published an improved AMSAT-OSCAR orbital data calendar containing all orbits for 1978 for AMSAT-OSCAR 7. Designed so that it may be hung on the wall, the calendar includes information on the operating schedules and frequencies for the spacecraft, and also the telemetry decoding equations. Also included is step-by-step information on how to determine times of passage of the satellite.

The orbital calendar is available post-paid for $5 US funds or 30 IRCs ($3 to AMSAT members, and free to AMSAT Life Members). Overseas orders will be airmailed. Orders and payments should be made in US currency to:

Skip Reymann W6PAJ,
PO Box 374,
San Dimas, California 91773, USA.

Orders may also be charged to VISA or Master Charge.

Important — To speed up handling of your order, please include a gummed, self-addressed label.

Proceeds from the Orbital Calendar benefit AMSAT. ■

QSP

RADIO AMATEUR OLD-TIMERS' CLUB
As a follow on from the QSP in October AR (p. 28), the annual dinner of the RAOTC will be held at the Science Club, Melbourne, on 9th March, 1978. Members and aspiring members (amateurs holding a licence 25 years or more) should write to the address given for reservations.

THE OLDEST AMATEUR
A letter received from the grand-daughter in Western Australia of an amateur living in Auckland says he is 92 and the oldest radio amateur in New Zealand. Is there any amateur in Australia over 90 still holding an amateur licence?

1977 CALL BOOK OMISSIONS
As explained in the Call Book editorial, it was shown there would be errors and omissions but time did not permit these to be resolved before printing began.

Here are some which you can note in your Call Books —

VK2FP — Initials B. J. not B. S. Postal address: Box 103, Bexley, NSW 2207.
VK2GS — Stewart, N. J., 131 Bradfield Rd., Lindfield, NSW 2070.
VK2NW — Was VK2BNW.
VK2BNW — McTaggart, F. K., Dr., 21 Ellsmore Ave., Killara, NSW 2071.
VK2NFB — Healey, C. O., 121 Jamison Rd., Penrith, NSW 2750.
VK5MO — McGrath, E. P., 81 Cave Ave., Bridgewater, SA 5155.
VK5YI — Hannaford, B., 57 Haydown Rd., Elizabeth Gve., SA 5112.
VK5NLF — Listed erroneously as VK5NLS.
VK7ZKC — Was VK4ZGR, now deleted. ■

Sideband Electronics Sales

Distributors of COMMUNICATIONS TRANSCEIVERS

HF TRANSCEIVERS

ASTRO - 200 digital solid state 200 W.P.E.P. **$1000**

TRIO KENWOOD new model TS-520-S 160 to 10 M, with optional digital readout connected externally. Can be used as a frequency counter self contained separately powered by 12 volt DC. **$700**

TRIO KENWOOD model TS-820S AC only 160 to 10 M with digital readout. **$1,100**

TRIO KENWOOD model TS-820 AC only 160 to 10 M. **$930**

TRIO KENWOOD model MC-50 Microphone. **$ 50**

TRIO KENWOOD model TS-600-A FM-AM. SSB transceiver full 50-54 MHz coverage 10 Watt output variable from 1 Watt to full power. VFO controlled AC-DC operation. Styling as TS-700-A. **$700**

TRIO KENWOOD model TR-7400 2 meter FM tranceiver 10 to 25 watts output. Frequency range 144.00 to 147.995 MHz No. of channels 800, Double conversion super-heterodine sensitivity better than 0.4 UV for 20 DB. **$440**

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VHF TRANSCEIVERS SSB

ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz **$215**

ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz. **$215**

ICOM IC-22-S synthesized 22 channel 2 M transceiver 10 channel pre programmed. Supplied with 50 extra diodes for the programming. **$269**

ICOM model IC-245 **$450**

ICOM model IC-211 **$750**

YAESU MUSEN model FT-101-E AC-DC transceivers 10 to 160 M with speech processor **$850**

YAESU MUSEN model FT-301. **$960**

YAESU MUSEN model FT 301 - D **$1140**

YAESU MUSEN model FT - 301 - S **$660**

YAESU MUSEN model FL-2100-BLineal Ampl. **$525**

YAESU MUSEN model FP - 301 **$165**

YAESU MUSEN FR G-7 Uses Wadley loop princ. **$300**

YAESU MUSEN FT221-R 2 meter all mode transceiver. **$628**

FREQUENCY COUNTERS

YAESU MUSEN model YC-500-E-S-J **P.O.A.**

SWR METER

Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality **$ 28**

DRAKE TV - 3300 TVI lowpass filter **$ 34**

SSR-1 Receivers **$270**

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KLM SOLID STATE POWER AMPLIFIERS

(MHz)			
144-148	PA10- 80BL	80	OUTPUT (watts)
"	PA10-140BL	140	"
"	PA10-160BL	160	"
"	PA 2- 70BL	70	"
400-470	PA10- 70CL	70	"
	PA 2- 12-B	12 Watts	
	PA 2- 25BL	25 Watts	P.O.A.

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New range of beam antennas from Western Communications U.K. model DX33 3 element tri-bender **$238**

HIDAKA model VS-33 3 element tri-bender including Balun **$258**

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Guide wires (Radial Kit additional $30)

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HW-80, 6' long for 80 M. **$ 28**

HW-40, 6' long for 40 M. **$ 25**

HW-20, 6' long for 20 M. **$ 23**

Swivel mounts & chrome-plated springs for all **$ 13**

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A144-11 11 Element 2M-Yagi **$ 50**

A147-11 11 Element 2 M Yagi **$ 50**

A147-20 combination horizontal vertical 2 M **$ 75**

ANTENNA ROTATORS

Model CDR Ham-11 for all hf beams except 40 M **$240**

Model CDR AR-22 L junior rotator for small beams **$ 75**

KEN model KR-400 for all medium size hf beams with internal disc brake **$120**

All models rotators come complete with 230-volt AC indicator-control units.

6-conductor cable for KR-400-500 **65 cents per metre**

COAX CABLE CONNECTORS

PL-259 **$1.20**

SO-239 Chassi Mount **$1.20**

Male to male joiner **$1.20**

Female to female joiner **$1.20**

Angle connector **$2.00**

T-connector **$2.50**

COAX CABLE

RG - 8 - U foam filled per metre **$1.20**

CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals. **$ 35**

APOLLO 3 position co-ax switches **$ 15**

All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over $100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded.

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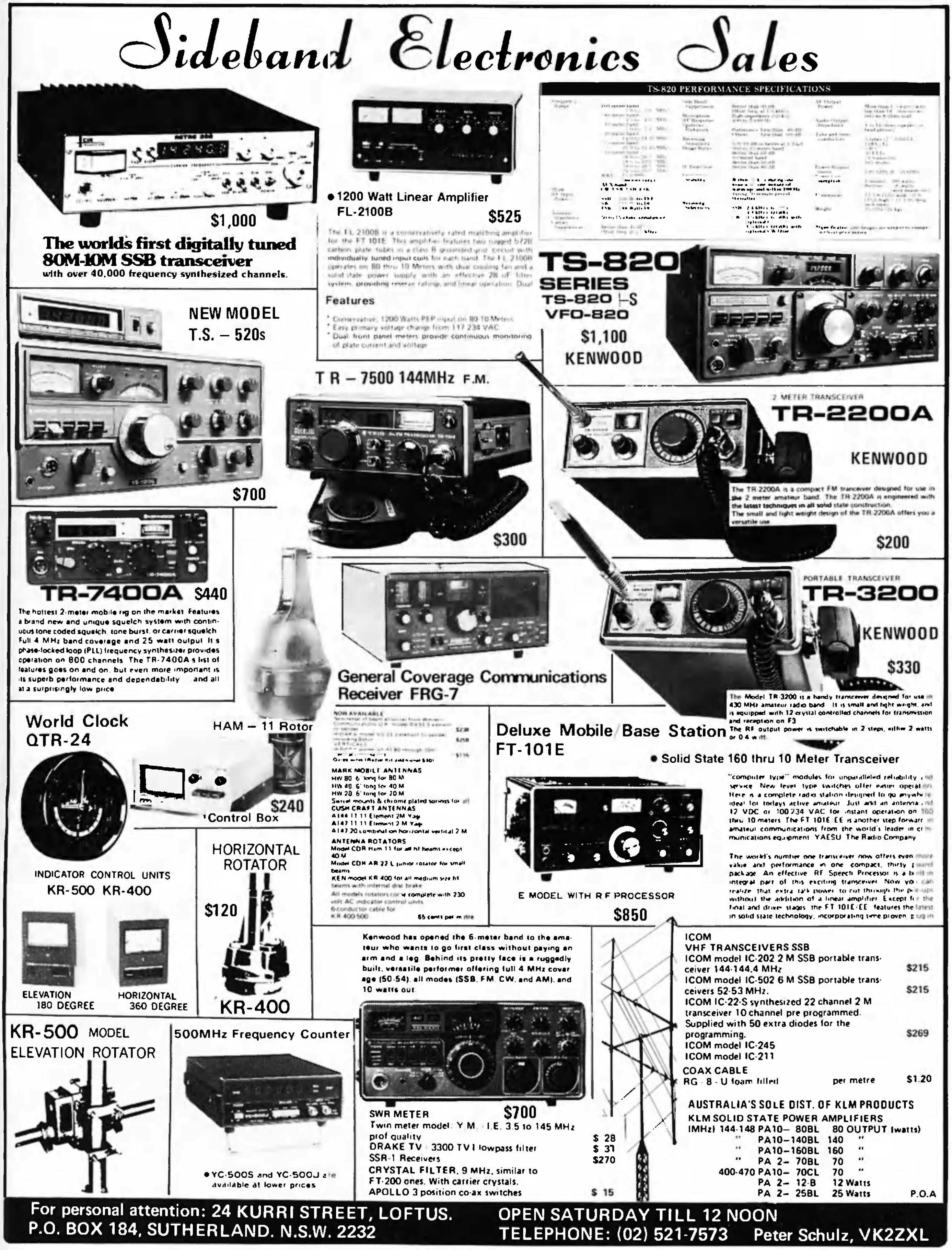
PETER SCHULZ, VK2ZXL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The worlds first digitally tuned 80M-10M SSB transceiver
with over 40,000 frequency synthesized channels.
• 1200 Watt Linear Amplifier FL-2100B
$525
The FL 2100B is a conservatively rated matching amplifier for the FT 101E. This amplifier features two rugged 572B carbon plate tubes in a class B grounded grid circuit with individually tuned input coils for each band. The FL 2100B operates on 80 thru 10 Meters with dual cooling fan and a solid state power supply with an effective 28 uF filter system, providing reserve ratings and linear operation. Dual
Features
* Conservative, 1200 Watts PEP input on 80-10 Meters
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T R – 7500 144MHz F.M.
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TR-2200A
KENWOOD
The TR-2200A is a compact FM tranceiver designed for use in the 2 meter amateur band. The TR 2200A is engineered with the latest techniques in all solid state construction.
The small and light weight design of the TR-2200A offers you a versatile use.
$200
TR-7400A $440
The hottest 2-meter mobile rig on the market. Features a brand new and unique squelch system with continuous tone coded squelch, tone burst, or carrier squelch. Full 4 MHz band coverage and 25 watt output. It's phase-locked loop (PLL) frequency synthesizer provides operation on 800 channels. The TR-7400A's list of features goes on and on, but even more important is its superb performance and dependability ... and all at a surprisingly low price.
General Coverage Communications Receiver FRG-7
PORTABLE TRANSCEIVER
TR-3200
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The Model TR-3200 is a handy tranceiver designed for use in 430 MHz amateur radio band. It is small and light weight, and is equipped with 12 crystal controlled channels for transmission and reception on F3.
The RF output power is switchable in 2 steps, either 2 watts or 0.4 watt.
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Swivel mounts & chrome plated springs for all
CUSH CRAFT ANTENNAS
A144 11 11 Element 2M Yagi
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A147 20 combination horizontal vertical 2 M
ANTENNA ROTATORS
Model CDR Ham 11 for all hf beams except 40 M
Model CDR AR 22 L junior rotator for small beams
KEN model KR 400 for all medium size hf beams with internal disc brake
All models rotators come complete with 230 volt AC indicator control units.
6-conductor cable for KR 400 500 ... 65 cents per metre
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"computer type" modules for unparalleled reliability and service. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere, ideal for todays active amateur. Just add an antenna and 12 VDC or 100/234 VAC for instant operation on 160 thru 10 meters. The FT 101E EE is another step forward in amateur communications from the world's leader in communications equipment. YAESU The Radio Company.
The world's number one transceiver now offers even more value and performance in one compact, thirty pound package. An effective RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile-ups without the addition of a linear amplifier. Except for the final and driver stages the FT 101E/EE features the latest in solid state technology, incorporating time proven plug in
E MODEL WITH R F PROCESSOR
$850
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ELEVATION 180 DEGREE
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KR-400
Kenwood has opened the 6-meter band to the amateur who wants to go first class without paying an arm and a leg. Behind its pretty face is a ruggedly built, versatile performer offering full 4 MHz coverage (50-54), all modes (SSB, FM, CW, and AM), and 10 watts out.
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ICOM IC-22-S synthesized 22 channel 2 M transceiver 10 channel pre programmed. Supplied with 50 extra diodes for the programming. ... $269
ICOM model IC-245
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COAX CABLE
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500MHz Frequency Counter
• YC-500S and YC-500J are available at lower prices
SWR METER
Twin meter model. Y M - I.E. 3.5 to 145 MHz prof quality ... $ 28
DRAKE TV - 3300 TV I lowpass filter ... $ 31
SSR-1 Receivers ... $270
CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals.
APOLLO 3 position co-ax switches ... $ 15
AUSTRALIA'S SOLE DIST. OF KLM PRODUCTS
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(MHz) 144-148 PA10– 80BL 80 OUTPUT (watts)
" PA10–140BL 140 "
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VHF-UHF
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AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTT, Mt. Mowbullan	144.400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
JA	JA2IGY, Japan *	52.500
KG6	KG6JDX, Guam †	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North ‡	52.250
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North ‡	145.250
	ZL2VHP, Palmerston North ‡	433.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

* Geoff VK3AMK, advises receiving information via JA2DDN that this beacon will be back on this frequency running 10 watts to a ground plane. Graham VK8ZCJ confirms this by advising he has copied this beacon which sends VVV de JA2IGY continuously. Reports are requested and should be sent to the JARL.

† Graham VK8ZCJ also reports the KG6 beacons are not beacons in the normal sense. They are electronic keyers driving normal amateur stations on an attended basis and do not operate on any specific frequency. KG6JDX for instance was heard on 11-10 running his ident on 52.045 trying to rustle up some other activity. Nearly all the operators in Guam have this facility and use it. None are on for a 24 hour basis though. Thanks Graham for that information. It may still be useful to continue to list the call sign but with a warning that any frequency could be used either on the low end of 50 or 52 MHz.

‡ Selwyn ZL2BJO sends some corrections to the beacons listed in the ZL2 area. The three stations so marked are now listed in accordance with his directions. Note particularly the frequency change of the six metre beacon to 52.250. Thanks for writing Selwyn.

SIX METRES

Graham VK8ZCJ from Darwin has sent me a very interesting letter, most of which I have decided to publish because there are items in it which will make the mouth water of those living in southern climes, and there is also some food for thought towards the end. I quote:

"Firstly I would like to say we VHF operators in Darwin are very lucky to be here. I am convinced Darwin is probably the most interesting spot for six metre operation in Australia. It's not so much the equipment used or operator skills, just the location.

"Secondly, BE WARNED. This year will probably be the best for JA contacts for many years, probably the best since 1972. All operators could reasonably expect to have some good openings. To back that up, here are some facts.

"Since my last letter JAs have been worked as follows:

21-9	1020-1045Z	JA1, 2, 3 and 4 — 7 stations.
23-9	1210-1319Z	JA1 and 2 — 7 stations.
24-9	1255-1320Z	JA2, 3, 4 and 5 — 4 stations.
26-9	1040-1255Z	JA1, 2, 3, 4 and 6 — 11 stations.
30-9	1055-1215Z	JA5 and 6 — 4 stations.
1-10	1035-1330Z	JA1, 2, 3, 4 and 5 — 38 stations.
4-10	1155-1307Z	JA1, 2, 3 and 4 — 14 stations.
5-10	1215-1230Z	JA2 — 2 stations.
6-10	1134-1214Z	JA2 and 6 — 4 stations.
7-10	1112-1314Z	JA2, 3, 4, 5 and 6 — 15 stations.
8-10	1122-1230Z	JA1, 3, 4, 5 and 6 — 12 stations.
9-10	1200-1345Z	JA2 and 4 — 3 stations.
11-10	0958-1155Z	JA2, 3 and 4 — 9 stations.

"As you can see this is a phenomenal list and I might add on 9-10 and 11-10 many other JAs were available but I was otherwise occupied as you will shortly find out. One thing which has been quite staggering is the reliability of propagation over the last week (to 11-10) just about every night there are JAs to work.

"I had occasion to phone Ross VK4RO on 10-10 and he advised openings had not got down that far yet, and he had not heard or worked any JAs this season.

"George P29HV . . . I have heard JAs working George in Port Moresby, but no sign of George in Darwin. I have lost some of my notes but George P29HV was worked by one of the biggest dogpiles you could imagine on both 6-10 and 7-10 around the same times as the openings to Darwin.

"Now for some interesting information. KG6 Guam has been worked in Darwin on 9-10 and 11-10. Times were 1200 to 1315Z and 0957 to 1055Z respectively. Both Brian VK8VV and myself were operating on 9-10 but Brian had a cockatoo or similar feathered 'fiend' chew up his 300 ohm feedline and was QRT on 11-10. KG6JIH and KG6JDX were on on 10-11 and 11-11 KG6JIH, KG6JDX, KH6APP and KG6DX were all worked. Signals were 5 x 9 plus both ways at times. Here are some details of the KG6 stations:

KG6JIH Gerry — Navy — 36 — TS600 + 4CX1500B.

KG6JDX Joe — Ford Aerospace — 33 — Swan 250.

KG6DX Joe — FTDX401 — FTV650B.

KG6APP Mac — FL400B — FTV650.

"The signal from Gerry was fantastic, he was up to 25 dB over S9. His linear runs 1400W PEP input and the antenna is a single 6 element wide spaced yagi. Gerry has worked 11 countries this year on 6 metres. KG6JIN is the only other active six metre station.

"Philippines: On 11-10 at 1230-1245Z I worked WB5LBJ/DU6 at Eloelo on Panayi Island in the Philippines. Signals were around S9 peaking to 10 dB over. Clarence runs an FTDX401 to an FTV650 to a six element yagi feet up. As far as I can determine the last VK/DU contact on six metres was in April 1970. On this occasion I heard Clarence talking to Joe KG6JDX on the low end of the band and Joe advised him to check for VK8VF. I immediately began calling CQ on 52.202 and after establishing contact we QSYed to 52.050.

"PROPAGATION: For some time now I have been of the opinion that a previously unknown mode of VHF propagation is being observed in Darwin, or at the very least a wholesale variance from published theory about transequatorial propagation.

"In the evening, contacts over long distances on this side of the geomagnetic and geographic equators have been observed regularly. I quote for example:

1. P29, KX6, C21, KG6 and DU to Darwin.
2. Channel E2 TV Ipoh Malaysia to Darwin.
3. Channel E3 TV Malaysia to Darwin.
4. Channel E4 TV Padang Indonesia to Darwin.

"These signals cross the equator at a very small angle (if any at all) and do not appear to fit into any mode of propagation described in amateur handbooks or radio engineering texts to my knowledge. The mode of propagation is associated with TEP because JA openings usually accompany an opening to these other areas. However, the TEP flutter associated with the JAs is not present.

"I suggest (or a better word would be 'think') that the mode of propagation is F2 via a highly ionized band located south of the equator. The distances involved indicate single hop F2 and fading is not present as for Es. The frequency is too low for tropospheric ducting and signals are too strong for scatter.

"If 102 MHz propagates from Darwin to JA via night time TEP and maybe 144 MHz too, it might be possible to work these other countries on two metres as well.

"This mode of propagation east west along the equator is not new. It's been observed from many years by amateurs in Darwin. I think we may be on to something new and the possibilities are interesting. The guys in KG6 are very interested and it's opened up a new 'world' on six metres to them. Most of them thought Australia was impossible. Now they are thinking of anywhere between Fiji and Singapore. It's all so exciting.

"I was advised by KG6JIH that ZS6ANE operates 50.1 MHz with 500 watts to a six over six antenna. Chaps in the south might think about that one."

What a terrific letter, Graham. It's great you should be prepared to spend the time necessary to write it all down for us here in the South. I am sure we will all look forward to hearing further from you. It would appear however, that the southern areas seem to have a chance for long distance propagation more particularly during the autumn equinox than the spring time, but even that may be open to question.

Still on six metres, Maurie VK3AVO writes to support my moves for the return of 50 to 52 MHz, and in so doing outlines some of his experiments with low power on 6 metres. He found that the former mostly valve T Vsets in his area were a disaster as far as TVI was concerned, even the use of a GDO produced severe local TVI with no hope of even using 10 watts.

He finds the situation now is quite different with the introduction of solid state colour TV sets with their obviously better rejection of out of band signals. Limited testing so far indicates he is not worrying his neighbours.

Maurie supports my argument all the way but it should be possible in most locations to operate on 6 metres with low power on a non-interference basis — which exists now anyway — and to prove it he has deliberately tried to induce TVI in his own CTV at very short range with a GDO, a condition which would obliterate any picture on the older sets. Provided the GDO frequency is kept well away from the video carrier frequency, and this for Channel 0 is well below 50 MHz, the interference produced is negligible or non-existent, and he sees no reason why a clean low power amateur signal, should not produce similar results. I agree, and particularly as almost every transmission today on six metres is SSB — signal without carrier, we hope it seems logical to expect a further improvement in rejection.

And are all you guys out there getting lazy? So far this month, and I do admit it is only half way through when these notes are being prepared to meet the printers' Christmas schedule, only two have written to say they support my moves for a return of the full six metre band. I would like to thank Maurie VK3AVO and Phil VK2YDY.

Phil VK2YDY writes from Moree and mentions he is now operational with 65 watts output to a 5 el. yagi on six metres SSB; 50 watts O/P to 10 el. yagi on 144 SSB; 10 watts O/P to 10 el. yagi on 146 FM; and 10 watts O/P to 15 el. yagi on 432 SSB. He is hoping to have a 4CX250B linear on 2 metres before the end of the year.

Others in Moree are Dick VK2ZVA on 6m SSB 2m SSB and FM; Dave VK2ZDY on 6m with an IC502, and hopes soon to be on 2m SSB using the 502 to a home brew transverter. The repeater VK2RAB on Ch 5 is still looking for a good home on a suitable site.

Thanks, Phil for writing, and I note you are tied to shift work, but are available most days and evenings for anyone wanting skeds to your part of the world. So why not try him sometime?

Geoff VK3AMK, in a short note, mentions that on 11-10 Steve VK3OT worked 9 JA stations on 6 metres between 0500 and 0700Z. Most call areas except JA8, signals 5 x 3. This operating took place during an exceptionally good period on 10 metres, Europeans were arriving short path and numerous solar flares observed in the previous few days. Geoff ruefully mentions there were no JA openings in Melbourne though!

MOONBOUNCE REPORT

Lyle VK2ALU reports in "The Propagator" that no tests have been scheduled since those covered in the September report.

As was prdicted earlier, terrestrial 432 MHz activity is causing QRM to EME contacts. The large amount of EME activity is covering a frequency range of 432.000 to 432.600 MHz. Moves are now afoot in the U.S.A. to reserve 432.000 to 432.050 MHz for EME work only.

REPORTING OF INFORMATION

Over the past few months a few errors or incorrect information has appeared in these columns much to my concern and that of others. The aim of the writer is to maintain the highest order of credibility at all times. in the main information has not been correct in relation to some six metre contacts in particular, so in future I will be looking fairly closely at anything reported out of the usual, and most certainly anything which arrives here about third hand onwards, with particular regard to information passed on through several hands on the air, this being the area of most error.

I don't want anyone to think I do not want to hear from you. Please continue to write as in the past and talk to me on the air by all means, but please do give me some warning if you are not sure about something. Most will appreciate I have to lean quite heavily on the information which is sent to me each month, I am unable to spend a tot of time on the air in any one month due to various commitments, and VK5 Is not renowned for being a hive of activity on VHF and UHF for the greater part of the year.

So let's continue much as we have done in hte past, you write to me, I will publish what I can, but let us all try and raise the total accuracy of reporting at all levels, and I am sure we can do this without hurting anyone's feelings. Fair enough?

By the time you read this It will be approaching Christmas, and I take this opportunity to wish all my readers a very Happy Christmas, and may the new Year bring with it better tidings than those of the past few years spoilt by inflation and other national and local problems. As I go into my ninth successive year of being your scribe for this column may I once again thank all those kind people who have contributed during the past year much information which I have been able to pass on. As you all know I always acknowledge your names at the time of inclusion of the relevant information. There are risks in mentioning specific people but I feel I should thank particularly Graham VK8ZCJ who keeps sending lots of interesting notes, Geoff VK3AMK who also contributes often, and to Ross VK4RO who sent along a very interesting tape recording earlier.

May you all have a successful Ross Hull Memorial Contest this season, and please send in some more logs than have been arriving for the past few years. I personally am waiting to see what the points score system is like this year before saying anything further on that contentious matter at the moment.

Thought for the month: "The three stages of man: he believes In Santa Claus; he does not believe In Santa Claus; he is Santa Claus."

73. The Voice In the Hills. ■

HAVE YOU JUST BROKEN A VHF, UHF OR SHF RECORD?

If you have claim to a record and wish to have it recognised nationally or internationally, then send details of contact, including frequency, station worked, location of both stations (latitude and longitude preferred), date, time, mode, power and approximate distance claimed to Federal Executive, P.O. Box 150, Toorak, 3142.

LARA

Ladies Amateur Radio Association

This month was to be the start of a series on interesting YLs. Unfortunately the publicity officer's annual leave and a change In editorial deadlines have combined to make this impossible.

Christmas is again with us, and with Christmas comes the annual hassle of Christmas shopping. The LARA member is more fortunate than most women, who end up buying new ties and chocolates. For the other enthusiasts in the family there are radio manuals, log books, electronic magazine subscriptions, soldering irons, tools and an endless list of components including the ever popular 807. For the non-enthusiast there are radio manuals for beginners, radio course enrolments, lifetime memberships in LARA, and, when all else fails, a pair of earmuffs and a high pass filter for the television.

So far the only state to hold regular meetings Is Victoria. However, membership is growing in all States and we hope that the New Year will see regular meetings beginning in other States. If you are interested please contact your local State Co-ordinator. A list of the State Co-ordinators follows:

Queensland: Linda Luther VK4VV.
Western Australia: Jill Weaver VK6YL.
Victoria: Mavis Russell VK3BIR.
South Australia: Jenny Warrington.
Tasmania: Anne Jenner VK7LY.

If you live in New South Wales how about volunteering to be State Co-ordinator. This is the only State where the position is not filled.

In conclusion LARA wishes all its members a very Happy Christmas and New Year.

73s from LARA.
Heather Mitchell VK3NFY, Publicity Officer. ■

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC

PROPAGATION

No doubt all those who have been reasonably active during 1977 will have felt the upsurge of activity, Indicating the upward trend with the new cycle really starting to assert Itself. 28 MHz has QSB-ed out of the doldrums and some fine openings are taking place right across the world almost weekly.

As 1978 approaches activity will continue to climb as "ol' sol" gets into second gear, and we can look forward to many hours of fine DX on the top HF bands.

For the sunspot followers here is the year's to date monthly means, the smoothed running mean and forward predictions for the next few months.

Monthly Means: 1/77 — 15.7 2/77 — 22.6, 3/77 — 8.0, 4/77 — 13.2, 5/77 — 18.4 6/77 — 38.4, 7/77 — 21.2, 8/77 — 29.9, 9/77 — 44.1.

Running Soothed Mean: 7/76 — 12.9 (lhe minima month), 8/76 — 14.0, 9/76 — 14.2, 10/76 — 13.4, 11/76 — 13.4, 12/76 — 14.7, 1/77 — 16.6, 2/77 — 18.0, 3/77 — 19.7. There will probably be a further smoothing before the absolute final numbers are determined. These of course are the mathematically balanced series which go down on record as the measured sunspot cycle.

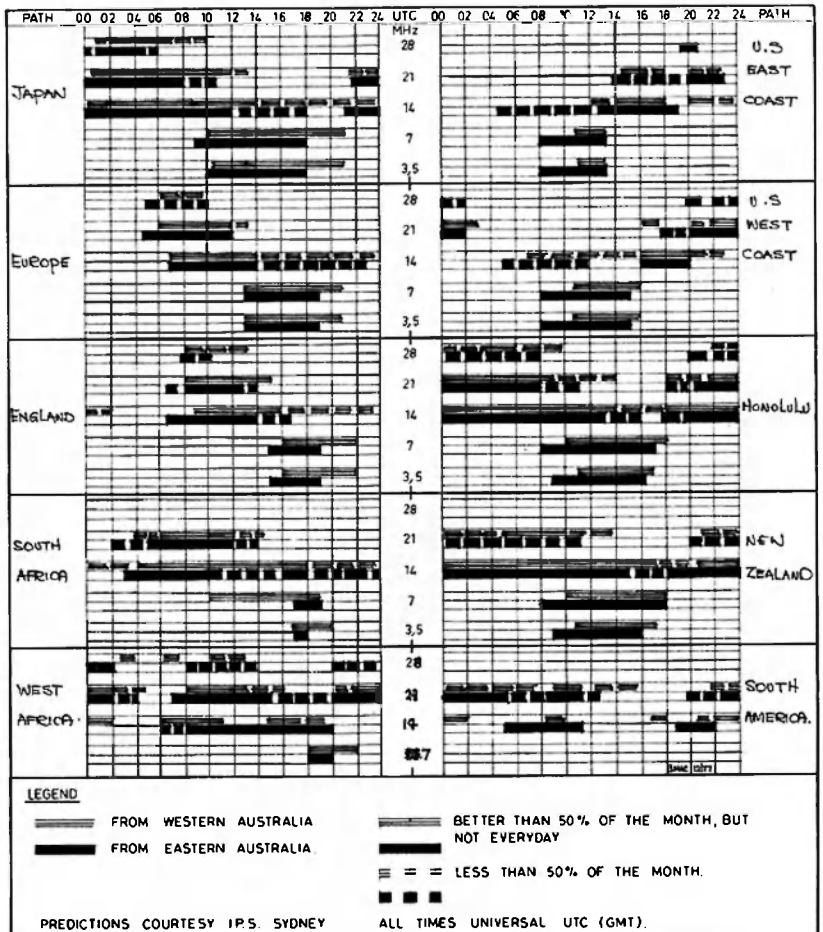
Predicted means for 12/77 — 38, 1/78 — 40, 2/78 — 42, 3/78 — 44.

Looking back across August-October period has seen a real revival on the amateur bands. As we pass through summer and head towards autumn 1978, most of the bands should be in top condition. We are experiencing quite a deal of daylight fade-outs and minor geomagnetic storms. Some lasting only a few minutes, others last for hours, but the bands bounce back quite rapidly. I guess many thought the CQ WW Phone Contest might fizz due to the storm just prior to the contest start. Whilst conditions could be better, most of the world's zones were being worked wih relative ease.

The short skip season started on October 25th right on schedule (for me), and many novices are enjoying VK and ZL contacts on 15 and 10 Mx.

Well, I trust the coming year will produce much DX — good conditions throughout the year. Keep an ear on WWV for propagation indices. If you keep your records straight you should be getting a reasonable idea of the better times to try for DX.

My best wishes to you all for Christmas and New Year 1978. May your DX be bigger and better in 1978. ■



LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
This correspondence will limit its discussion to 6m repeaters. It is assumed that the fundamental reasons for repeaters are understood.

The overriding reason for 6m repeaters is to allow the amateur to follow the fundamental reason for amateur radio, that is to experiment with radio. The present restrictions on repeater experimentation are difficult to understand.

The 6m band is suffering from a lack of activity, particularly FM and in particular FM Mobile activity. Six metre repeaters will greatly increase activity on six metres. This increased activity will increase our hold on six metres; use it or lose it.

The six metre band offers better propagation over two metres and in particular for mobile operation. The flutter effect present on two metres is not present on six metres.

Amateurs with 6m FM equipment are looking to use their equipment but most agree that until 6m repeaters appear their equipment will receive little use.

Today more is known by most amateurs about 2m propagation than 6m propagation. Six metre repeaters will increase our knowledge of 6m propagation characteristics.

In summary many of the reasons for six metre repeaters will not be known until there are six metre repeaters — even Marconi remarked that he could see little practical use for radio in the future.

THOUGHTS ON A SIX METRE REPEATER BAND PLAN

Input	Output
53.05 MHz	53.65 MHz
53.1 MHz	53.7 MHz
53.15 MHz	53.75 MHz
53.2 MHz	53.8 MHz
53.25 MHz	53.85 MHz
53.3 MHz	53.9 MHz
53.35 MHz	53.95 MHz

This band plan was chosen as a compromise between repeater technical problems and mobile operation requirements. Simplex operation would be between 53.4 MHz and 53.6 MHz with a national calling frequency of 53.5 MHz.

Mrs. G. Weaver, VK6YL (Hon. Sec.). ■

AMATEUR SATELLITES

Bob Arnold

VK3ZBB

During the past twelve months our satellite reports have become increasingly technical and exciting; for the end of the year notes, perhaps we should relax a little and review the Oscar programme since its inception, to give newcomers to our branch of the amateur radio hobby some background information. What or who is Oscar?

Oscar is an acronym for Orbiting Satellite Carrying Amateur Radio which is quite self explanatory in these days of rockets, moon walks and interplanetary space travel.

Oscar 1, the first amateur satellite, was launched on 12 December, 1961, and carried a 100 mW telemetry beacon. The satellite was live for three weeks and more than 600 amateur stations submitted reports on its signals.

Oscar 2 was a similar satellite and operated for 18 days following its launch on 2 June, 1962.

Oscar 3 was remarkable, being the first "free access" satellite sent into orbit on 9 March, 1965, even before the professional Early Bird series. The transponder aboard Oscar 3 accepted signals on 144.1 MHz and re-radiated them on 145.9 MHz with a power level of 1W PEP. A telemetry beacon was also carried and over 100 amateur stations communicated through the satellite during its two weeks of operation.

Oscar 4 was launched on 21 December, 1965, and carried a 2 metre to 70 centimetre transponder. Unfortunately, the satellite failed to attain its predetermined orbit, but during its limited life a dozen or more contacts were made, including the first direct satellite link between the USA and USSR.

Oscar 5 was Australia's own, being entirely constructed by a local group, led by a team of enthusiasts at Melbourne University. The satellite was designated Australis Oscar 5 and carried two telemetry channels. For the first time a control facility was carried which enabled AO5 to be commanded on or off from ground control stations. AO5 was also the first satellite to be co-ordinated by Radio Amateur Satellite Corporation (AMSAT), a newly-formed group which today has several thousand members from many countries.

Oscar 6 was launched on 12 October, 1972, as part of the payload of a Thor-Delta rocket carrying the NOAA2 weather satellite. The orbit was near polar and the orbital time of 1 hour 55 minutes allowed access to the satellite several times each day. Beacon signals were transmitted on 29.45 MHz and 435.1 MHz and the transponder had a centre input frequency of 145.95 MHz and an output frequency of 29.50 MHz. The satellite was equipped with a Codestore unit which is an 800 bit message storage unit permitting the storage or play back of up to 18 words of morse code. The Codestore enabled a range of operating parameters to be transmitted for the information of ground control stations. Oscar 6, being fitted with solar cells, operated satisfactorily until early 1977, when battery failure became apparent and restricted operation was necessary. After 22,900 earth orbits the satellite has recently been abandoned for regular use.

Oscar 7 was a more sophisticated version of its predecessor and was launched on 15 November, 1974. It is still working perfectly, having completed 14,000 orbits of similar parameters to Oscar 6. The satellite carries a Codestore unit which enables the four beacons and two transponders to be ground controlled.

The 145 MHz to 29 MHz repeater (Mode A) receives signals on a centre frequency of 145.90 MHz and re-transmits them on 29.45 MHz with a power of 2W, the beacon is located on 29.50 MHz. The 432 MHz to 145 MHz repeater (Mode B) receives its signals on a centre frequency of 432.15 MHz and re-transmits them on 145.95 MHz with a power of 8W, this beacon is located at 145.972 MHz. The two repeaters are generally operated on alternate days and the prediction in these monthly notes give the appropriate information to enable listeners and operators to assess the satellite. Also refer to AR October 1972 for more detailed information on satellite location calculations.

Operation is by CW or SSB and many Australian and New Zealand stations, together with others from more remote locations, can be heard on most orbits.

To communicate through Oscar 7 requires a recommended effective radiated power of 100W, which can be achieved with high power transmitters feeding simple ground plane antennae or lower power transmitters and higher gain antennae such as yagi or quad. The most popular up link transmitter power on Mode B, which is by far the most effective mode, is 10W PEP, but satisfactory contacts have been achieved with a power as low as 250 mW or 432 MHz.

If you have an interest in this form of communication listen around 145.95 MHz in the evening, you will find it interesting and maybe you will become involved.

The future of amateur satellites is bright. By the time you read this article it is probable that up to four Russian satellites will be in space and available for communication on Mode A.

These "System RS" satellites will be in orbits similar to the AMSAT Oscar series with an orbit period of 103 minutes.

Then in February 1978, Oscar D will be launched and will no doubt become Oscar 8 when in its designated orbit. This satellite will have transponders in Mode A and the new Mode J, which has a 145 MHz up link and 435 MHz transmitter.

Under construction by various groups around the world is the advanced Phase 3 satellite due for launching in December 1979. In addition to the usual radio and command facilities, this Oscar will carry an on-board rocket which will be used to place the satellite in a predetermined eliptical orbit, the apogee of which will gradually move towards the equator. This feature will permit communication over far greater distances than at the present time and over a period of years give Australian stations access to many parts of the north Pacific area as well as Africa and South America.

I hope this resume will awaken interest in satellite communication by amateur and VHF listeners. In each future edition of "Amateur Radio" I hope to give updated information on the progress of our satellites with stop press news via the Divisional broadcasts.

Perhaps I shall have the pleasure of contacting you via one of the "birds" — if you can only listen, SWL reports on my signals will be welcomed and acknowledged.

DECEMBER 1977

OSCAR 6				OSCAR 7			
Orbit	Date	Time	Lon. °	Orbit	Date	Time	Lon. °
23446	3	00.30	72.60	13923	1	01.20	75.19
23459	2	01.25	86.35	13935	2	00.19	60.07
23471	3	00.25	71.35	13948	3	01.13	73.69
23484	4	01.20	85.10	13960	4	00.12	58.[illegible]
23496	5	00.20	70.10	13973	5	01.07	71.[illegible]
23509	6	01.15	83.85	13985	6	00.06	57.07
23521	7	00.15	68.85	13998	7	01.00	70.69
23534	8	01.10	82.60	14010	8	00.00	55.57
23546	9	00.10	67.60	14023	9	00.54	69.19
23559	10	01.04	81.35	14036	10	01.48	82.81
23571	11	00.04	66.35	14048	11	00.48	67.69
23584	12	00.59	80.10	14061	12	01.42	81.31
23597	13	01.54	93.85	14073	13	00.41	66.19
23609	14	00.54	78.85	14086	14	01.35	79.81
23622	15	01.49	92.60	14098	15	00.35	64.69
23634	16	00.49	77.60	14111	16	01.29	78.31
23647	17	01.44	91.35	14123	17	00.28	63.19
23659	18	00.44	76.35	14136	18	01.23	76.81
23672	19	01.39	90.10	14148	19	00.22	61.69
23684	20	00.39	75.10	14161	20	01.16	75.31
23697	21	01.34	88.85	14173	21	00.16	60.19
23709	22	00.34	73.85	14186	22	01.10	73.81
23722	23	01.29	87.60	14198	23	00.09	58.69
23734	24	00.28	72.60	14211	24	01.03	72.31
23747	25	01.23	86.35	14223	25	00.03	57.19
23759	26	00.23	71.35	14236	26	00.57	70.81
23772	27	01.18	85.10	14249	27	01.51	84.43
23784	28	00.18	70.10	14261	28	00.51	69.31
23797	29	01.13	83.85	14274	29	01.45	82.93
23809	30	00.13	68.85	14286	30	00.44	67.81
23822	31	01.08	82.60	14299	31	01.38	81.43

■

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded. Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

National NCX-3 Transceiver, plus AC power supply, all in good going condition. Suitable Novice, etc., $250. VK2BMP, QTHR. Ph. (02) 90 3066.

Drake R4C Rx, T4XB Tx, MS4 spkr, $1,000. Also $250. Yaesu 620B 6m SSB transceiver, $480. VK5AS, QTHR. Ph. (086) 82 2899.

TCA1674 2m FM Transceiver, complete with xtals for ch 40, mic and crable, 25W output, $45. VK2BSM. Ph. (02) 62 4492 (A.H.) or VK2NED, QTHR.

G09 Tx, as is, what offers? VK3EJ. Ph. (03) 735 1350 for full information and/or to arrange inspection.

Eyer 66 Tape Recorder (3¾, 7½ in IPS), complete with radio tuner, in first class condition, $300. National panasonic cassette recorder, model RQ-306S (new), $40. Marconi marine HD morse key, $65. Type 365EZ (new), $85. Pioneer stereo headphone, SE305, new, $30. J. Nairn, PO box 29, Churchill. Ph. (051) 22 1097.

Yaesu FT220 FM/SSB Transceiver with anti-repeat mod, $400. FT620 AM/SSB transceiver, $350. FT dx 560 transceiver, $325. VK3ANY, QTHR. Ph. (051) 34 5184.

Collins 51J4 Comm Rx, complete with handbooks but less external speaker box, in unmodified condition, $300, ONO. VK3??Y, QTHR. Ph. (03) 97 1295.

Yaesu FR-100B amateur bands Rx, $165. Tower, 28 ft, self-supporting steel on 6 ft base, $30. Mast, 50 ft 3 section telescopic, $50. Mast, 30 ft Hill's telescopic, $25. Hygain vert antenna, 14 AVQ, 10-40m, $40. Bob, VK3AOT, QTHR. Ph. (03) 697 6612 (Bus.), (03) 787 6426 (A.H.).

AR88D (unmodified) an manual; Kleinschmidt teleprinter AN/FGC-25 and manual; BC221; ART-13 Tx; 2 off APX-6; P/S 1200V at 500 mA. VK3TY, QTHR.

Yaesu FL100B, CW AM SSB (mech filter) Tx, 120W output all bands. 80 to 10m, with manual, $170. Yaesu FC-2S mic compressor, $15. Both units for $175. VK3WY, QTHR.

Yaesu FTV-250 Transceiver, complete with cables and manual, EC, $175. Xtal XCB7, 23 ch. CB, $50. Yaesu FL50 SSB Tx, complete with FV-50 VFO, modified for operation on 52-52.5 MHz, $55, ONO. Yaesu FL50 SSB Tx, complete with FV-50 VFO, modified for operation on 144-144.5 MHz, $55, ONO. Drake 2B Rx, ham bands only, 80-10m, with Q multiplier, calibrator, 240V, $120, ONO. ICOM IC502, 6m, SSB, EC, $175, ONO. Lionel VK3NM, QTHR. Ph. 329 7888 (Bus.), 89 3710 (A.H.).

Free two 20 ft telescoping triangular tower sections — never used, need finishing. Philips 50 MHz type 1676 transceiver with 6m AM net crystal, $30. VK3SM, QTHR. Ph. (03) 386 4406.

Europa B 144/28 MHz Transverter, complete with handbook, as new, $180. Plugs into most Yaesu gear such as FT101, FT200 etc. VK2AHH, QTHR. Ph. (065) 62 6213 or (065) 62 4760 AH.

Brand new Atlas 210X Solid State SSB Transceiver with noise blanker, Atlas 240V Deluxe AC console speaker, Atlas Deluxe mobile mount, Atlas 10X 10 ch xtal oscillator, Shure 404C microphone, Mark Antxer helical mobile antennas for 80-40, 20m with deluxe mobile base. All equipment brand new in factory sealed cartons, $1,250.00. Also brand new Wilson WE-800 2m FM portable synthesised radio, 1W and 12W switchable output, complete with nickel cadmium batteries, frequency range 144-148 MHz. Also five pre-set channels, $399.00. VK2JO, GPO Box 5076, Sydney, 2001. Ph. (02) 35 7756.

Drake TR4C 300W input SSB transceiver with Drake AC-4 AC power supply, commun spkr, dynamic mic, complete with owners manual, full 10m coverage, very little used, as new condition, $650. John Berry Ph. (02) 389 6790 AH (02) 389 6455 bus.

Vintage Valves, Nos. 15 to 866 Series A415, PM2, 1D4, CL4, EK2, 7C5, 25A6, metal 6 and 12V, new, boxed and used. Vibrators, eliminators, dials, spkrs, etc. Restorers and collectors — SAE for list, state your needs. VK3DS, QTHR.

Tri-Band X Beam (see AR Oct '72), $50. WIA 2m pre-amp and converter, $25. VK3AHG, QTHR. Ph. (03) 288 2024.

Yaesu FT101E, hardly used, as brand new, complete with mike, etc., in carton, full warranty extended, $575. VK4ZT, QTHR.

Yaesu FT200-FP200, complete unit, in excellent condition, full 10m cover, PTT mike, outboard home-brew solid state speech processor, spare tubes, handbook, just completely agent-checked and in A1 working order, $340. Yaesu FL2000B linear amp. pair 572B in GG, covers 80 thru 10m — little used, in good condition, handbook, $300. VK3ZM, QTHR. Ph. (03) 689 3135.

Atlas 210B, very little used. 80m-10m, $600 ONO. VK6GT, PO Box 171, Paraburdoc, WA 6754.

Yaesu Musen FRG-7 comm. Rx, good condition, $240 ONO. Trio CO-1303D 5 MHz oscilloscope, as new, $185. VK2NCK, QTHR. Ph. (02) 604 7137.

Self-Contained Novice Amateur Licence Study Kit. Contains two theory texts (Elementary 1 text and famous Westlakes manual). These allow easy learning while text of 1000 multiple choice questions allows constant testing. Two C60 learning morse cassettes and study guide provide expert morse help. Kit handbook provides all information about using the kit and applying for exams. Complete kit $15 post free. D. Wilson Y.R.S. Education Officer VK2ZCA, 63 Superior Ave., Seven Hills, 2147.

Swan 350, with matching Swan 240 AC & 12V DC power supplies. In good order, $290. Ed. Driscoll VK2BI, QTHR.

FT620 6m SSB/AM transceiver, fitted with xtls for 51.5-54 MHz, $365. Ph. (03) 544 9955 ext. 295, between 7.30 p.m. and 9.30 p.m. and ask for Alan Woods.

Kenwood TS700A 2m all mode txcvr, mint condition, $570 ONO. Multi-7 2m FM txcvr with repeater 2, 4, 6, 7, 8, reverse 2, 3, 4, 6, 8, simplex 40 & 50, $165 ONO. David VK1ZDF, QTHR. Ph. (062) 63 3419 bus.

Uniden 2020, matching speaker and remote VFO, first class condition, in original cartons, $175.00. VK3TG, QTHR. Ph. (058) 52 1636.

WANTED

14AVQ or 4BTV Vertical Antenna for Scout group. VK3BMP, QTHR. Ph. (02) 90 3065, price and details.

Rx 75A-4, SP600JX, RO60 or similar Rx. Also transceiver HW7, Argonaut or old army transceiver in original condition. VK5QQ, QTHR.

Antenna, 18AVT or similar, 10-80m, vertical. Reg Nicholls VK2NFY, QTHR. Ph. (02) 713 9719.

VHF, UHF and SHF Rxs, Txs, radar, etc., valves type RL18, 955, 2C39, 2C40, 2C42, 2C46, thyratron type 3C45; coils to suit Tx type TA-2J-24; old QST, radio and hobbies and general amateur radio magazines. VK2ZHS, QTHR. Ph. (02) 59 5390.

Special Morse Class, for limited operators, 5 intensive nights before the Feb. exam! Mon., 23 Jan.-Fri., 27 Jan., 1978, 6-8 p.m. ITU and hand key practice and simulated exams. At Box Hill Tech. College, 16 persons max. Contact Graeme Scott VK3ZR. Ph. 89 938 (office hours).

TH3 Junior Beam, Monitorscope suitable for FT 101B, and a SWR bridge — Oscar or similar, operational to at least 150 MHz, in good working order. VK3AKU, QTHR. Ph. (03) 598 5892.

Simplex hand morse keyer, 455 kHz, ex AMR 101 Rx, variable capacitors, miniature/HF types for cash or exchange new 832's, or QQE04/20. VK2IS, QTHR.

Two dial mechanisms ex BC 221 Frequency Meter, preferably inclusive capacitor. VK5KI, QTHR. Ph. (08) 264 1902.

Remote VFO Calibrator unit and VOX card for Galaxy V. VK5ZE, QTHR. Ph. (08) 255 7586 AH.

Old Time Radio Programs — will exchange. Tapes of vintage Australian overseas programs and commercials, also interested in movie posters and stills. Tom King VK2ATJ, QTHR.

Your Interest in Novice Studies. A text of 1000 multiple choice revision questions covering regulations and theory with answers. Price posted $3.00. D. Wilson Y.R.S. Education Officer VK2ZCA, 63 Superior Ave., Seven Hills, 2147.

QSP

HISTORY OF RAAF RADIO ORGANISATION

A letter received from Gp. Capt. E. R. Hall of 17 Orchard Crescent, Box Hill North, Victoria 3129, advises he has written a book entitled "A Saga of Achievement", due to become available early next year. The book sets out to present an accurate and reasonably adequate account of the origins of the RAAF radio organisation and includes much material not previously appearing in print. The book, which will include many photographs, covers the period from 1916 to the late 1960s. The RAAF Wireless Reserve was conducted for many years under the auspices of the WIA and its members went on to make an outstanding contribution to radio successes during World War II. The total print run will be limited to copies ordered prior to publication, providing these are received by about the end of the year.

SILENT KEYS

It is with deep regret that we record the passing of —

LIONEL (LEE) DEVEREAUX CUFFE ZL1OB
ex VK2AMA/VK2MA/VK2XC (1939-48)

Born in Whakatane, NZ, 1910, Lee moved with his parents to Australia, and was first licensed March 1939 with the call VK2AMA. He made contacts before war broke out, mainly CW on 20 metres. After the war he was given a Class B licence and call sign VK2AM, operating from the old QTH in Mosman, NSW. Again operation was on 14 MHz and some 618 contacts were made before he was closed down, in May 1950. Lee returned to NZ and sat his AOCP and received certificate number 4077, and the call ZL1OB was issued in Whangarei. Operation was again mainly CW on HF from his home on the Whangarei Harbour. A member of NSW Division WIA in 1946, Lee was a member of the Northland Branch NZART until his Key fell silent earlier this year. Sincere sympathy is extended to his wife.

WALTER SALMON VK2SA
"The Last of the Homebrewers"

It is with deep regret that I record the passing on of VK2SA Walter Salmon on 14/8/1977, who was a world-wide radio identity. Walter Salmon, QPM, JP, retired from the position of Metropolitan Superintendent of Police (Sydney) in 1962, after having acted in the position of Assistant Commissioner prior to his retirement. He then joined the Sutherland Bowling and Recreation Club and served on several committees and became their publicity officer for the last five years, as well as being their official photographer. Wal obtained his amateur licence in 1924 but his radio interests were commenced well before then, as he was a radio operator at sea in 1915 at the age of 17.

An outstanding achievement of Wals' was when he had mobile radios installed in the Sydney police motor vehicles and became the Head of the Police Wireless Division. Incidentally, the installation and maintenance was conceived and managed by Wal and was unique in so far as it was the first such installation in the southern hemisphere. Besides being a competent technical and theoretical radio man, Wal was an efficient literary man and was able to document his work. Many articles have been published in the journal of the Institute of Radio Engineers of which he was a member. He also submitted articles for publication in the Amateur Radio magazine and in 1966 he was awarded the "Adams" trophy for the best technical article published that year.

In 1976 his continued interest in radio was manifest by a lecture he gave to the St George Amateur Radio Society in September, in which he described what he called the St. George 2 metre aerial. An antenna which he developed after having revived his interest in 2 metre operation by purchasing an IC 22A, the only amateur radio set he ever bought. His shack is full of "home brew" gear with which he has so successfully pursued his hobby with amateurs throughout the universe.

Yes, it is with profound regret that I record the passing of VK2SA, a great friend who became known to me through the medium of Amateur Radio. To Sheila, his wife, their daughter, sons, daughter-in-law and grandchildren, we all extend our sympathy.

Alf VK2AAC.

VICOM ham catalog VICOM ham catalog VICOM

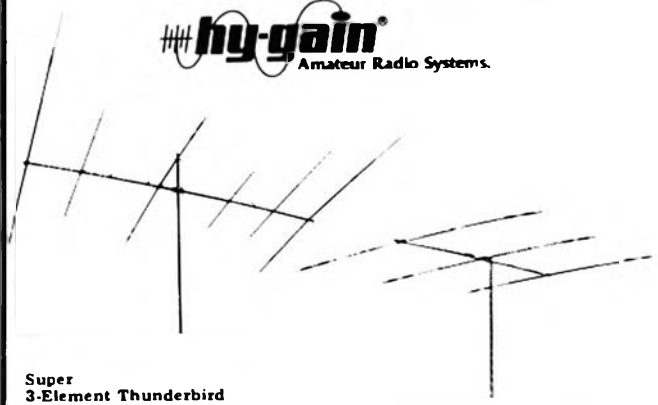
ANTENNAS & ACCESSORIES

JAYBEAM VHF/UHF BEAM ANTENNAS

Model	5Y/2M	8Y/2M	10Y/2M	10XY/2M	18/70	48/70	88/70	D8/70
Type	yagi	yagi	yagi	X yagi	yagi	yagi	yagi	twin
Band	2m	2m	2m	2m	70cm	70cm	70cm	70cm
Gain dBd	7.8	9.5	11.4	11.3	14.9	15.7	18.5	12.3
No. of el	5	8	10	10	18	48	88	2×8
Horiz beam width	58°	47°	37°	38°	28°	26°	19°	45°
Max power	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw
length metres	1.6	2.8	4.4	3.6	2.8	1.83	3.98	1.1
Mass Kg	1.8	3.8	4.5	5.9	3.4	2.7	4.7	2.5
Impedance Ohms	50	50	50	50	50	50	50	50
Price	$30	$39	$59	$72	$64	$64	$75	$48

There is no substitute.

hy-gain® Amateur Radio Systems.



Super 3-Element Thunderbird for 10, 15 and 20 Meters Model TH3Mk3 — $249

Hy-Gain's Super 3-element Thunderbird delivers outstanding performance on 10, 15 and 20 meters. The TH3Mk3 features separate and matched Hy-Q traps for each band, and feeds with 52 ohm coax. Hy-Gain Beta Match presents tapered impedance for most efficient 3 band matching, and provides DC ground to eliminate precipitation static. The TH3Mk3 delivers maximum F/B ratio, and SWR less than 1.5:1 at resonance on all bands. Its mechanically superior construction features taper swaged slotted tubing for easy adjustment and larger diameter. Comes equipped with heavy tiltable boom-to-mast clamp. Hy-Gain ferrite balun BN-86 is recommended for use with the TH3Mk3.

	TH6DXX	TH3Mk3
Electrical		
Gain—average	8.7dB	8dB
Front-to-back ratio	25dB	25dB
SWR (at resonance)	Less than 1.5:1	Less than 1.5:1
Impedance	50 ohms	50 ohms
Power rating	Max legal	Max legal
Mechanical		
Longest element	31.1'	27'
Boom length	24'	14'
Turning radius	20'	15.7'
Wind load at 80 MPH	156 lbs.	103.2 lbs.
Maximum wind survival	100 MPH	100 MPH
Net weight	57 lbs.	36 lbs.
Mast diameter accepted	1¼" to 2½"	1¼" to 2½"
Surface area	6.1 sq. ft.	4.03 sq. ft.

6-Element Super Thunderbird DX for 10, 15 and 20 Meters Model TH6 DXX $320 Separate HY-Q traps, featuring large diameter coils that develop an exceptionally favorable L/C ratio and very high Q, provide peak performance on each band whether working phone or CW. Exclusive Hy-Gain beta match, factory pretuned, insures maximum gain and F/B ratio without compromise. The TH6DXX feeds with 52 ohm coaxial cable and delivers less than 1.5:1 SWR on all bands. Mechanically superior construction features taper swaged, slotted tubing for easy adjustment and re-adjustment, and for larger diameter and less wind loading. Full circumference compression clamps replace self-tapping sheet metal screws. Includes large diameter, heavy gauge aluminum boom, heavy cast aluminum boom-to-mast clamp, and heavy gauge machine formed element-to-boom brackets. Hy-Gain's ferrite balun BN-86 is recommended for use with the TH6DXX.

	$249 TH3JR
Electrical	
Gain—average	8dB
Front-to-back ratio	25dB
SWR (at resonance)	Less than 1.5:1
Impedance	50 ohms
Power rating	600 watt PEP
Mechanical	
Longest element	24.2'
Boom length	12'
Turning radius	14.3'
Wind load at 80 MPH	87 lbs.
Maximum wind survival	80 MPH
Net weight	21 lbs.
Mast diameter accepted	1⅝"
Surface area	3.4 sq. ft.

VICOM are proud to have been appointed Australian distributors for **NAGARA** quality ham antennas. This month we introduce the **NAGARA** self-supporting HF trap verticals:

NEW TRAP VERTICALS!

80 thru 10m MODEL V5Jr 5 band trap vertical;
Height: 6.7m
Weight: 2.3Kg
Wind surface: 0.15 sqm
Max power: 1Kw pep
Impedance: 52 ohms
Price: $109 **NEW**

40 thru 10m MODEL V4Jr 4 band trap vertical;
Height: 5.2m
Weight: 1.8Kg
Wind surface: 0.10 sqm
Max power: 1Kw pep
Impedance: 52 ohms
Price: $89 **NEW**

EACH KIT CONTAINS A TUBE OF PENATROX AND TENA COAT TO ENSURE LONG-LIFE ANTENNA SERVICE.

Also NEW 6 m 5 element beam, Model SD-56. **$98**

MARK HF HELICALS

The Mark range of top loaded whips employ a carefully proportioned helical conductor featuring advanced design principles. The load is concentrated at the top and produces the important 50 ohm match at resonant frequency. A tough dielectric plastic covering eliminates static interference from the precipitation effect and a subsequent improvement in signal to noise ratio and receiver sensitivity.

Model	Res. Freq.	Bandwidth	Length	Price
HW80	3.6MHz	50KHz	6 ft.	$30
HW40	7.07	199KHz	6 ft.	$30
HW20	14.2	250KHz	6 ft.	$30
HW15	21.2	500KHz	6 ft.	$30
HW10	29.0	1MHz	6 ft.	$30

Spring base $13
HWM 1 moulded base $17.50

PARABOLIC DISH UHF–SHF

This professionally engineered dish handles both 430MHz and 1.2GHz with high wind velocities.

	430MHz	1.2GHz
Gain	12dB	20dB
Beam width	20	8
F/B ratio (horiz)	22dB	30dB
F/S ratio (horiz)	40dB	40dB
VSWR	less than 1.3	
Max power	1Kw CW	
Max wind velocity	50m/sec	
Input impedance	50 ohms	
Dish Diameter	1.2m	
Net Weight	4KG	
Price	$349	

DAIWA

2 METER FM ANTENNAS

Lindenow 5/8 wave, quality construction	$26
— base for above	$ 3
42S ¼ wave whip with cable	$14
82D 5/8 wave stainless-steel with cable	$26

The **RINGO RANGER ARX-2** is a 2M gain omnidirectional antenna with three half-waves in phase and a one-eight wave matching stub. The Ringo Ranger gives an extremely low angle of radiation for better signal coverage. It is tunable over a broad frequency range and perfectly matched to 52 ohm coax. Price $49.

RINGO RANGER ARX-2

4dB gain with reference to half-wave dipole.
6dB gain with reference to quarter wave whip.

TRAP DIPOLES

Midy VN 80 thru 10m	$67
AL48DXN 40/80m, 2Kw	$54

Midy-V N

ART-3000C

ART8000 King Kong	$478
ART3000C heavy duty	$199
AR22XL light duty	$109
8-core cable per m	$1.40

ROTORS

MODEL NO	ART-8000	ART-3000C
Rotating Torque	2,500kg/cm	850kg/cm
Braking Torque	10,000kg/cm	1,700kg/cm
Maximum Vertical Load	2,500kg	250kg
Control Accuracy	± 5°	± 5°
Forward/Reverse Delay	3 seconds	3 seconds
Maximum Continuous OP	20 minutes	3 minutes
Mast Clamp	48 ϕ ~ 78 ϕ	34 ϕ ~ 55 ϕ
Cable Requirement	9 conductor	8 conductor

BALUNS

AS-BL (Asahi) for beams	$ 31
BN-86 (HyGain) for beams	$ 30
BL50A (Rak) 50 ohm, 4Kw, for dipoles	$ 25
BL70A (Rak) 70 ohm, 4Kw, for dipoles	$ 26

COUPLERS

CL65 500w, 2.5 thru 29MHz	$134
CL99 200w, 2 metres	$ 61
CSW216 incl. swr/pwr. meter, 3.5 to 28MHz	$219

SWR

VC2 twin meters, 3-150MHz, 50 ohms	$ 38
SWR200 Oskerblock 3-200MHz	$ 75
SWR410A, 140-500MHz, quality	$ 98

NOISE BRIDGE

Te7-01 Omega up to 100MHz	$ 44
Te7-02 Omega up to 300MHz	$ 54

LOW PASS FILTERS

FD30M 32MHz cut-offs, 1Kw pep. max.	$ 35
FD30LS 32MHz cut-offs, 200w max.	$ 20

ICOM'S DIGITAL ALL SOLID STATE HF TRANSCEIVER

IC-701

THE ULTIMATE!

ICOM's advanced technology and huge success in the VHF market enable us to introduce the most advanced HF transceiver today, with ICOM quality and value.

Check the features and you'll see why the IC701 is . . . THE ULTIMATE.

- All solid-state
- 100w continuous all bands, all modes
- Dual Built-in individual VFO's offering split frequencies
- 160m thru 10m coverage
- USB, LSB, CW, CW-N (narrow), RTTY
- Speech processor
- Band pass tuning
- Receiver triple conversion
- VOX, semi break-in CW, RIT, AGC, NB
- Built-in DC power supply with optional AC unit
- Full line of accessories to come
- Backed by VICOM technical support and expertise together with 90 day warranty

CHECK THESE FEATURES

Number of semiconductors	:	125 transistors, 22 FET, 57 ICs, 248 diodes
Frequently coverage	:	1.8-2.0, 3.5-4.0, 7.0-7.3, 14.0-14.35, 21.0-21.5, 28.0-30.0MHz
Transmitter	:	Power 100w (output) adjustable 0-100w Emission: A1, A3J, F1
Spurious and Harmonics	:	Better than 60dB below peak power
Carrier suppression	:	Better than 40dB down
Unwanted sideband	:	Better than 40dB down at 1000 Hz AF input
Microphone	:	600 ohms
Rx IF frequencies	:	9.0115MHz, 10.7016MHz, 9.0115MHz
Sensitivity	:	Better than 0.25uV for 10dB S+N/N
Selectivity	:	SSB, RTTY + 1.1 KHz at -6dB (Adjustable to + 0.5KHz Min.) + 2.0KHz at -60dB CW + 250Hz at -6dB + 700Hz at -60dB CW-N + 100Hz at -6dB + 500Hz at -60dB (with Audio Filter)
Receiver spurious Response Rejection	:	Better than 60dB
Audio output	:	1.5 watts

The IC-701, the one you've waited for, the ULTIMATE.

COMING SOON!

IC701 TRANSCEIVER $1160
IC701PS optional AC supply $239

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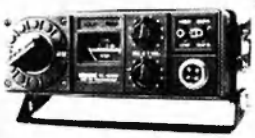
VICOM ham catalog VICOM ham catalog VICOM

The 2m all-mode IC211 features twin optically-coupled VFOs with 7 segment LED readouts, handheld FM, USB, LSB and CW operation. Ac/dc, complete with mci, handbook, VICOM 90 day warranty. Price $785.



ICOM

IC22S FM mobile

THINK HARD BEFORE YOU BUY

Buying yourself a 2m fm mobile rig is quite an expensive exercise and it is well worth taking time off to think and put down a few comparisons before you buy. The IC22S has some great features which include:

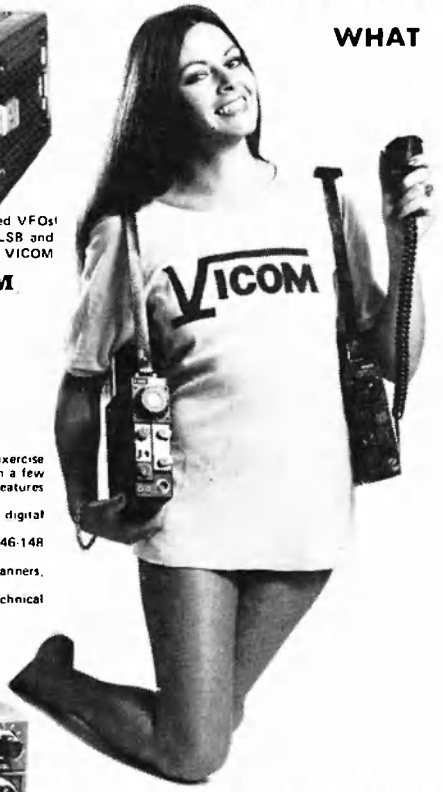
- No hassles with mobile operation, no difficult to read digital displays or maze of knobs.
- Synthesiser with programmable 25KHz frequencies 146-148 MHz. Units come pre-wired for R1-8, 40, 50 and 51.
- Lends itself to experimentation in digital logic-scanners, external programmers, etc.
- ICOM quality and reliability backed by VICOM technical support including 90 day warranty.
- Price – well a real bargain at $279!

FOR FULL DETAILS WRITE FOR OUR ICOM CATALOG.

IC245 fm/ssb mobile

IC245

The VFO revolution goes mobile with the unique ICOM developed synthesiser with 40 digit LED readout. Covers 146-148MHz in 5KHz steps for FM and with the optional sideband adapter the step rate scrops to 100Hz from 144 to 146MHz. Your new IC245 will give you the most for mobile. Price $489.



WHAT A GREAT PAIR! ICOM

Hold it!

Take hold of the great pair of SSB twins, the IC202 and IC502 transceivers. Three portable watts on two metres or six!

HELLO 6M DX

Yes, the 6m DX season is now on. The IC502 is ideal for your own experimentation on this band. The IC502 covers 52-53MHz with VFO control, RIT, effective noise blanker, provision for external power and antenna and comes complete with carry-strap, mic. and English manual. Backed by VICOM 90 day warranty. Price $219.

OSCAR

The IC202 is the ideal 2m exciter for those long-haul DX contacts or to work Oscar. 3 watts ssb and cw, VXO control, quality manufacture and comes complete with English manual, carry-strap, mic. and VICOM 90 day warranty. Price $219.

2M FM PORTABLES

IC215 FM portable puts the good times on the go. Take it to the beach, climb a hill, the long-lasting batteries make fm portable really portable. Features collapsible antenna, 15 channel capacity, dual power, crystals identical to the IC22 series. Your new IC215 comes complete with 3 popular channels, mic. shoulder-strap, batteries and English manual. Price $219.

ACCESSORIES FOR THE PORTABLES

Rubber Ducky 2m antennas	$ 13
Mobile bracket for portables	$ 18
BC-20 nicad pack and reg	$ 57
IC3PS power supply stand	$ 27
IC50L 6m linear amp, 10 watts	$ 79
IC20L 2m linear amp, 10 watts	$ 98

ATLAS

ATLAS 350XL s/state base stn.	$1199
ATLAS 350PS matching AC supply	$ 285
ATLAS 210X 80 thru 10m	$ 969
ATLAS 215X 160 thru 15m	$ 969

uniden

Uniden 2020 Mk2 HF transceiver	$849
Uniden 8010 digital VFO	$159
Uniden 8020 matching speaker	$ 49

YAESU

FT101E HF transceiver	$859
FL2100B HF linear amp.	$578
FT301D HF solid-state	$1149
FRG-7 communications receiver	$338

KENWOOD

pacesetter in amateur radio

TS820S HF transceiver including digital display, mic	$1105
TS520S HF transceiver with mic	$705
VFO820 external VFO for TS820S	$ 155
DS-1 dc/dc power supply	$ 70
YG-886C crystal filter for TS820S	$ 64
YF-399C cystal filter for TS520S	$ 64
SP520/820 matching speaker	$ 36
TV502 2m transverter	$ 260
TV506 6m transverter	$ 229
TS600 6m transceiver	$ 759
TH3200 70cm fm transceiver	$ 299
TR7400 2m fm digital transceiver	$ 450
MC50 desk microphone, dynamic	$ 54
MC10 ptt hand mic, dynamic	$ 14

COMING SOON

TS700S 2m all-mode, digital display
TL-922 HF linear, 2Kw input
TR-7500 2m fm synthesised

SOLID STATE FET VOMs

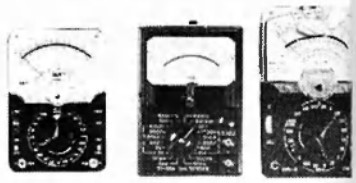
Model 150 Solid State FET VOM
Super sensitivity makes it suitable for any application in the field or on the bench

- 11 megohm input resistance on all dc volt ranges
- 1 megohm input resistance on all ac volt ranges
- temperature compensated for high accuracy
- built-in overload protection.

DC volts: 7 ranges, 0.25 thru 1000 volts
A.V volts: 4 ranges, 2.5 thru 1000 volts
DC amps: 5 ranges, 0.025 thru 250mA
Resistance: 5 ranges to 5000megohms
Decibels: 4 ranges
Complete with comprehensive instructions, leads and batteries.

20,000 ohms/volt General Purpose
Model TP-5SN
Accurate and dependable, 6 dc ranges, 5 ac ranges, 4 current ranges, 4 resistance ranges, capacity and decibel ranges also. Price of $29 incl. instructions and test leads.

DELUXE MIRROR SCALE MODEL 200
20,000 ohms/volt on 6 dc volt ranges
10,000 ohms/volt on 5 ac volt ranges.
Readings for capacity, resistance, decibels. An advanced multimeter for the professional, serious hobbyist or for the school lab. Price of $29 is a real bargain for this quality instrument! Includes comprehensive instructions and test leads.



KSR3000 RTTY terminal incl. video HAL $1499
ST6000 FSK/demodulator with cro $1031

RECEIVER

The NRD-505 professional receiver covers 100KHz thru 30MHz with digital display, CMOS memory, high stability, all-mode operation. Price $2499.

MICROPHONES

VM-1 ptt low Z, noise-cancelling	$8.90
VM-2 base with pre-amp, low Z	$29.80

-QUALITY DAWA

PROCESSORS and COMPRESSORS

MC330 audio mic compressor	$ 71
RF440 rf processor, ac/dc	$112
RF550 rf processor with crystal filter	$149

TUBES for Tx

6JS6C	$12	6146B	$11
6KD6	$14	572B	$50

HI-MOUND

MORSE KEYS

HK702 deluxe, marble base	$ 35
KH708 economy model	$ 19
HK706 operators model	$ 20
MK701 manipulator	$ 38
EK103W electronic keyer	$159

QM70 PRODUCTS

2M6432 transverter	$125
2M linear, 70w pep	$119
28/144 "Scorpion" transverter	$225
432/28 converter	$ 50
144/28 converter	$ 45
1296/28 converter	$ 59

TRANSCEIVERS & ACCESSORIES FROM VICOM

VICOM

VICOM international Pty. Limited is an Australian Company owned and controlled by licensed Amateur Radio operators who understand the Amateur's desires as well as professional conduct in business. We offer the same to our purchasers of our products whether they be the Military or hams. Being active Amateurs ourselves, we demand an organised, qualified, well-equipped service facility to support the complex equipment we purchase. VICOM dealers are also licensed hams and are able to solve any problem that may occur and are well stocked for spares for most of the major brands. VICOM is a healthy, growing company and fully recognises its responsibility to provide customers the support and constancy to put them at ease. Careful planning, attention to detail and response to customers needs have been material in its rapid rise to success. A long future of continued planned growth and success is ahead.

SPECTRUM ANARCHY

The law provides that a licence be held to use transmitting equipment. Customers are warned that evidence indicating an appropriate certificate of proficiency may be required when making purchases. Please, help stamp out spectrum anarchy, especially on our Amateur frequencies.

PRICES

All prices shown are correct at the time of compiling this catalogue but are subject to change without notice. Prices may be slightly higher from interstate dealers to cover freight costs. Prices include sales tax but exclude freight and insurance.

SERVICE

VICOM are experienced in serving the most complex of equipment. Our labour rate is $20 per hour, minimum one hour.

WARRANTY

All new equipment sold by VICOM carries a 90 day warranty. Please note that the warranty covers labour and materials but excludes final transistors, damage due to polarity reversal or excessive voltage, tampering and negligent use.

MAIL ORDER

We offer a speedy mail order service throughout Australia, New Zealand and New Guinea. Goods are despatched freight collect via Ansett, Kwikasair, registered post or rail, as requested.

FINANCE

Finance can be arranged for approved buyers

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DRAKE®

C-Line Amateur Equipment

$795

Drake R-4C

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. In addition to the ham bands, tunes any fifteen 500 kHz ranges between 1.5 and 30 MHz, 5.0 to 6.0 MHz not recommended. Can be used for MARS, WWV, CB, Marine and Shortwave broadcasts.

Superior selectivity: 2.4 kHz 8-pole filter provided in ssb positions. 8.0 kHz, 6 pole selectivity for a-m. Optional 8-pole filters of .25, .5, 1.5 and 6.0 kHz bandwidths available.

Tunable notch filter attenuates carriers within passband.

Smooth and precise passband tuning.

Transceive capability; may be used to transceive with the T-4X, T-4XB or T-4XC Transmitters. Illuminated dial shows which PTO is in use.

Usb, lsb, a-m and cw on all bands.

Agc with fast attack and two release times for ssb and a-m or fast release for break-in cw. Agc also may be switched off.

New high efficiency accessory noise blanker that operates in all modes.

Crystal lattice filter in first i-f prevents cross-modulation and desensitization due to strong adjacent channel signals.

Excellent overload and intermodulation characteristics.

25 kHz Calibrator permits working closer to band edges and segments.

Scratch resistant epoxy paint finish.

$47

Drake MS-4

Drake MS-4 Matching Speaker for use with R-4, R-4A, R-4B and R-4C Receivers. (Has space to house AC-3 and AC-4 Power Supplies).

$695

Drake T-4XC

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. Four 500 kHz ranges in addition to the ham bands plus one fixed-frequency range can be switch-selected from the front panel.

Two 8-pole crystal lattice filters for sideband selection.

Transceives with the R-4, R-4A, R-4B, R-4C and SPR-4 Receivers. Switch on the T-4XC selects frequency control by receiver or transmitter PTO or independently. Illuminated dial shows which PTO is in use.

Usb, lsb, a-m and cw on all bands.

Controlled-carrier modulation for a-m is compatible with ssb linear amplifiers.

Automatic transmit-receive switching. Separate VOX time-delay adjustments for phone and cw. VOX gain is independent of microphone gain.

Choice of VOX or PTT. VOX can be disabled by front panel switch.

Adjustable pi network output.

Transmitting agc prevents flat-topping.

Meter reads relative output or plate current with switch on load control.

Built-in cw sidetone.

Spotting function for easy zero-beating.

Easily adaptable to RTTY, either fsk or afsk.

Compact size; rugged construction. Scratch resistant epoxy paint finish.

High Pass Filters for TV Sets

provide more than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.

Drake TV-300-HP
For 300 ohm twin lead **$13**

Drake TV-75-HP
For 75 ohm TV coaxial cable; TV type connectors installed **$17**

$165

MN-4 (Model No. 1507)

$310

MN-2000 (Model No. 1509)

Drake MN-4 & MN-2000 Matching Networks

• **Integral Wattmeter** reads forward power in watts and VSWR directly; can be calibrated to read reflected power • **Matches 50 ohm transmitter output** to coax antenna feedline with VSWR of at least 5:1 • **Covers ham bands** 80 thru 10 meters • **Switches in or out** with front panel switch • **Size:** 5½"H, 10¾"W, 8"D (14.0 x 27.3 x 20.3 cm), MN-2000, 14⅜"D (36.5 cm). • **Continuous Duty Output:** MN-4, 200 watts; MN-2000, 1000 watts (2000 watts PEP) • **MN-2000 only:** Up to 3 antenna connectors selected by front panel switch.

TVI Filters

Low Pass Filters for Transmitters

have four pi sections for sharp cut off below channel 2, and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm, SO-239 connectors built in.

Drake TV-3300-LP

1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as TV front-end problems. **$32**

Drake TV-5200-LP

200 watts to 52 MHz. Ideal for six meters. For operation below six meters, use TV-3300-LP or TV-42-LP. **$32**

Drake TV-42-LP

is a four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input. **$19**

Prices shown include Tax

Write, 'phone or call for technical information.

ELMEASCO

Instruments Pty. Ltd.

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