SOR

1.45p

The SHORT WAVE Magazine

February 1987

Volume 44 Number 12

G3JFS describes an indoor antenna for the HF bands

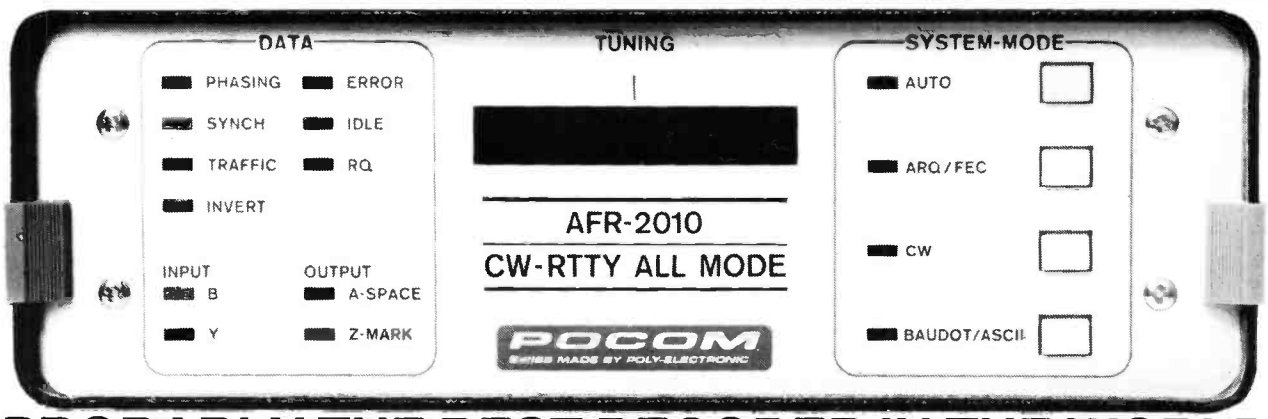
G3RJV takes another look at the S.C.D. Transmitter

G3RJV UPDATE

S.C.D. Mk.2

3 watts output on 80 metres

for the radio amateur & amateur radio



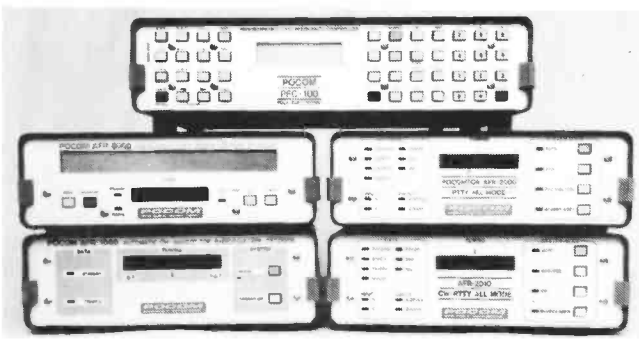
PROBABLY THE BEST DECODER IN THE WORLD

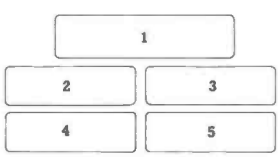
In its standard form the **POCOM 2010** is extremely versatile and capable of decoding most signals, yet it costs just **£781.** However, specialist users may want to be able to decode some of the more unusual transmissions that are around, so for them a range of expansion boards are available. These just plug straight into the **2010** and turn it into what must be the most versatile decoder on the market (the boards marked YES are fitted as standard).

	AFR-2010
RTTY Baudot CCITT No. 1 Standard 45/50/57/75/100/150/200 Baud	OPTION
RTTY Baudot CCITT No. 2 Standard 45/50/57/75/100/150/200 Baud	YES
RTTY Baudot CCITT No. 1 Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot CCITT No. 2 Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot CCITT No. 1 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot CCITT No. 2 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY 8 Channel 200 Baud Press Service (SID, KNA, etc.)	YES
NEW RTTY CODE 8 Channel 200 (300 Baud) Press Service (DPA, VWD, etc.)	OPTION
RTTY ASCII CCITT No. 5 Standard 110/150/200/300 Baud	YES
RTTY ASCII CCITT No. 5 Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot Synchron-Printer, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Baudot Mode 32, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
RTTY Autospec, Variable 30-250 Baud, Accuracy 1/1000 Baud	OPTION
MORSE (CW) 15-250 Characters Per Minute (CPM)	YES
TOR (SITOR/SPECTOR/AMTOR, ARQ-FEC according to CCIR 476-2), 100 Baud	YES
ARQ Multi Channel (Time Div. Multiplex, Moore) 2 Sub-channels 86, 96, 100 Baud	OPTION
ARQ Multi Channel (Time Div. Multiplex, Moore) 4 Sub-channels 172, 192, 200 Baud	OPTION
ARQ Multi Channel (TDM) Mode PLEX 2 Sub-channels 86, 96, 100 Baud	OPTION
ARQ Multi Channel (TDM) Mode PLEX 4 Sub-channels 172, 192, 200 Baud	OPTION
ARQ One Channel Standard 48, 64, 72, 85, 96 Baud	OPTION
FEC System with 7 BIT Code according to CCITT No. 3, 96, 100, 192, 200 Baud	OPTION
FEC System with 7 BIT Code Self Checking (Convulgenter Code) 30-250 Baud	OPTION
FEC System with 7 BIT Code according to CCITT No. 3, 30-250 Baud	OPTION
BIT ANALYSE (Analysis of received BIT format)	OPTION
AUTO SPEED-CHECK Baud Rate Indication 30-250 Baud with 1/1000 Baud Accuracy	YES

The price of individual expansion units is available on request and a fully expanded AFR 2010, capable of decoding virtually any transmission in any mode, costs about £1500.

INTRODUCING THE REST OF THE POCOM FAMILY





1 — PFC 100
2 — AFR 8000
3 — AFR 2000
4 — AFR 1000
5 — AFR 2010

POCOM decoders are manufactured in Switzerland by the Poly-Electronic company who are known throughout the world for the quality of their products. The **2010** is the flagship of their range and this is the one that we would recommend to professional and commercial users — it covers everything! The **AFR 8000** is similar to the **2010** (it uses the same software) but it has the added feature of a built-in LCD display which makes it ideal for mobile or marine use where a video monitor is not really practicable, although a video option available. The **AFR 2000** is again similar to the **2010** but in its standard form it is supplied without CW capability. A CW expansion board is available as an option. The **AFR 1000** is a budget priced ASCII, ARQ/FEC (SITOR/SPECTOR/AMTOR) and CW decoder which has many of the features of the **2010** but which is not upgradeable. Although it is not a decoder, it is worth mentioning that we can also supply the **POCOM PFC 100,** a versatile frequency controller for radios such as the NRD 515 and the ICOM R70/71.

Whether you are a professional user or a dedicated listener there is a **POCOM** decoder for you and, although the top of the range model costs about **£1500,** prices start from as little as **£395.** They may not be the cheapest on the market, but they are certainly the best! For more details send s.a.e. (at least 8"×6") for a free booklet which gives the full specifications of the entire **POCOM** range of decoders.

This ad cannot really do justice to these marvellous pieces of equipment, so next time you are in the area, come in and try them for yourself – you will be convinced.

FULL RANGE OF TRIO PRODUCTS STOCKED
We are also stockists of DAIWA—MET ANTENNAS—MUTEK—WOOD & DOUGLAS—TASCO TELEREADERS—MICROWAVE MODULES—ICS AMTOR—AEA PRODUCTS—DRAE

Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Telephone: Stourbridge (0384) 390063/371228.
Telex: 337675 TELPES G

VISA

Access

Instant finance available subject to status. Written details on request.

SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

VOL. 44 FEBRUARY, 1987 No. 520

CHANGES

The New Year brings with it major changes to *Short Wave Magazine*. With this issue the magazine has new owners and a change of staff and, shortly, a totally new look and direction.

The editorial staff of *Practical Wireless* have for some years believed that there is a need for a magazine covering the needs of the listener as opposed to the radio amateur. The acquisition of *SWM* by the publishers of *PW* provides the ideal opportunity to redirect the editorial direction of *SWM* towards the s.w.l.

The April 1987 issue of *SWM* will be completely different in appearance and editorial approach. The format will be changed to full A4 giving a larger type area with a brighter and more modern look. The editorial platform will cover all aspects of the short wave listening hobby — long, medium and short wave broadcasting band DXing, TV DXing, amateur bands, RTTY, FAX, weather satellites, CB and, of course, scanners. There will be in-depth reviews of receivers and accessories carried out using the well equipped *Practical Wireless* test lab. Although it is not anticipated that we will be publishing the more complex type of constructional projects, kits and simple projects of use to the s.w.l. will be covered, including the ever-popular and essential antenna articles.

At the same time *PW* will shift some of its emphasis away from listening, relieving some of the pressures on its editorial space. Of course it will not completely ignore the s.w.l. and likewise *SWM* will still provide the s.w.l. with some amateur radio articles, albeit on a much lower technical level than in the past.

Full details of the changes will be given in next month's issue. In the meantime please note the change of address for *all* communications with the magazine.

Dick Ganderton G8VFH

COVER DESIGN:
Allan & Co. Ltd., Welwyn

CONTENTS

Editor: **DICK GANDERTON, C.Eng., MIERE, G8VFH**

Features Editor: **Charles Forsyth**

Art Editor: **Rob Mackie**

Advertisement Manager: **Roger Hall, G4TNT (01-731 6222)**

Editorial and Advertisement Offices:
Short Wave Magazine,
Enefco House, The Quay, Poole. Dorset BH15 1PP.
Tel: Poole (0202) 678558
(out-of-hours service by answering machine).
Prestel 202671191.

S.E.M.

UNIT B, UNION MILLS, ISLE OF MAN
Tel: MAROWN (0624) 851277

NEW. S.E.M. QRM ELIMINATOR. Do you suffer from local QRM. Motors, power lines, TVs, local station? We can stop it, with this entirely new concept, developed by us. Phase out interference using a small pick up aerial. 1.8-30MHz. £85. If you don't believe it's true, try one for 10 days, if it doesn't solve your problem we'll refund, less £5.00 to cover costs.

We have many delighted users now, who can't speak too highly of its performance.

NEW. S.E.M. TRANZMATCH. Now has a switch to select DIRECT to aerial, Through ATU, or DUMMY LOAD. The matching unit retains its tremendous versatility. Capable of matching virtually any aerial to 50 ohms, at up to 1kW BALANCED or UNBALANCED. The link coupled output isolates the aerial from the rig, which can cure TVI both ways, and their robust construction is proved by ones in daily use for 15 years. 1.8-30 MHz **£110.00,** EZITUNE built-in **£39.50** (see below), Dummy load built-in **£8.90.** Ex-stock.

S.E.M. 2 METRE TRANSMATCH **£32.00** Ex-stock.

NEW S.E.M. DUMMY LOAD. 100w with Dummy load/Through switch so you can leave it plugged in. **£22.00.** Ex-stock.

Do you use an aerial matcher? You need our EZITUNE to tune it to your frequency WITHOUT transmitting. Listen to the S9+ noise on your receiver and adjust your aerial tuner for a dip in the noise and you are matched up to 50ohms (1:1 SWR). It protects your radio and stops tuning QRM **£45.00** boxed unit or **£39.50** for circuit board and fixings to fit in ANY ATU. Ex-stock.

VERY WIDE BAND PRE-AMPLIFIER

They cover from 3-40MHz or 20-500MHz with a noise figure of 1.5dB and an unprecedented + 30dB 3rd order 1P at the INPUT. This means that they are quite exceptional in handling very strong signals, very important on wideband pre-amps. Gain is 9dB.

We make each in three types. Straight pre-amp, this has a signal loss if you switch it off, **£32.00.** One which switches to "straight through" when switched OFF, can be used for transmitting through (100W) if supplied with 12V on receive and 0 on TX, costs **£35.00.** An R.F. switched unit is **£45.00.** All Ex-stock.

We are continuing to make our highly acclaimed dedicated 2 Metre pre-amps with adjustable 0-20dB gain and 1dB N.F. Receiver only **£21.90.** R.F. switched **£34.00** and with 240V P.S.U. **£39.00.** Ex-stock.

CONVERTER to cover LF, MF, HF, VHF, UHF

Our new H.F. CONVERTER opens new horizons for receivers, use with the new all mode V.H.F., U.H.F. receivers FRG9600 and ICR7000, extends their coverage down to 100KHz, giving you LF, MF, HF, VHF and UHF. You tune your RX from 100MHz up, e.g. 103.500 is 3.5MHz. It has two aerial sockets, one for H.F. into the converter and one for V/UHF switches straight through into your RX when you switch the converter OFF, i.e. No plugs to change. All this for **£45.00.** Ex-stock.

R.F. NOISE BRIDGE. If your are experimenting with aerials you need one of these units. Tells you the resonant frequency and impedance of your aerials and also invaluable for measuring ¼, ½, etc., wavelength of feeders, etc. **£45.00.** Ex-stock.

WAVEMETER. A pretty little absorption wavemeter, to satisfy the licence conditions. 1.5-30MHz with a meter indication. **£39.50.** Ex-stock.

IAMBIC KEYER. We use the world famous CURTIS chip which eliminates the little idiosyncracies common in other keyers. Opto-isolators from the chip ensure that R.F. can't get in, a common problem with multi-chip keyers. **£45.00.** An excellent twin paddle key often mistaken for ones costing several times more at **£19.50.** Ex-stock.

2 METER LINEAR POWER AMP/PRE-AMP. People are constantly telling us that comparing different makes our Pre-amp is best. (See Pre-amps for spec.) Three models, Sentinel 35 12x power gain e.g. 3W IN-36W OUT. Ideal for FT290 **£85.00.** Sentinel 50, 10W IN-50W OUT **£95.00.** Sentinel 100 10W IN-100W OUT **£135.00.** All Ex-stock.

AUDIO MULTIFILTER. Has fully adjustable BAND PASS, HIGH PASS, LOW PASS and 2 NOTCH filters. From 2.5KHz to 20Hz. Making the most versatile filter available. **£69.50.** Ex-stock.

T.V.I. Our Braid Breaker/High Pass Filter cures T.V.I. by plugging into the TV aerial socket. **£7.50.** Ex-stock.

S.E.M. SWITCH. 3 way ant. switch + 4th position to earth. 1kW. SO239S D.C.-150MHz. **£23.00.** Ex-stock.

12 MONTHS COMPLETE GUARANTEE INCLUDING ALL TRANSISTORS.

Prices include VAT and delivery. C.W.O. or phone your CREDITCARD No. Ring or write for further data. Orders or information requests can be put on our Ansaphone at cheap rate times.

Bredhurst electronics

SITUATED AT SOUTHERN END OF M23 — EASY ACCESS TO M25 AND SOUTH LONDON

HF RECEIVERS		£	(c&p)
Icom	ICR71	825.00	(—)
Trio	R2000	565.00	(—)
Trio	VC10 V.H.F. Converter	151.48	(2.00)
Yaesu	FRG8800	639.00	(—)
Yaesu	FRV8800 V.H.F. Converter	100.00	(2.00)

HF TRANSCEIVERS			
Trio	TS940S	1895.00	(—)
Trio	TS930S	1595.00	(—)
Trio	TS440S	998.00	(—)
Trio	TS430S	867.00	(—)
Trio	TS830S	981.00	(—)
Trio	TS530SP	849.00	(—)
Yaesu	FT980	1750.00	(—)
Yaesu	FT757GX	969.00	(—)
Yaesu	FT767GX	1550.00	(—)
Icom	IC735	949.00	(—)

V.H.F. SCANNING RECEIVERS			
Icom	ICR7000	975.00	(—)
Yaesu	FRG9600	525.00	(—)
A.O.R.	AR2002	487.30	(—)
Signal	R532 "Airband"	224.00	(—)

V.H.F. HANDHELD RECEIVERS			
F.D.K.	ATC720 "Airband"	189.00	(2.50)
F.D.K.	RX40 141-179 Mhz F.M.	159.00	(2.00)
Signal	R537S "Airband"	69.51	(2.00)

ANTENNA TUNER UNITS			
Yaesu	FRT7700 Short wave listening	59.00	(2.00)
Yaesu	FC757AT	349.00	(—)
Trio	AT230	185.98	(2.50)
Trio	AT250 auto	342.00	(—)
Daiwa	CNW518 High power	258.00	(—)

2.M. TRANSCEIVERS		£	(c&p)
Trio	TH21E Handheld	199.00	(—)
Trio	TR2600E Handheld	199.00	(—)
Trio	TM201A 25w F.M. mobile	322.00	(—)
Trio	TR751E 25w multimode	580.00	(—)
Trio	TS711E base station	839.00	(—)
Yaesu	FT290R II Portable multimode	429.00	(—)
Yaesu	FT203R +FNB3 Handheld	255.00	(—)
Yaesu	FT209RH +FNB3 Handheld	309.00	(—)
Yaesu	FT270RH 45w F.M. mobile	469.00	(—)
Yaesu	FT726R base station (70cm optional)	999.00	(—)
Icom	IC2E Handheld	225.00	(—)
Icom	IC02E Handheld	299.00	(—)
Icom	IC27E 25w mobile	399.00	(—)
Icom	IC271E base station	835.00	(—)
Icom	IC3200E 2M/70cm F.M. mobile	556.00	(—)

70cm TRANSCEIVERS			
Trio	TH41E Handheld	240.00	(—)
Trio	TR3600E Handheld	353.00	(—)
Trio	TM401A 12w mobile	392.00	(—)
Trio	TS811E base station	998.00	(—)
Yaesu	FT703R +FNB3 Handheld	289.00	(—)
Yaesu	FT709R +FNB3 Handheld	319.00	(—)
Yaesu	70cm module for FT726R	349.00	(—)
Icom	IC4E Handheld	285.00	(—)
Icom	IC04E Handheld	299.00	(—)
Icom	IC471E base station	927.00	(—)

OTHER BANDS			
Yaesu	FT690R 6M portable	399.00	(—)
Yaesu	6M module for FT726R	249.00	(—)
Yaesu	21/24/28 H.F. module for FT726R	269.00	(—)
Icom	IC1271E 1.2 GHz	1140.00	(—)

STATION ACCESSORIES		£	(c&p)
Drae	V.H.F. wavemeter	27.50	(1.50)
A.K.D.	V.H.F. wavemeter	24.95	(1.50)
Yaesu	FF501DX low pass filter 30MHz 1kW	37.50	(2.00)
Trio	LF30A low pass filter 30MHz 1kW	30.18	(2.00)
Adonis	AM303G desk mic with pre-amp	53.00	(2.00)
Adonis	AM503G desk mic with compression	69.00	(2.00)
S.M.C.	Polar-phaser II 2 metre	49.00	(2.50)
S.M.C.	Polar-phaser II 70 cms	69.00	(2.50)

ANTENNA SWITCHES			
Welz	CH20N 1300MHz N skts.	49.00	(1.50)
Welz	CH20A 900MHz SO239 skts.	29.95	(1.50)
SA 450N	2way diecast 500MHz N skts.	23.75	(1.00)
SA 450	as above but SO239 skts.	17.50	(1.00)
Drae	3way N skts.	19.90	(1.00)
Drae	3way SO239 skts.	15.40	(1.00)
CS 4	4way B.N.C. skts. 1500MHz	30.39	(2.00)

ANTENNA BITS			
HI-Q	Balun 1:1 5kW P.E.P.	11.95	(1.00)
Bricomm	Balun 4:1 1kW	11.20	(1.00)
Bricomm	7.1MHz Epoxy Traps (pair)	9.95	(1.50)
Self Amalgamating Tape 10M×25mm		3.95	(0.75)
T-piece polyprop Dipole centre		1.60	(0.25)
Small ceramic egg insulators		0.60	(0.20)
Large ceramic egg insulators		0.85	(0.20)

CABLES ETC.				
URM67	low loss coax 50 ohm	per metre	0.75	(0.25)
UR76	50 ohm coax dia. 5mm	per metre	0.30	(0.10)
UR70	70 ohm coax	per metre	0.35	(0.10)
UR95	50 ohm coax dia. 2.3mm	per metre	0.40	(0.10)
4mm	Polyester Guy Rope (400kg)	per metre	0.20	(0.10)
50mtrs.	16 swg hard drawn copper wire		6.95	(1.50)

GOODS NORMALLY DESPATCHED WITHIN 24 HRS.
– PRICES CORRECT AT TIME OF GOING TO PRESS
– E&OE

MAIL ORDER AND RETAIL

BREDHURST ELECTRONICS LTD HIGH ST, HANDCROSS, W. SX. RH17 6BW (0444) 400786

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

LET me start the column for this month by remarking that it is the first time 'under new management': the situation from now on is that *Short Wave Magazine* has joined up with the *Practical Wireless* team and in future Dick Ganderton, G8VFH, will occupy the editor's chair, thus enabling me to slide gently into retirement and sloth. Not completely, though, as there are plans afoot which involve me continuing to write the odd column in the long term, and keeping my nose to the grindstone in the short run!

I have greatly enjoyed my ten-year stint as editor of this august journal, which started life 50 years ago next month under the energetic leadership of Austin Forsyth, G6FO, who reigned supreme on *S.W.M.* for forty years. I wish Dick and *Short Wave Magazine* every success for the future and offer them every support.

The Bands

It is still not finally certain that we have truly gone through the bottom of the sunspot cycle. At the moment of writing there is 10/10 cloud and the countryside has gone all white and mushy, neither of which encourage serious thoughts of looking at sunspots, or even venturing outside. Not all of us feel the same: in sight of the window, a large Alsatian-sized dog and a small Peke-sized one are playing together and with a pensioned-off plastic cone such as are used at roadworks; they seem quite determined to leave no snow unturned.

Seriously, the period under review has shown the bands displaying all sorts of quirks; W and VK are reported as having been noted on Ten, and DX has been noted on the other bands at appropriate times, and there is even a rumour of a clear channel found on Eighty! Perhaps we should turn to the reports and see what the feelings about it all are.

Ten Metres

G4ZZG (Warrington) kicks off here and Charles notes that some of his recent letters have probably failed to come home to roost — perhaps we need pigeon post! Charles has been as usual monitoring conditions on Ten, particularly by way of lunch-time CQ calls using phased verticals in both E-W and N-S directions. However it was almost a blank month save for December 11, when at 1157 SM2RMK came back on CW with an RST 529 report on Charles' 40 watts from a pair of 807 valves, which makes G4ZZG wonder if he would have been heard at all with his TS-120V running barefoot. The other QSO was again a CW one with G0CWM, on ground-wave. Charles is now wondering whether lunchtime is the best time, although he does concede that almost any time *might* produce replies.

GM4WJA (Elgin) comments that although the odd beacon has been heard, the band is usually dead until a contest or similar activity brings the signals on to the band. Activity around G was noted on November 27, and on 29th EA8AJS was worked at 1120; on November 30 between 0835 and 1000 UA6AGR, SV0CV, and VE3FXT/P/ZS4 were booked in, while on December 6 at 1030 there was ZS6BBP. On 11th between 2115 and 2215 a couple of IKs were raised and the next day a gaggle of DLs and an F around 1900. December 13 was quite a red letter day as around 0500 to 0230 some EUs were worked, followed between 1025 and 1810 by 5B4SA, *thirty* assorted EUs between 1545 and 1645, L4D, and three local GMs. 35 contacts in the day! December 14 gave G4YLO, YU, I, SV8EP, RA6NMJ, RB5INI, SV5RW, HA and G stations. In the gotaways we noted that on the same dates such DX as 5B4SA, ZS, EA8, LU, TA2AB, 9J2FC (who was underneath an S9 Italian), 4X6TA, and 9H1IF were heard.

G3NOF (Yeovil) didn't catch the openings, save on December 14, when he noted around lunchtime several Europeans, plus OA4OS and PZ1AC, but no contacts were made.

Reverting for a moment to G4ZZG he notes how, during the Contest, KP2N gave the band a going-over but neither Charles nor G4HZW (who is in groundwave range) could raise the chap; he seemed to have been the only Statesider in the contest who was willing to try the band. The pick of the crop, though, had to be N9AG/J6L working Gs around noon on November 28th.

Eighty

One has to be an *operator* on SSB in order to work DX on this band as well as having a good aerial and getting RF away. However it isn't quite so bad at the CW end where for instance the QRP Club members hide out. G2NJ's notes are always useful of course, and this time are accompanied by a note from GW8WJ of TOPS who says that some joker has been pirating the GW8WJ call; cheeky with it, the character actually has the nerve to come up on the 3508 kHz net frequency when Phil is on and accuse the real GW8WJ of being a pirate! Of course the DTI/RIS have been informed, but meanwhile it should be noted that the real GW8WJ does not ask for QSLs *via* the Bureau, and the pirate has been known to give QTH as Mold or North Wales. It is believed that the pirate is in fact the holder of a legitimate callsign — be warned, chaps!

To return to G2NJ, Nick notes that GI3OLJ of Bangor has met with an accident which may have delayed his return to the Seattle area. On the QRP front, G3BOV (Peterborough) was worked on his new QRP rig and Elaine, G0ATS, down in Cornwall. G3KPO was noted on the band using an old W.W.I vintage key, although Doug did say he would have liked a little more beef in the return spring. Nick mentions the Straight Key Event on the evening of February 7, 1600-1900 GMT. The exchange is RST plus serial number, class letter, name and age (YLs give age as "xx"). Class-A is ten or less watts input, or five watts or less output, Class-B 100 watts input or less (50 watts output), Class-C is 300 watts max. input (150 watts max. output), Class-D is SWL; CW only of course and only straight keys. The Gs will be on 3510-3560 kHz and the scoring is as follows: Class-A—Class-A nine points, Class-A—B seven points, A—C five points, B—B four points, B—C three, and Class-C—Class-C two points per QSO. Send logs to carry time, band, call, serial number in and out, class, station description, points claimed, and a signed declaration to: Freidrich Fabri DF1OY, VOR DEM Steintor 3, 3017 Pattensen, W. Germany, posted before February 28; if you want a copy of the results, enclose an s.a.e. and 1 IRC. My only comment is the weird power input and output relationships which seem bound to cause trouble; we foresee people being in more than one class depending on how their power level is measured!

G2HKU (Sheppey) offers W2BA and K2MGR on CW with the big rig, while on the QRP one he found OK1FFZ, GM3KPD, and PA0RU.

Top Band

The arrival of the ON's on the band has proved to be the big event of the month and immediately ON4UN was putting out his enormous signal; not surprising when one considers just how much wire he has in the ground, but some of the ON's jumped the gun and were active as early as December 27.

G3BDQ (Hastings) says that for him the highlight was working KL7Y on the morning of January 2; before this season, KL7s were a mere dream on Top Band for

most of us, the path lying as it does right over the north polar regions. Not satisfied with that, on January 4, KL7H was heard at 579, and G3BDQ wraps it up by saying that he recommends DX to the elderly as hooking that KL7 has made him feel ten years younger! The receiving loop and its special low-noise pre-amp are found to give a signal/noise ratio improvement of up to *three* S-points over receiving on the transmitting aerial. During the period under review some 69 assorted Ws were worked, including N. Dakota for a new state, plus nine VEs. W2XN at around 0110 was worked, while screwing the power right down to one watt the W was still reporting RST559. The interesting part of this month was to note how, when the West Coast W9, W0, KL7 and so on signals are present, the East Coast ones seem to just vanish — just like a skip effect which it probably in fact is. On a different tack, last time we mentioned WB9HAD and his tower plus six miles of radials: G3BDQ reckons he is always a 59 + signal, and even such as G3RBP have now got some 200 radials out.

The thought of the G-QRP Club lads and lasses is towards establishing a calling frequency (mentioned in his letter by G2HKU), and we wonder whether anyone has a suggestion to offer? Difficult in fact, if one takes into account all the odd national allocations on the band. Ted seems to have been up to the G3RJV hideaway, at Rochdale, and had a whale of a time although the search for the G3RJV missing black pea tanker was *not* successful! The whole affair seems to have been something of a clerical rave-up. Ted maintains his strength, though, and his Top Band offering included ON4JR, ON4IN, IK1IET, SM6DYK, OL1BNG, OE6BWG, 7S6FRD, DF5KD, SP9DH, AA1K, W3FV, N2GUV, K5NA, HG9R, GM3GNM, HA8UB and RA4NBG. We wonder if the last-mentioned realises the significance of the back-end of his call?

There is no doubt whatever that the loop aerial is the thing for any Top Band operator who hasn't room for, say, a Beverage. The writer has been playing with one of late, a conversion in fact from a BC-band loop; it has been found that it helps to have adjustable coupling between the main winding and the secondary of one turn so that one can compromise between the higher 'Q' values and wider bandwidths as one scans over the band; it has been a revelation to the writer and I am quite sure that I haven't by any means squeezed everything out of it yet. More on the beastie at some time in the future.

Forty

Quite a surprise to have a new reporter on this band. We used to have the odd note from GM3JDR before he moved from Golspie, and others have mentioned it in passing of course but the regular users have always kept quiet about it.

G4ZOB (Roundhey, Leeds) is one who reports this time. We were amused to note he first got the 'bug' back in about 1957 and passed RAE in 1960, at which time he promptly lost interest until 1983. However in that year the pass slip was dusted down, the Morse test taken and passed and QRP operation commenced, although we gather there is now a QRO rig to hand. The aerial is a fixed vertical two-element array aimed at the west and in the past few weeks Peter's 'pick of the crop' included 4K1A, 5T5XX, 6Y5JH, CE0ZIG, CX6BM, HK1KXA, FM5BH, OA4ADX, PZ1AV, TI2PI, XE2AHQ, ZP5CA, JAs, VKs, ZL, W6 and W7. G4ZOB reckons that the casual user of the band is maybe fooled by the way the band will be unproductive for two or three evenings, followed by an evening when it is bursting with DX from, say, South America. No doubt a resumption of reporting on this band will indicate to others that they can winkle the DX out too, so a firm welcome to G4ZOB.

G2HKU's log of 7 MHz contacts included CW to YN3EO, FM5BH, DL1RK/5B4, N4UB/3, K5MA, K2MGR, and D44BC.

Another one to offer information on the band is SWL Keith Rogers of Coseley. Clearly Keith is, as it were, Forty-oriented, and he describes the band as superb for intercontinental working at any stage in the sunspot cycle; since he has been reading this piece (see — we do have a reader!) for twelve years now, it is a fair comment on the band. On the other hand, Keith is also aware that the BC QRM is an unmitigated pain, as he says. Anyone who is prepared to persist with the band into the small hours will be surprised at what is to be found. During the autumn lift period, say October-time, the band will open to JA as early as 1430 followed by Asian Russians and the Middle East. Around 1700 S.E. Asia appears, though often beneath the BC QRM. Start again around 2100 and there is a quieter period until around 2300, when the Caribbean appears along with South America; by 0100 the European QRM has gone away. At 0400, when the Pacific appears, to 0500, and the VK/ZL stations up to 0600, and on to around an hour after sunrise. Not bad is it? To back it up, Keith sent in a log of his hearings over a month, too long to use, and with no dross we could excise. He makes his point very fairly!

New Bands

There is only one report this month, that from G2HKU; Ted worked N4UB/3 and W4DHZ on CW.

Oddments

That KD7P expedition to Peter 1 Island was a busted flush, though not in fact Bob's fault. It appears that the ship was within 50 miles of the island but could get no nearer; only one helicopter was serviceable, and the captain would not permit it to take-off lest the party be stranded on the island by a mechanical failure with no back-up and poor weather. However, the LA-DX group will leave ZL on January 10 and the trip will take 15 days, with five days actually on the Island. The LA DX Group say they would prefer dollar bills from those who QSL direct, although they will respond if IRCs are used; the IRCs are much more difficult to handle and less economical than dollars for them. The QSL Manager will be LA6VM.

That 7P8BE was VE3FXT, and it is said that George has made some 12000 QSOs on this African tour.

S79LJ, on from Bird Is., was G4LJF, and QSLs go direct to him.

The Mellish Reef Expedition, VK9MW, is now firming up nicely for August 1987; a boat has been rented in Cairns, Australia, and we understand that Kirsti, VK9NL is treasurer for the operation. CW operators are needed for this one, and those interested should contact K4ADN.

"CDXN" deadlines for the next three months:

March issue — February 4th
April issue — March 4th
May issue — April 1st

please be sure to note these dates

G3SEJ/MM is *en route* for the Falklands, with the intention of applying for authority to operate from South Georgia, South Sandwich, and South Shetlands. In addition VP8BLQ hopes to visit S. Georgia during the last week in January, so he may still be around by the time you come to read this.

If you are still looking for C21, Nauru, C21NI has been heard on 7004 kHz in the mornings, working G4BWP. The operator was FK0AT, who was to move on in due course to YJ and FW. QSLs go to FK0AT.

Those thirsting for a contact with Libya should look out for 5AOA around 21005. He has been heard repeatedly calling CQ and getting no takers! It is understood that the paperwork is identical to that obtained by G3JKI, and QSL Manager SP6BZ is confident that this operation will be accepted in due course by the DXCC desk. The QSL cards are at the moment being printed.

The new VK0 calls emanating from the Australian Antarctic bases are probably the result of the crew changes which should give somebody a little extra interest, and we hear that VK0DA is active and working people quite strongly.

Glorioso, FR/G, should be active at the time this comes to be read, the operator

being FH4ED. It is understood that when he gets there he will remain for about a month, and be followed by FH4EC who will also spend a month there.

Twenty

Our first reporter on this band is VK4CPD/MM aboard the *Mobil Flinders* and stationed in France. His letter indicates that he is now operating an Atlas 210X on CW and SSB and has in addition a two-metre rig, although the latter has made just one contact, through the Marseilles repeater to the surprise of the other users! The ship is Australian manned and owned by Mobil Australia, but on time-charter to Exon, regularly running round Western Europe and the Mediterranean area, so he hopes to work many Gs, particularly as he used to be G3PLQ at Salisbury and then Burnham-on-Sea. Looking at the log extract page, on Twenty we find him working G4LGI, G3MUL, UB4EXP, PA3AOB, DL1EBP, G3WRU, HA5KKN, G0AEP, G3BAZ, IK4HLD, EA2BEF, IK1ICC, N5BYR.

G3BDQ mentions just one SSB QSO on Twenty with a VK6. A couple of non-DX type amateurs were visiting the station, and just to demonstrate John put out a CQ on Twenty SSB, and right back came VK6YQ, who gave 59. John then had the difficult task of explaining that it was not all a pre-arranged contact.

Turning to G2HKU, Ted offers SSB with ZL3FV, ZL3RS, plus CW with W4DHZ, W2LZX, YO4AHG/MM and K4XU.

G3NOF now; Don found conditions were very similar to last month. The long path 0800-1000 with ZLs to start, followed later around 0900 by VKs. VK8SS was heard several times around 0900 and VS6DO around 1000, both long path. No other Pacific stations were noted. The short path didn't seem to be as good as previously, although around noon there were a few openings to DU, VK and YC. Some West Coast Ws were good for short periods around 1600. Although the band was generally dead by 1800 there were some openings such as Africans at 1830, West Coast Ws at 2030 and VE67 at 2200. It totalled to SSB QSOs with BV2HA, C56/G4LJA, C56/G4PCB, C56/G4YRM, CU7GA, D6QL (Yasme), FK5FS, G4DUW/DU1, K0DD (S. Dakota), KA7TRL, KB7SU, KM6B, N9AG/J6L, OY2J, VE2LJ, VE6AKY, VE6KL, VE7DGI, VK2AGA, VK2ALH, VK2CLB, VK2CU, VK2DTR, VK3AHT, VK4AI, VK4UF, VK6AAO, VK6RG, VP2VA, VS6DO, W6KPC, W6KTE, W6PU, ZL1ADG, ZL1BQR, ZL1DM, ZL1NU, ZL2AHT, ZL2NM, ZL3QA, ZS6AAC, 5N9SRC, 5V7WD, and 7P8BE.

The other reporter on this band is G4ZZG, Charles has now put up an inverted-V dipole on the gable end of the house, one leg going across the roof and the other descending rapidly into the garden but giving an apex angle of about 105 degrees. Results are better than with the two verticals, and on 26th at 1640 on CW he made it to Mauritius with 3B8CF. 3B8CF may be old hat to G3NOF, says Charles, but it raised G4ZZG's spirits. The inverted-V, plus pair of 807s, is certainly putting the 'ham' back into Amateur Radio!

Fifteen

G2HKU offers CW with W1WEF, W8JBR, K2AGJ, W7LNI, CX5BW, N4VZ, N4UB/3, 4X4DX, K9QVB, WA4CNJ, VP8PTG (Walker Creek, Falklands, and *ex*-G4PTG).

VK4CPD/MM offers as his contribution VU7AJQ, NI2B, UP2BZZ, SP8ZHY, ZC4EE, HB0CZS, G0CBH, G0DRM/M, G4WXZ.

Turning now to G3NOF, Don made SSB QSOs with A82RL, D6QL (Yasme), HK1LAQ, TI2LTA, VE3FXT/H5, VE3FXT/ZS4, VI5AQZ, VI5NVC, VK3EW, VK3KF, VK5PGH, VK6AHW, VK6KMW, VK7KMR, W8ILC/J6L, VP9JY, ZD7CW, ZD8RP, ZS1LW, ZS2JL, ZS2ND, ZS3Z, ZS5JF, ZS5NZ, ZS6AZJ, ZS6JCF, 3B8CA, 3C1MB, 7P8BE, and 9J2LG.

Bits & Bobs

G3KPO writes from the Wireless Museum on the Isle of Wight, to comment on the amusing cartoon by GW3COI in the January issue. This showed what was supposed to be a Zepp aerial but G3KPO points out that this was a misnomer as it was quite clearly a dipole with open-wire feeder, in the centre. The main characteristic of the Zepp, of course, was that it was always end-fed, normally a half-wavelength long and whilst one wire of the feeder was connected to the aerial the other was left 'up in the air' so to speak. The aerial was originally designed for use with the Zeppelin airships.

We were highly amused by a letter from G3AAJ, of AMSAT, who wrote to ask whether he could quote from an article in *Short Wave Magazine* dated, would you believe September 1949, p. 530, which discusses the business of an SWL visiting an amateur, in somewhat ironic style.

Next we come to a letter from G4RVV, regarding the question of GB QSLs and the RSGB Bureau. He says that over a year ago he took over the GB sub-manager's duty from the late Mr. Newman, but although this was published in *Radio Communication,* and printed in the 1986 Call Book, envelopes are *still* being sent to the address of Mr. Newman, and indeed to his predecessor! Mrs Newman has in fact now moved. Temporary arrangements have been made to forward any mail to G4RVV, but obviously this cannot continue indefinitely. Would readers therefore *please* note that all envelopes for collection of cards for GB stations should be sent to G4RVV-QTHR in 1985-on Call Books. If you have any ideas of how many cards there will be, send in envelopes to suit — a 5 x 7½ inch envelope and 13p stamp will hold about 20 cards. Send the cards in to G3DRN or G4RVV as soon as possible, and don't wait for the arrival of the GB station's card. Cards arriving at G4RVV a year later may well never be collected if it was a one-off event. Uncollected cards are only held for three months and then destroyed.

The G-QRP Club writes to cover the OK-G QRP tests; these will be on January 31 and February 1, 1987 and may thus just be noted. The time and frequency schedules are as follows: 0800-0900, 7030 kHz; 0900-1100, 10106; 1100-noon, 14060; noon-1300, 21060; 1300-1430, 14060; 1430-1500, 10106; 1600-1700, 7030; 1700-1900, rest; 1900-2100, 3560 (or alternative 3570-3580); 2100-2300, 1900 (alternate 1840 and 1815 KHz). The same routine on both days. Send logs to G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND.

An interesting letter from G2BUV, *ex*-ON4KT. Ted notes that we made some comments about ZA operations, and he writes enclosing a QSL card which he got from an operation in ZA back in 1957, when DM2ABC had permission to operate from June 12-15 — and G2BUV was one of the lucky ones to make contact.

A letter from G3ATU starts off by remarking that "this is a voice from the past calling G3KFE!" (We wonder whether this in one of these wonderful long-delayed echoes?) Stan has just hooked 5AOA on 21005 CW and wonders whether he is the same as 5AOAA mentioned last month. We don't know for sure.

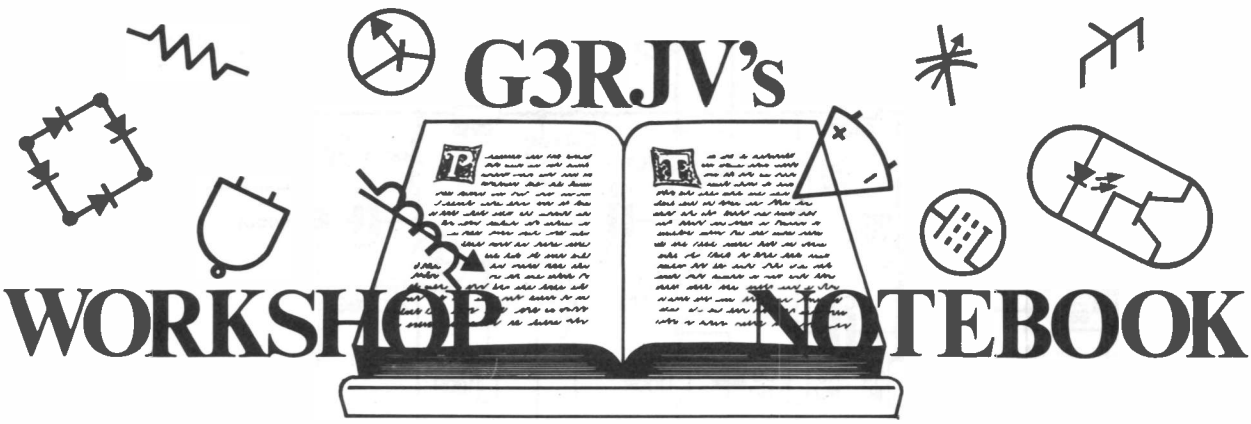
W1WY's Contest Calendar next; we see the February 14-16 slot occupied by the YL-OM contest, and on February 21-22 the ARRL DX Contest CW leg, the rules being as per last year. Over the weekend February 28-March 1 a delightful one (but one doubts there'll be any U.K. activity) called the "Rat's Nest and Crooked Stick Sprint" and goes from 2300 to 0400 GMT.

A note from G3ZPF indicates he has nothing to report this time apart from the arrival of the second 5BDXCC plaque to replace the original tatty one; plus the arrival of David's GW4OXB 100 Prefixes plaque which is really superb — except that the engraving shows him to be G32PF!

The last one is a letter from Mr. Heriz-Smith of the DTI RRD who points out the next Class-B licence prefixes will be in the G7 series once the G1 series are used up.

Finis

That's it for this time. For the next one, please note the **new address for your letters** namely "CDXN", *Short Wave Magazine,* Enefco House, The Quay, Poole, Dorset, BH15 1PP. See you next month!



"THE SEVEN-YEAR ITCH"

Another Look at the S.C.D. Transmitter

To Quote . . .

"It is something of an irony that at a time when technology is leaping ahead at a pace that leaves most of us gasping for breath, groups have arisen in most scientific fields which emphasise simplicity. Most of us have read about "Appropriate Technology" groups, and in America the slogan K.I.S.S. (Keep It Simple Stupid!) has appeared."

SO began an article which I wrote for this magazine seven years ago in January 1980. I suppose I could have easily began an article of today with the same words. Perhaps in 1980 I thought that technology was moving towards greater simplicity and being more appropriate for the tasks in hand. How wrong can anyone be! The opening sentences might not have been prophetic but the article itself was well received. By the way, if you do happen to have a copy of the January 1980 *Short Wave Magazine* and decide to look at the article, let me tell you that *there should not be a capacitor between L2 and the base of TR4.* I don't want to start the correspondence on that one again! Nor do I want the letters asking me what "S.C.D." means. At a loss to think of a snappy title for the project I used the initials of my eldest son: Stephen Christopher Dobbs.

The article was the first in a series called "The S.C.D.: A Low Cost, Low Technology, Amateur Bands Transceiver Project". That first part described the Transmitter Board. Later articles went on to additional circuit boards to form a complete simple transceiver. Usually old magazine articles are best left to die a quiet death as they are superceded by the more youthful later contributions. Somehow, the S.C.D. seems to have gone on beyond its years and respectability.

Last year I saw it appear in extracts in the journal of the Australian QRP Club and a few weeks ago I worked a station on 80 metres who was using an S.C.D. transmitter. At about the same time John Beech, G8SEQ, wrote to me about versions of the S.C.D. that had been recently attempted on 80 metres. So that gave me an itch to go back and rebuild the S.C.D. again for myself. I already had a spare etched circuit board: the G-QRP Club used to sell etched S.C.D. boards.

These days there is a lot of QRP CW activity on 80 metres therefore I decided to build the new S.C.D. for that band. In its original form the circuit ran about a 1 watt of RF output on a good day. The power limit for claiming valid QRP QSO's for the G-QRP Club is 3 watts of RF output, so I decided to make the S.C.D. Mk.II capable of delivering the "legal limit".

The circuit diagram of the S.C.D. Mk.II is shown in Fig. 1. The oscillator is still the FET Colpitts circuit of TR1 followed by an FET buffer, TR2. I choose to use the J304 FET transistors that *John Birkett* has been selling cheaply, although the original 2N3819 transistors or the J310 would both do the job. The variable capacitor, VC1, provides a little upward frequency movement of the crystal to allow TR1 to be a Variable Crystal Oscillator (VXO). The capacitor I used for VC1 is an airspaced variable of around 50pF but my original tests were done with a 65pF foil trimmer. It is only possible to pull the frequency a few kHz (usually about 3 kHz) and if the value of VC1 is too large oscillations will cease if too much pulling is attempted.

TR2 is the driver transistor. This stage needs a little bit of "wellie" to drive the PA, TR4, into Class-C. The original S.C.D. keyed the emitter of TR3 but this technique could give rise to problems if the leads to the key were long. In this version the power supply to TR3 is keyed using a DC switching transistor, TR5. The emitter resistor, R8, is then used to control the drive to the PA. The switching transistor, TR5, is a *pnp* type and any *pnp* device capable of handling the current drawn by TR3 would serve the purpose. C9 provides slightly softer keying and C7 decouples the keyed supply line. The RF choke in the collector of TR3 is homemade from 7 turns (try and get the 10 on if you wish) wound through a ferrite bead.

The PA stage uses an altogether beefier device, the 2SC1096 transistor which is available from *John Birkett* for about 40p; although an audio transistor, it is still very happy at 3.5 MHz. The coupling transformer, T1, has changed in that a ferrite core is used as the former. The original circuit used a T-50-2 Amidon toroid, which is a powdered iron core, but for broadband power transfer applications ferrite is better. I had an Amidon FT-50-43 ferrite core so T1 was wound on that but I suspect that many surplus ferrite cores of an outer diameter of about an inch would be suitable.

Another change to the PA circuit is the addition of a loading resistor, R9, across the secondary of T1 to aid stability. Usually lower values than 100 ohms are used in this arrangement, the

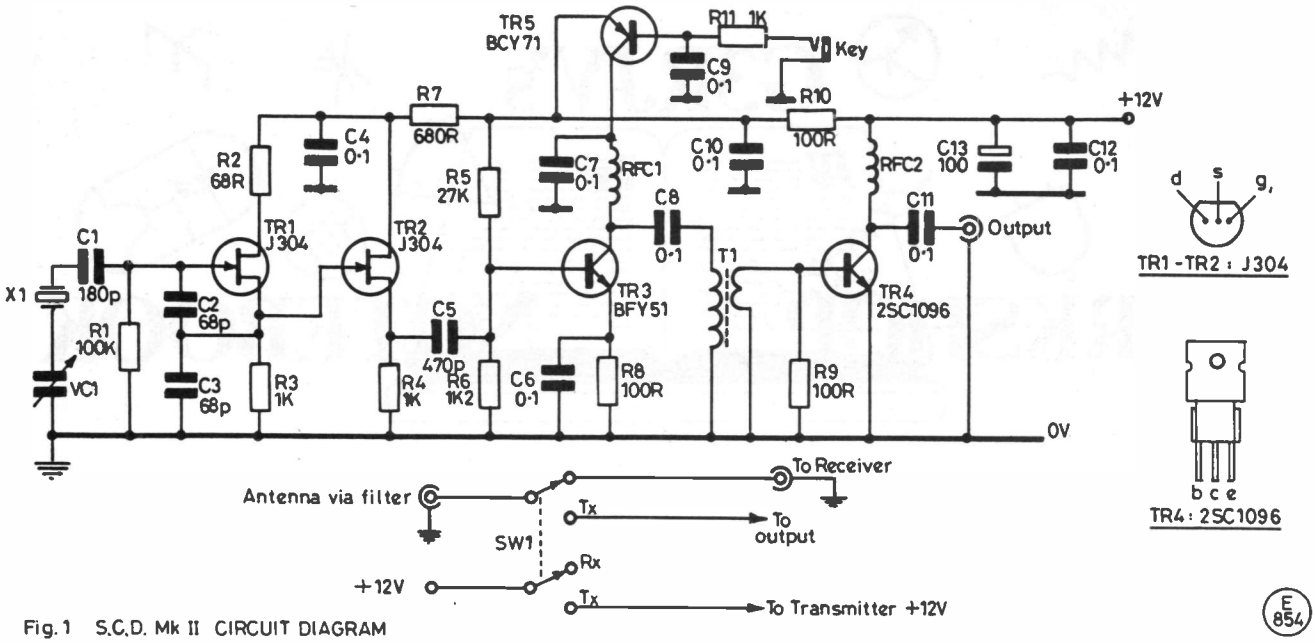


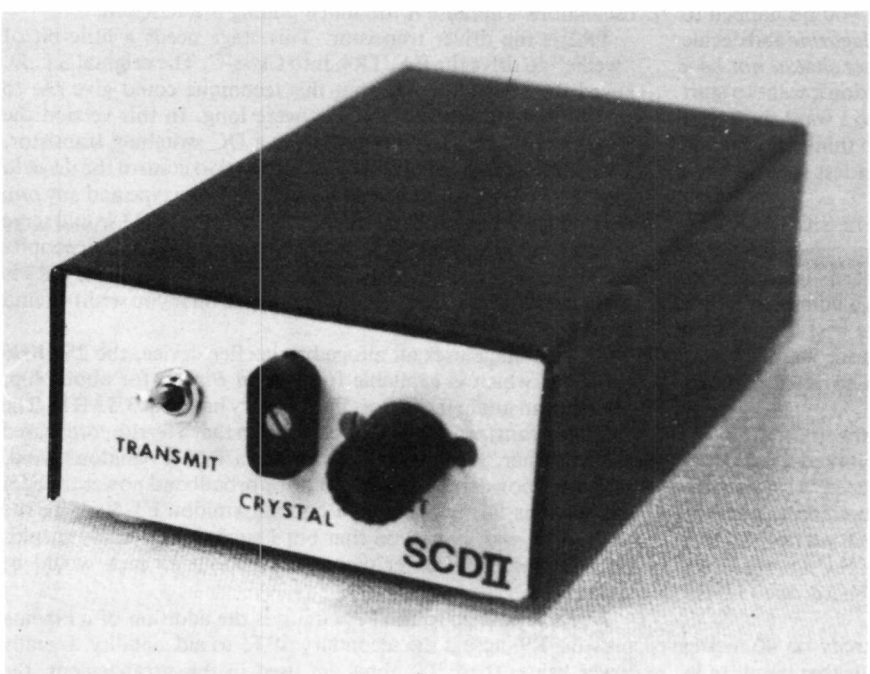
Fig. 1 S.C.D. Mk II CIRCUIT DIAGRAM

Table of Values
"S.C.D. Mk.II"

R1 = 100K
R2 = 68R
R3, R4, R11 = 1K
R5 = 27K
R6 = 1K2
R7 = 680R
R8, R9, R10 = 100R
C1 = 180pF
C2, C3 = 68pF
C4, C7 to C12 = 0.1μF
C5 = 470pF
C6 = 0.01μF
C13 = 100μF 35v. elec.
VC1 = 50pF or 75pF variable
TR1, TR2 = J304
TR3 = BFY51
TR4 = 2SC1096
TR5 = BCY71 or similar silicon *pnp*
RFC1, RFC2 = 8 turns, 30 swg, thro' small ferrite bead.
T1 = primary 20t, 30 swg; secondary 5t, 30 swg, wound over earthy end of primary; former FT-50-43 ferrite core.
SW1 = double-pole changeover switch

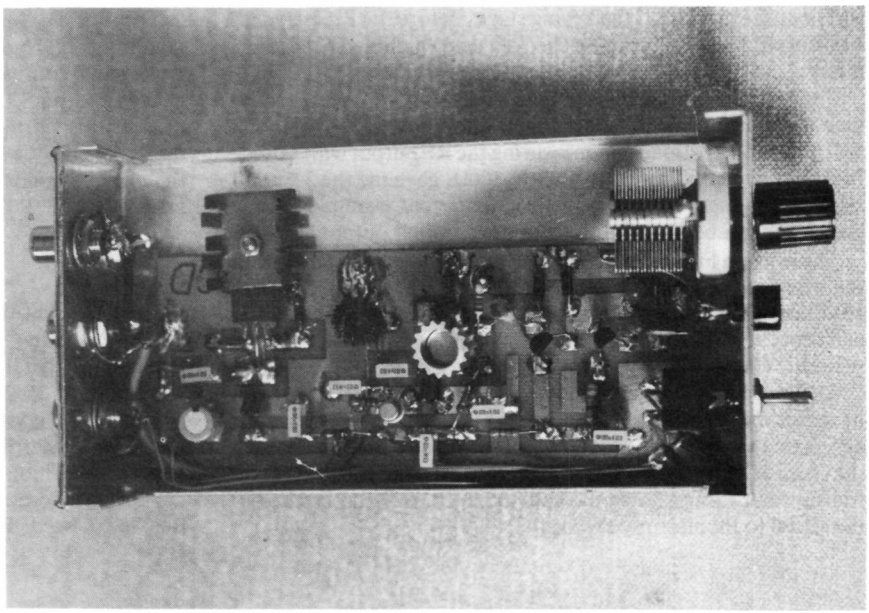
lower the value (10 to 50Ω is common) the more the power dissipated in the resistor, and the lower the output power of the stage. The value of 100Ω used in this circuit seems a decent compromise as the PA has shown no signs of instability even when hooking components into the stage during testing.

The PA collector load is another little homemade choke wound on a ferrite bead. The values given in the circuit, with R8 at 100Ω, gave me almost exactly 3 watts of RF output. One slight problem is that at this power level the impedance of the output, taken from the collector, will be somewhat less than 50Ω so this precludes the use of a 50Ω-in/50Ω-out conventional lowpass filter. It would be possible to wind a suitable matching balun transformer to suit a 50Ω lowpass filter but I just fed the output of the transmitter directly into my Z-match antenna tuning unit. An ATU which provides tuning, hence harmonic suppression, should be enough to clean up the signal prior to transmission.



The S.C.D. Mk. II

Inside the S.C.D. Mk. II



Building the Transmitter

The original S.C.D. was built on etched circuit board using the technique known as "island construction". In this system the components are soldered onto etched copper pads, these being on the component side of the board, so that no holes are required. Apart from the obvious advantage of not having to drill lots of small holes, the board will accept a wide range of physical sizes of component since they do not have to fit the hole spacings. It can be annoying when following someone elses PCB layout, or using a commercial board, to find that the available components, although of the correct value, do not fit the holes.

Although some constructors shy away from printed circuit board making, this board is very simple to produce. The etch resistant material is sticky backed plastic of the *Fablon* type. To make a copy of the board shown in Fig. 2, a piece of copper clad board of the correct size is covered with Fablon to mask the copper and the layout is drawn or traced onto the plastic in pencil; a ruler may be used to tidy up the lines and then they are cut using a modelling knife. The positions of the components between the pads are shown: note that each pad becomes a small island of copper. As much copper as possible is left on the board between the non-etched portions to form a ground mat. This not only provides a degree of screening for the circuit elements but also provides plenty of convenient points for short earth returns on grounded components.

The areas to be removed (the gaps between the islands) are then carefully removed from the board exposing the copper. The unwanted copper is removed in the usual ferric chloride solution. The plastic protecting the required island pads is pulled off and the copper surfaces cleaned with household abrasive. If the plastic has been evenly stuck onto the board, the islands should have neat straight edges. The board layout shows no holes for mounting the board but they could be added. I fixed my board to the bottom of the case with blobs of *Blutack:* what did we do before that stuff was invented. My S.C.D. Mk.II did not have a new etched board but used an old S.C.D. board hacked about to provide the extra pads for TR5.

The layout for the components is shown in Fig. 2. It is best to build the oscillator and buffer (TR1 and TR2) stages first and test these by listening for the signal on a receiver. Most crystals should oscillate in this circuit although some of the older 10XJ types can be sluggish. I used my range of 80-metre HC6U crystals bought over the years from the surplus stock of *John Birkett.* it is not a bad idea to test the circuit first without VC1 (short out its position) to hear the oscillator run.

The positions of the windings of T1 are shown in the layout of Fig. 2, (attempt to keep the leads on T1 short). The PA transistor, TR4, requires a heat sink. The layout shows that I mounted my TR4 horizontally which means bending the leads of the transistor; take care if you do this, these leads can fracture if not bent carefully. It is quite helpful to build up the two stages TR3 and TR5 before the PA is added, and they can be tested; this at least

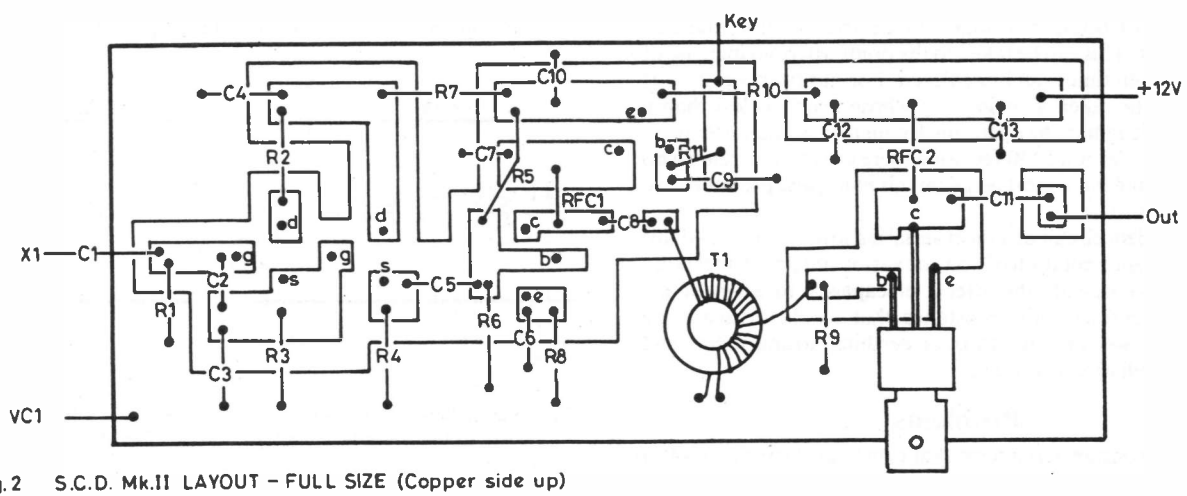


Fig. 2 S.C.D. Mk.II LAYOUT – FULL SIZE (Copper side up)

sorts out the driver and the keying stages before the PA is added. The output from T1 could be checked using a diode probe and a meter.

The completed circuit must be tested using a low impedance load for the output, say by feeding it into a wattmeter/load or a 50Ω non-inductive load and measuring the RF output with a diode probe and meter. The value for R8, 100Ω, gave me the 3 watts I required, though this may vary with different examples of the board; R8 can be adjusted to form the required output.

The inset on Fig. 2 shows the switching arrangement I used with the board. It is simply a double pole change-over toggle switch. Half the switch changes the antenna from receiver to transmitter and the other half applies the 12 volts to the board during transmit periods. The RF Change-over circuit I described in December's "Notebook" could be used in this circuit but a switch would still be required to apply the 12 volts on transmit. The board could not be left on the whole time because the oscillator would be heard in the receiver during receive periods. I did not mute the receiver on transmit but turned down the audio gain control and listened to the signal to monitor my keying.

The S.C.D. Mk.II is housed in a *Minffordd Engineering* aluminium box type A25 which provides plenty of room. The only front panel controls are VC1 and SW1.

Well — the S.C.D. still lives and performs very well on 80 metres. It is worth looking at 3560 kHz as a possible frequency: this is the QRP Calling Channel. 3579 kHz is also used because of the cheaply available crystals on this frequency but sometimes some "heavy" RTTY is on this channel.

SOURCES:

The A25 All-Aluminium Box: *Minffordd Engineering,* Sun Street, Ffestiniog, Gwynedd. Tel: 076676-2572.

The 2SC1096 transistor (and perhaps 80-metre CW crystals): *John Birkett,* 25 The Strait, Lincoln, LN2 1JF. Tel: 0522-20767.

3560 kHz crystals in HC25U mountings: *P.R. Golledge Electronics,* Merriott, Somerset. £4.00 ea. (£3.50 to members of the G-QRP Club).

FT-50-43 cores: *TMP Electronics,* Unit 27, Pinfold Lane, Buckley, Clwyd. Tel: 0244-549563.

• • • "Practically Yours" • • •

with GLEN ROSS, G8MWR

I HAVE received several letters from readers asking for a simple explanation of the effects of inductive and capacitive loading of aerial systems and how it affects the performance compared with a full size aerial. Let me say straight away that there is no such thing as a simple explanation of these things and that I am not a top authority on aerial systems. If you really want the full inside information you will need to consult the text books, and particularly the writings of Les Moxon, G6XN, and John Heys, G3BDQ. However a simpler introduction may not come amiss before you struggle with weightier tomes on the subject.

The Basics

The basic idea of inductive or capacitive loading, or even a combination of both, is to make an electrically short radiator more efficient. This can be taken to the point where an increase of efficiency of ten times can be achieved. For our purposes a short radiator can be taken as being one whose length is less than a quarter wavelength at the operating frequency. As a quarter wave on Top Band is around 130 feet long there are few amateurs who can use anything but a short aerial on this band, and probably also on eighty metres.

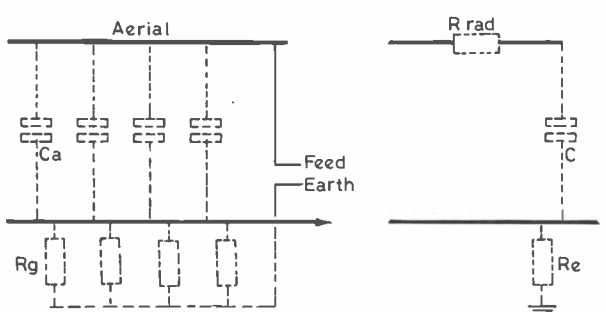
The equivalent circuit of a short aerial is shown in Fig. 1 and this also shows a representation of how the various circuit elements are obtained. C represents the effects of capacity to earth of the system, Re represents the resistance that would dissipate the amount of power lost due to poor earthing arrangements and Rrad is the radiation resistance.

Problems

Radiation resistance is a term that causes problems to a lot of people in that it seems to indicate the aerial's wilful refusal to radiate. This is *not* the case, and in fact the opposite is true. As far as the aerial is concerned all power radiated is a loss of power because it is no longer in the circuit (aerial). The efficiency of an aerial can therefore be calculated as the equivalent resistance that would dissipate the power radiated (lost). Obviously, then, the more efficient the aerial and the more power it actually radiates the *higher* will be the radiation resistance. This sounds all wrong but if you follow the argument through carefully it should become clear.

Loading

For our example we will use a four-foot rod aerial and assume that we are going to use in on Top Band. This may sound ludicrous, but it would be around the length that you could



Ca Capacity between wire and earth. C Capacitive effects
Rg Power wasted in ground losses. R rad. Radiation resistance.

Fig. 1

E 866

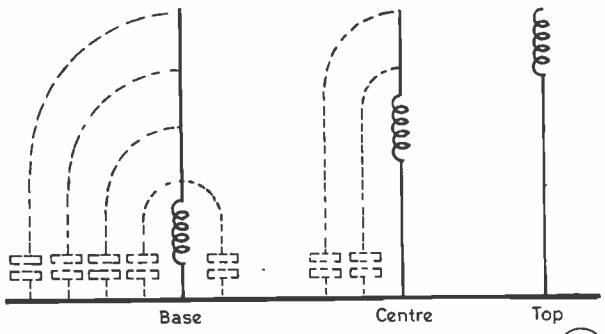


Fig.2 Methods of inductive loading.

conveniently use as a mobile whip and it does produce some figures which are large enough to grasp and where improvements of a few percent make noticeable changes in those figures.

The usual way to get this aerial to work would be to inductively tune it with a loading coil at the base of the aerial. We now run into a problem; the loading coil itself will have losses due to the resistance of the wire and its capacity to earth, so the available RF power is now shared between the radiation resistance, the earth resistance and the coil losses.

Earth Resistance

Let us see what sort of earth resistance we may get in a typical system. It is impossible to give an exact figure as it will depend to a large extent on the nature of the soil and how much moisture there is around the earthing system. If we assume that you have driven four or five one inch copper tubes into the ground to a depth of 10 feet or so, then you would probably find an earth resistance of around ten ohms. This represents power lost and the only way you can get round this is to drive in more pipes or bury a huge earth mat of wires. The use of a counterpoise earth is not a satisfactory answer because this will have capacity to earth and so will generate earth currents, and hence losses.

Radiated Power

With a four-foot rod so much inductance is required to bring it to resonance that even a very high 'Q' coil may have around twenty to thirty ohms resistance. The rod itself will have a radiation resistance of less than 0.1 ohm and, as all these resistances are in series, only 1 or 2 percent of the available power will be radiated. If we call the losses in the coil Rc then the percentage of the power available which will actually be radiated can be calculated using

$$\frac{\text{Rrad}}{\text{Rrad} + \text{Re} + \text{Rc}} * 100 \text{ (percent)}.$$

The approximate radiation resistance of short aerials on Top Band can be obtained from the following table:—

Table 1.

Length in feet	*Rrad*
10	<0.5
20	<1
30	1.5
40	2.75
50	4.0
60	6.0
70	8.0
80	12.0

From this table it is obvious that any vertical that the average amateur can put up is going to have a Rrad of under three ohms.

Analogy

The idea that a loading coil consists of enough wire to make up the amount needed to increase the length you have up to a quarter wavelength, whilst it may be a simplistic way to grasp what is going on, is not what is actually happening. The inductance in the coil is actually tuned by the capacity existing between the part of the aerial above it and earth. This is shown in Fig. 2, which also shows the three common ways of installing the required inductance and illustrates the way in which the effective tuning capacity which is available decreases as the coil is moved up the rod. When the coil is at the top of the rod it is tuned only by its own self-capacity, there being very little capacity to ground. Under these circumstances the contribution to radiation efficiency would be virtually nil and we could get a greater increase by short circuiting the coil and simply using it as a rudimentary form of "capacity hat".

The Hat

This is a device for increasing the capacity of the aerial to earth and means, in the case of a coil loading arrangement, that the number of turns required is less and therefore the losses are lower than without it. If we double the aerial capacity then we need a coil with only half the original inductance to bring the system to resonance. For the same 'Q' value this will have only half the losses of the original coil; if the coil losses were originally greater than the earth losses, this can result in a doubling of radiated power. An extra improvement can be obtained because we can now use a larger diameter wire to wind the coil and hence reduce the losses even more.

Radiation

Let us put some figures to the example four-foot whip on Top Band and see what we come up with. We will take ground losses as equalling ten ohms, although this would be exceptionally good for a mobile installation and assume a lossless loading coil. Under these conditions the maximum efficiency which could be expected would be around 0.5 percent and so, using a ten watt transmitter, a radiated power of about 20 milliwatts would be obtained. In the real world coils have resistance and a typical loading coil would have a 'Q' of around 150. This, using normal construction techniques, would have a resistance of about 50-60 ohms and would give a radiated power of some 5 milliwatts of power and an efficiency of about 0.07 percent. If we were able to make a coil with a 'Q' of around 350, and that is far from easy, the coil losses could be reduced again by a factor of some 50 per cent, or perhaps a little more, resulting in a radiated power of about 10-12 milliwatts from our ten watt driver.

Extension

The only other solution is to lengthen the whip; let us use an increase to eight feet as our new example. This has an immediate advantage because the radiation resistance increases as the square of the length of the whip. Thus we have, for the same earth and coil losses, quadrupled the Rrad. Even more is to come because the capacity of the whip to earth is now double what it was, and so a significantly smaller coil (and hence even lower losses) can be used to bring the system to resonance. The total effect of all these points is to raise the efficiency to something in the region of 1 percent which is about a tenfold improvement over the original four-foot design. If we increase the length to twelve feet we get another doubling of radiated power without counting in the improvement due to lower coil losses.

Final Notes

It is hoped that this article may have cleared up a few points for you. There is a lot more to aerials than this simplified and "bare bones" approach can show. That the figures given are generalised is due to the fact that it is very difficult to be precise. That is one of the joys of aerials; there is still plenty of scope for a "suck it and see" approach. We have used Top Band as an example but the general ideas are applicable to any band; only the figures will change!

An Indoor Aerial for the HF Bands

practical details for a loft-mounted radiator

P.C. COLE, G3JFS/DA1PE

AS permission to put up an outside aerial at my present location was not forthcoming, I decided to use a loft mounted system in order to get on the air with my DA1 call. Nothing startling was expected in the way of performance, but considering the poor conditions being experienced at the present phase of the sunspot cycle, results have been very good and these notes are therefore offered in response to pleas for practical information on aerials for use in difficult situations. It is hoped that they will give ideas and encouragement to other operators who are inactive because they do not have the facilities to put up a good outside aerial.

Choice of Aerial System for Indoor Use

Because of the restricted space the choice of an aerial system for indoor use is usually limited to some form of simple wire aerial, except perhaps on 10/15 metres where it might be possible to accommodate a minibeam of some sort. Undoubtedly the simplest aerial for multiband working is a random length end-fed wire with a universal ATU: although this can be made to give reasonable results it is not recommended for normal use indoors as it will almost certainly cause severe interference to domestic radio and TV equipment as well as having a rather unpredictable performance. Past experience has shown that a properly balanced aerial system — one that is *centre-fed* with a *balanced twin feeder* and coupled to the transmitter by a suitable matching unit — will give the best results in the conditions under consideration. When compared with an end-fed wire it will create fewer interference problems (though it may not completely eliminate them) and will generally radiate more efficiently simply because it does not have to rely on the mass of house wiring and plumbing to form part of the system.

Fig. 1(a) gives the details of the aerial used at DA1PE for operation on the 14 — 28 MHz bands and this is nothing more than a centre-fed doublet aerial with simple broad-band radiating elements fed by 300-ohm twin balanced feeder. The great advantage of this aerial, and what makes it such a good choice for this particular application, is that providing the top is symmetrical and it is fed with a low-loss balanced feeder all tuning adjustments can be done with a tuning unit at the operating position. In this case the length of the top is not at all critical since the radiator and feeder are resonated as a whole, but this does put greater demands on the ATU because it has to cope with very wide variations in impedance at the bottom end of the feeder. However, where a suitable matching unit is employed this aerial is very versatile and will work with good efficiency so long as the overall length of the top is greater than about a quarter of a wavelength at the desired operating frequency.

Construction and Installation

For use indoors, where the aerial is protected from the effects of wind and rain, any light-weight materials may be used so long as the insulation is good and the electrical connections are sound. The actual installation will, of course, depend very much on local circumstances, but the principle aims should be:

(a) To make the dipole element as long as possible.
(b) To get it as high up as possible in the apex of the roof.
(c) To keep the elements clear of metallic obstructions.
(d) Maintain the best possible physical symmetry.

If necessary the elements may be drooped (inverted-V style), or if the Fig. 1(b) style of construction is used, may be fanned in the vertical or the horizontal planes. Don't worry too much if you can't meet all of the aims — the aerial isn't suddenly going to stop working because of a bit of unbalance — just do the best that you can within the constraints imposed by local conditions.

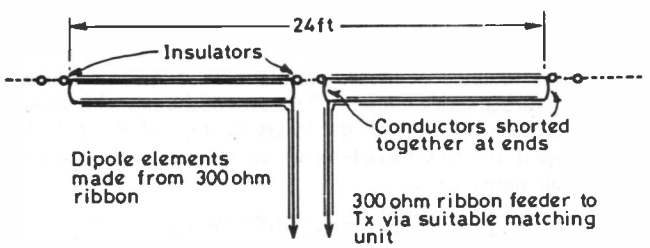
Feeders

Aerials of this type are usually fed with an open wire line in order to keep feeder losses to a minimum, but often this is not very easy to install indoors. Of course, open wire line would be entirely satisfactory from a technical view-point, but 300-ohm ribbon feeder is far more convenient and it can be used without any loss of performance providing it is not too long and is properly installed. That means keeping it at least a couple of inches clear from walls etc., and as far away as possible from other conductors, whilst avoiding sharp bends or kinks in the cable.

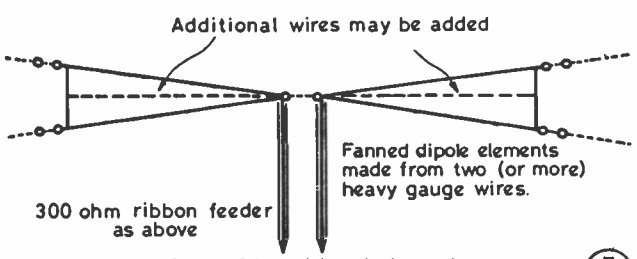
Aerial Tuning and Matching

The secret to getting good results with any aerial of this type is in the art of matching the generally unknown impedance at the input of the feeder to the 50/80-ohm output impedance of the transmitter. As noted earlier, the impedance to be matched varies considerably over the operating frequency range and although broad-band elements help to reduce the rate of change of impedance, so avoiding the need to retune after small shifts in frequency, there will still be big variations from one band to another — requiring the use of a very flexible matching unit for normal operation.

Designs for suitable matching units and detailed discussions of the problems connected with the use of tuned feeders are to be found in most handbooks dealing with aerials and transmission lines. However, the subject can be very complex and off-putting to the less technically minded; so, at least to start with, if you are a



1a. Loft mounted 14-28MHz aerial used at DA1PE



1b. Alternative form of broad band element

FIG. 1

Fig. 1: *(a)* **The loft-mounted 14-28 MHz aerial used at DA1PE consists of a simple broad-band radiating element, centre-fed with 300-ohm twin balanced ribbon feeder. Although this is used as a tuned line, losses are acceptably low because of the short indoor feeder run. The 24-ft. dipole length is set by the size of the loft.**

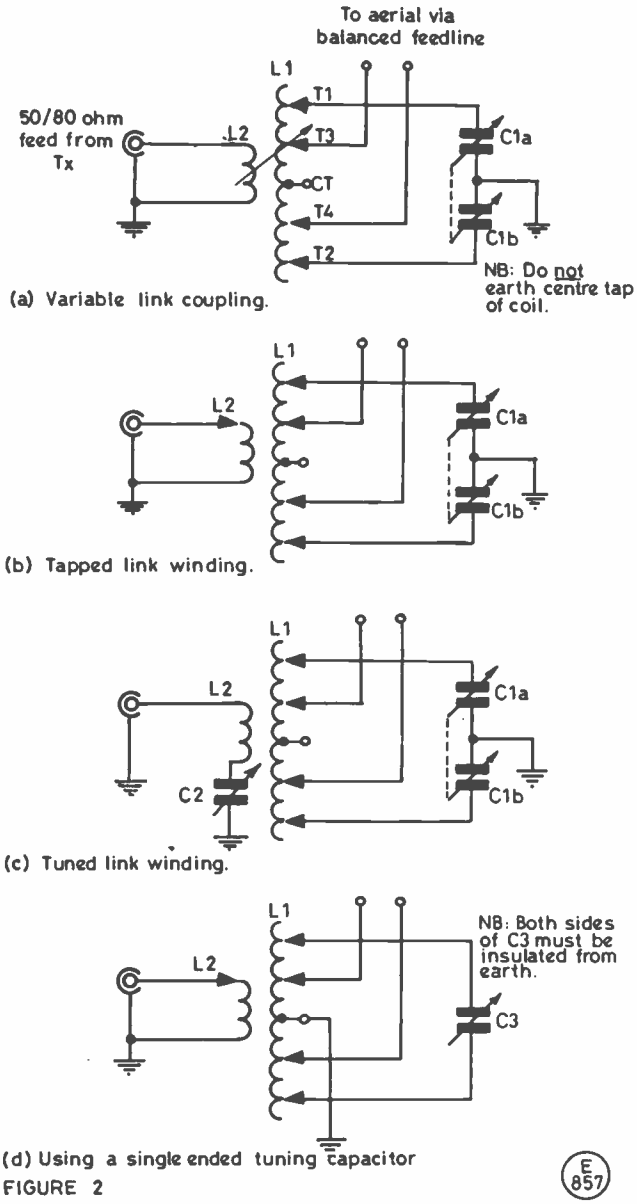


FIGURE 2

Fig. 2: The link coupled parallel-tuned matching unit for use with balanced feeders showing: *(a)* variable or 'swinging' link coupling; *(b)* a tapped link winding; *(c)* a tuned link winding; *(d)* the use of a single-ended tuning capacitor.

newcomer to tuned feeders it's a good idea not to get too involved with the theory until you have gained some practical experience in the subject.

Fig. 2 gives the circuit of a link coupled aerial tuning unit suitable for use with resonant feeders which will cope with most practical situations providing you are prepared to experiment with the component values, coupling and tapping points. L2 should be a high-Q inductor of similar diameter and wire gauge to the PA tank circuit (assuming a valve PA) and preferably made of air-spaced coil stock so that accurate tapping points can be made to it. The LC ratio of the tuned circuit is not unduly critical but as a simple rule of thumb, 'L' should be chosen to resonate at the operating frequency with a capacity of about 1.5pF per metre, *i.e.* 30pF for 20 metres (or 60pF per section for a split-stator capacitor) and *pro rata* for the other bands.

For maximum flexibility some control of coupling is essential and a variable or swinging link coil, L1, would be ideal in this respect though it is not the easiest to construct. Satisfactory, but somewhat less versatile, alternatives are tappings on the link, or a

Tables of Values

Fig. 2
(for 14 MHz operation)

L1 = 20 turns, 18 swg, 1½" dia., 10 tpi
L2 = 3t at/over centre of L1
C1 = 250 x 250pF Tx type, variable
C2 = 150pF (close-spaced unit is suitable)
C3 = 150pF transmitting type, variable

Note: tap L1 and L2 as necessary for the higher frequency bands.

Fig. 4
(for 14 MHz operation)

L1 = 10t, 16 swg, 1½" dia., 5 tpi
L2 = 3t over the C1 end of L1
C1 = 500 x 500pF Rx type, variable
C2 = 250pF Tx type, variable

Note: tap L1 and L2 as necessary for the higher frequency bands.

resonant link circuit which may be detuned to control the degree of coupling, as shown in Fig. 2(c).

Adjustment of the ATU is largely a matter of trial and error to get a low SWR with maximum efficiency. However, as there are many possible permutations of tuning and tapping points, the procedure summarised below (and in Fig. 3) is suggested as a good starting point:

a) Tune the transmitter into a suitable dummy load using the lowest power needed to operate the SWR bridge.

b) Connect the transmitter to the matching unit, and using miniature probe or crocodile clips to make temporary tappings, set T1, T2 taps across a suitable number of turns for the band in

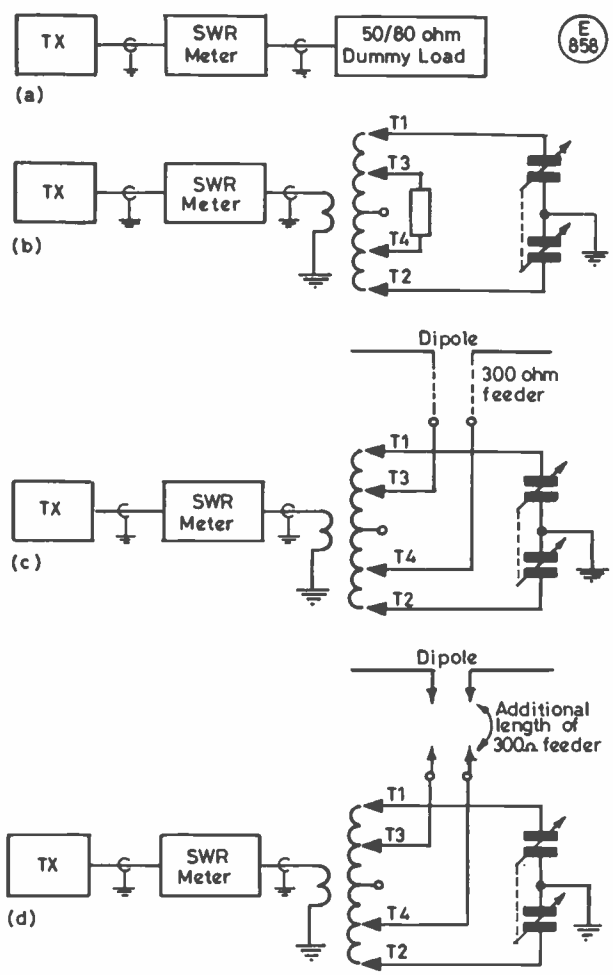


Fig.3 Summary of the tuning procedure described in the text

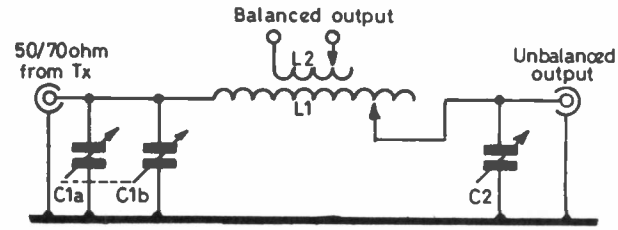


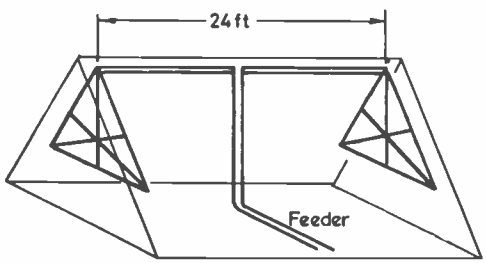
Fig.4 A Z-match type of matching unit suitable for use with low impedance balanced loads. This circuit also works well with a wide range of unbalanced loads. (E 859)

use. Tap a 300-ohm resistive load across about one-third of the coil (points T3, T4) and adjust tuning, tapping points and coupling for a low SWR with the recommended tuning capacity of about 1.5pF/metre. (*N.B.* The load does not need to handle a lot of power so could be made up from a number of ordinary carbon resistors in parallel, *e.g.* 5 x 1500-ohm 1-watt types in parallel would give 300-ohm at 5-watts.)

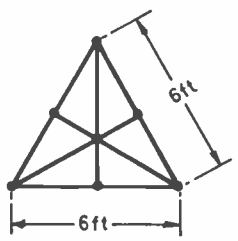
c) Connect the aerial feeder in place of the 300-ohm dummy load and still using the lowest possible power retune and/or reset tappings for a low SWR. Because the input impedance of the feeder is almost certain to be complex, *i.e.* resistive and reactive, these settings are likely to be quite different from those in *(b)*, but in most cases it will be possible to cancel out the reactance by retuning C1, and new tapping points will take care of the load resistance.

d) Because this ATU is parallel tuned it works best with a medium-to-high impedance load and so it is inevitable that at some operating frequencies the feeder line will present an awkward impedance to the ATU that is difficult to match. If this happens the impedance may be changed by increasing the overall length of the feeder by about $\lambda/8$ to $\lambda/4$ at the offending frequency — it might even be possible to find a compromise length that will allow easy matching on all of the bands to be covered.

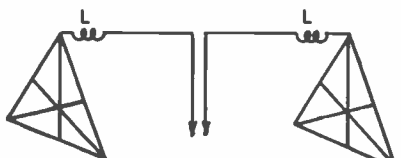
e) Log the settings for future use.



(a) End capacitive loading



(b) Detail of the end loading



(c) One possible way of using additional lumped inductive loading for lower frequency operation (E 860)

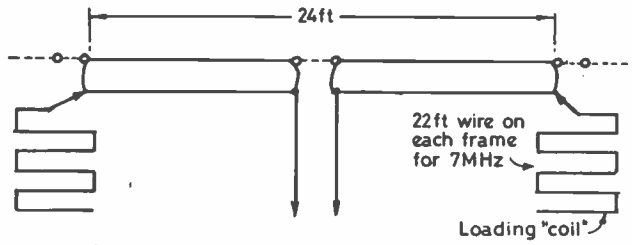
FIG. 5

Fig. 5: *(a)* end-capacitive loading of the loft-mounted dipole for improved performance on 14 MHz; *(b)* details of the end loading — dimensions shown may be modified to suit the available space.

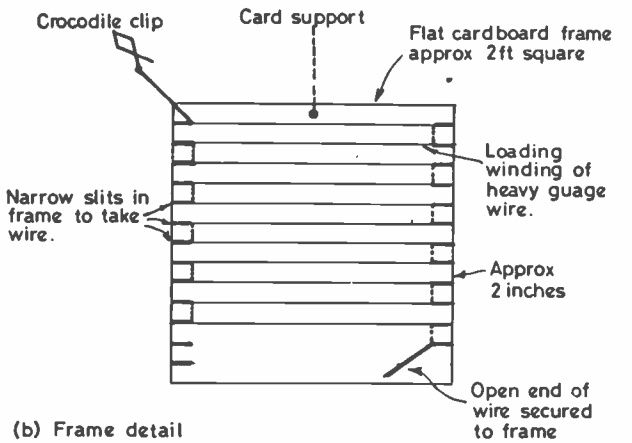
Testing the Aerial and ATU

Having found a suitable combination of ATU settings, run full power through it into the aerial to check for arcing in the tuning capacitor or over-heating of the coil. In the event of arcing the problem will probably be due to insufficient loading of the tuned circuit — which can usually be corrected by retuning with the load tappings further apart. Arcing will, of course, also occur if the plate spacing of the tuning capacitor is too small: as a guide, I find that a properly adjusted ATU using an old-fashioned receiving type twin-gang 500pF capacitor for C1 will handle 100-watts of HF CW/SSB without flashover (though one would normally try to use a much wider spaced capacitor in this position).

Coil overheating, it it occurs, is most likely to be in the link winding and will be due to using too few turns for the link L2, or to too loose a coupling between L1 and L2.



(a) "Open" inductive loading of the loft mounted dipole for 7MHz operation as described in text.



(b) Frame detail

Fig. 6 Details of the Loading Winding. (E 861)

An Alternative ATU

As has been noted earlier the link coupled, parallel tuned, ATU doesn't cope too well with low impedence loads, particularly when they are also reactive. If you have trouble in this respect then try the circuit of Fig. 4 which is a simple form of Z-match based on a pi-section coupler. I've used this circuit many times with a wide variety of different loads and it seems able to handle almost anything below a few hundred ohms, although it does tend to be slightly less efficient and less well balanced than the more traditional coupler. This is a small price to pay for greater flexibility, especially as this circuit also has the advantage of being equally useful with a wide range of unbalanced loads from low impedance coax to random length end-fed wires.

Operation at Lower Frequencies

The 24 foot long dipole as described radiates well on all of the HF DX bands but is very sharply tuned on 14 MHz where it is only about $\lambda/3$ long. To improve the performance on this latter band, end capacitive loading was added to the dipole elements using the arrangement shown in Fig. 5(a), which with the dimensions given effectively lengthened the aerial so that it was electrically somewhat longer than $\lambda/2$ at 14 MHz. No doubt this changes the performance at the higher frequencies (though tests would be needed to find out if this were for better or worse) but it does bring another benefit in that the loaded aerial works quite well on 10 MHz and is usable on 7 MHz where both VK and ZL have been worked (though I wouldn't claim that this was an everyday happening).

Unfortunately there is a limit, mainly dictated by the available space, to the amount of end loading that can be added and so any further reduction in the dipole resonant frequency must be obtained by inductive loading. Fig. 5(c) shows one possible way, but as an alternative to conventional loading with lumped inductance I can recommend another little-known, but nevertheless interesting approach to shortened aerials based on an article by G2QM in the January 1958 issue of the *RSGB Bulletin*. Briefly the idea is to take the length of wire needed for a full-sized aerial ($\lambda/2$ at 7 MHz in this case), erect as much as possible of the centre portion between available skyhooks and then wind the remaining lengths of wire at each end onto suitable formers in a non-inductive way so as to retain the open self-inductance of the wire.

Fig. 6 shows details of the aerial loaded to $\lambda/2$ resonance at 7 MHz using this method. The loading 'coils' are made of twin bell wire (used only because it was available) wound onto flat cardboard frames about 2 feet square cut from old cartons brought home from the local supermarket. These are quite good enough for use in a dry loft and they form a nice lightweight unit which can be hung from the end of the aerial or the rafters on a piece of string. As my loft is easily accessible I terminated one end of each loading winding with a heavy duty crocodile clip, so a rapid band change can be made by a quick dash up the stairs to 'clip' or 'un-clip' as necessary.

Note that there is no special significance in the loading frame dimensions given as these were chosen purely for convenience. In practice it would be a good idea to go for the largest, most open, form of construction possible so as to get the maximum amount of radiation from the loading sections. Also, the length of the loading wire is not at all critical as the object is to get the current maximum near to the centre of the aerial and a few feet either way is not going to make a lot of difference when using tuned feeders.

Results and Final Comments

In the course of 9 months' operation using the various forms of this aerial which have been described here, I have made over a thousand QSO's with 75 countries. These have been mostly on 14/21 MHz although I have also had quite a lot of contacts on 7, 10 and 28 MHz (mainly within Europe). Prompted by G3TXF's "Oblast Corner" column I did a quick check through the log and was surprised to find that I had worked 85 different regions, including many of the more distant and rarer ones. However, no extravagant claims are made for the performance as it must be appreciated that any indoor aerial is very much a compromise and results will depend a lot on local conditions and operating skill, as well as on the care and effort put into the installation. Still, whatever the short-comings and disadvantages, if you cannot put up any form of outside aerial the loft-mounted aerial is the next best thing as it does at least make HF band operation possible and with reasonable DX capabilities. My 1000-or-so contacts are evidence of this.

Reference:

"Aerials for Confined Spaces" by M.J. Heavyside B.Sc (Hons), M.Ed, Ph.D, G2QM, *RSGB Bulletin,* January 1958.

Amateur Radio Computing

a bi-monthly feature for all those with a radio station and a computer

PAUL NEWMAN, G4INP

I AM very pleased to be able to start the New Year series with a program submitted by an *S.W.M.* reader, Alan G4BDM, for the Commodore CBM64. It offers a full reference database for logged QSO's and has numerous facilities.

Before dealing with Alan's program there are some other points to cover. I have to apologise for omitting the promised review of the COMLINK-1 ZX81 system mentioned last time. Pressure of work has prevented full trials although a preliminary review appears in SARUG newsletter 25. I hope to publish fuller comments in issue 26.

Results from the G4IDE experimental Spectrum NOAA satellite picture system have been very encouraging and two are featured on the front cover of SARUG 25. Again, more details next time I hope.

GM4NNC wrote asking for contact with fellow MZ80 users, so if anyone can provide him with information please contact him (QTHR). I'll be pleased to pass on information also.

With packet radio usage on the gradual increase, Spectrum users may like to know that Terry Rowe, G8NNU, has a Microdrive-based terminal program for Interface One on offer at just £3.00*(i)*. It has facilities for loading/saving stores and a program-transmit option will be available shortly. Users of the Maplin interface with packet controllers might also find it useful to talk to Terry since he has been able to resolve some problems in that direction too. By the way, Terry also has some *new* Microdrives and Interface Ones available!

The decision to try to offer limited support of the Amstrad CPC range of micros within SARUG has now been taken and I shall welcome views, information and material suitable for inclusion in the newsletter.

And now to Alan's program. The system will run with a standard CBM64 with either disk or tape.

Type in the listing as shown but substitute all £-signs with hashes. Save the checked listing to tape or disk.

Typing RUN will get the startup screen requesting the current date which should be entered in the form 26/11/86 terminated by <cr>. The 11-option menu will now appear; each option will be described in turn.

Option 0 will terminate the program.

Option 1 clears memory of all records; the default for the ARE YOU SURE message is NO.

Option 2 loads a saved database file back into memory, requesting a filename.

Option 3 is used to enter the fields of a record; terminate each field with a <cr>. Keep each field to the minimum necessary to convey the required information since this will maximise the number of records which can be stored per file.

Option 4 deletes a record from memory. Make sure you are deleting the right record, preferably by using option 9.

Option 5 searches through the database for any part of any record. Entering a specific callsign will find just the one occurrence. Entering common strings like 'FT101' will find all records with the string in.

```
100 REM AMATEUR RADIO DATA BASE
110 POKE53280,15:POKE53281,15:PRINT"■"
120 D%=PEEK(186)
130 DIMA$(1000):N=0:D$="":F$=""
140 T$="AMATEUR RADIO DATA BASE"
150 PRINT"□";TAB(8);T$"■";PRINTTAB(11);"ALAN MORRIS APRIL 1986"
160 INPUT"■■DATE DD/MM/YY ■■■■";D$:DL$=D$:F$="NONE"
170 PRINT"□"TAB(8);T$
180 PRINT"■■CURRENT FILE■ ";F$:PRINT"■LAST UPDATE■ ";DL$
190 PRINT"■NUMBER OF ENTRIES■";N
200 PRINT"■ACTIVE DEVICE■ ";D%
210 PRINT"■OPTIONS ARE :-■"
220 PRINT"  0  STOP"
230 PRINT"  1  CLEAR FILE FROM MEMORY"
240 PRINT"  2  READ FILE TO MEMORY"
250 PRINT"  3  ADD TO FILE IN MEMORY"
260 PRINT"  4  DELETE FROM FILE IN MEMORY"
270 PRINT"  5  SEARCH FILE IN MEMORY"
280 PRINT"  6  EDIT FILE IN MEMORY"
290 PRINT"  7  SAVE FILE IN MEMORY"
300 PRINT"  8  PRINT FILE IN MEMORY"
310 PRINT"  9  LIST FILE IN MEMORY""
320 PRINT" 10  SWITCH ACTIVE DEVICE"
330 INPUT"■■OPTION■";O%
340 IFO%=0THENEND
350 IFO%=1THEN460
360 IFO%=2THEN540
370 IFO%=3THEN630
380 IFO%=4THEN750
390 IFO%=5THEN810
400 IFO%=6THEN950
410 IFO%=7THEN1170
420 IFO%=8THEN1240
430 IFO%=9THEN1420
440 IFO%=10THEN1650
450 GOTO170
460 REM CLEAR FILE FROM MEMORY
470 PRINT"□CAUTION ALL DATA IS LOST FROM MEMORY"
480 PRINT"CLEAR (Y/N) ";
490 INPUT"   N■■■■";O$:O$=LEFT$(O$,1)
500 IFO$="N"THEN170
510 IFO$="Y"THEN530
520 GOTO480
530 N=0:L1%=0:F$="NONE":GOTO170
540 REM READ FILE INTO MEMORY
550 INPUT"□FILE NAME ";F$
560 IFD%=1THENOPEN2,D%,0,F$
570 IFD%=8THENOPEN2,D%,2,F$+",S,R"
580 INPUT£2,DL$
590 PRINT"LAST UPDATED ";DL$:PRINT"READING DATA"
600 INPUT£2,N
610 FORQ=1TON:INPUT£2,A$(Q):NEXTQ
620 CLOSE2:GOTO170
630 REM ADD TO FILE IN MEMORY
640 PRINT"□";
650 PRINT"□■■ENTER '*' AS NAME TO STOP"
660 PRINT"NUMBER OF ENTRIES ";N:"■■"
670 INPUT"CALLSIGN          .■■■■";A1$
680 INPUT"NAME              .■■■■";A2$
690 INPUT"LOCATION          .■■■■";A3$
700 INPUT"EQUIPMENT         .■■■■";A4$
710 INPUT"AERIAL            .■■■■";A5$
720 INPUT"LAST WORKED       .■■■■";A6$
730 IFA1$="*"THEN170
740 N=N+1:A$(N)=A1$+"$"+A2$+"$"+A3$+"$"+A4$+"$"+A5$+"$"+A6$:GOTO650
750 REM DELETE FROM FILE IN MEMORY
760 PRINT"□";
770 PRINT"■■ELEMENT TO DELETE 0 TO STOP ";:INPUTO
780 IFO=0THEN170
790 FORQ=OTON:A$(Q)=A$(Q+1):NEXTQ:N=N-1
800 GOTO770
810 REM SEARCH FILE IN MEMORY
820 PRINT"□INPUT SEARCH STRING ";:INPUTS$
830 IFS$=""THEN180
840 S=LEN(S$)
850 FORQ=1TON
860 L=LEN(A$(Q)):L$=A$(Q)
870 FORZ=1TOL
880 Z1$=MID$(L$,Z,S)
890 IFZ1$=S$THENX$=L$:GOSUB1830:GOSUB1720
900 NEXTZ
910 NEXTQ
920 PRINT"■■SEARCH COMPLETED PRESS A KEY"
930 GETA$:IFA$=""THEN930
940 GOTO170
950 REM EDIT FILE IN MEMORY
960 PRINT"□";
970 PRINT"■ELEMENT TO EDIT 0 TO STOP ";:INPUTE%
980 IFE%=0THEN170
990 IFE%>NTHEN970
1000 ZZ=E%:X$=A$(ZZ)
1010 GOSUB1830
1020 PRINT"NEW DATA OR RETURN IF NO CHANGE■■"
1030 PRINT"CALLSIGN        ";B$(1)
1040 INPUTB1$:IFB1$=""THENB1$=B$(1)
1050 PRINT"NAME            ";B$(2)
1060 INPUTB2$:IFB2$=""THENB2$=B$(2)
1070 PRINT"LOCATION        "B$(3)
1080 INPUTB3$:IFB3$=""THENB3$=B$(3)
1090 PRINT"EQUIPMENT       ";B$(4)
1100 INPUTB4$:IFB4$=""THENB4$=B$(4)
1110 PRINT"AERIAL          ";B$(5)
1120 INPUTB5$:IFB5$=""THENB5$=B$(5)
1130 PRINT"LAST WORKED     ";B$(6)
1140 INPUTB6$:IFB6$=""THENB6$=B$(6)
1150 A$(ZZ)=B1$+"$"+B2$+"$"+B3$+"$"+B4$+"$"+B5$+"$"+B6$
1160 GOTO970
1170 REM SAVE FILE IN MEMORY
1180 INPUT"□FILE NAME ";F$:DL$=D$
1190 IFD%=1THENOPEN2,D%,1,F$
1200 IFD%=8THENOPEN2,D%,2,"@0:"+F$+",S,W"
1210 PRINT£2,DL$:PRINT£2,N
1220 FORQ=1TON:PRINT£2,A$(Q):NEXTQ
1230 PRINT£2:CLOSE2:GOTO170
1240 REM PRINT FILE IN MEMORY
1250 PRINT"□ PRINTING FILE ";F$
1260 OPEN3,4
1270 PRINT£3,"FILE ";F$;" LAST UPDATED ";DL$
1280 FORQ=1TO2:PRINT£3:NEXTQ
1290 PRINT£3,"CALLSIGN";CHR$(16);"10";"NAME";CHR$(16);"25";"LOCATION";
1300 PRINT£3,CHR$(16);"45";"EQUIPMENT";CHR$(16);"58";"AERIAL";
1310 PRINT£3,CHR$(16);"73";"DATE"
1320 PRINT£3
1330 FORZ=1TON
1340 X$=A$(Z)
1350 GOSUB1830
1360 PRINT£3,B$(1);CHR$(16);"10";B$(2);CHR$(16);"25";B$(3);CHR$(16);"45";B$(4);
1370 PRINT£3,CHR$(16);"58";B$(5);CHR$(16);"73";B$(6)
1380 NEXTZ
1390 PRINT£3:PRINT£3:PRINT£3,"TOTAL NUMBER OF ENTRIES ";N
1400 FORZ=1TO4:PRINT£3:CLOSE3
1410 GOTO170
1420 REMSAVELIST FILE
1430 INPUT"□LOWER LIST NUMBER";L1%
1440 INPUT"■UPPER LIST NUMBER";L2%
1450 IFL1%=L2%THEN1430
1460 IFL1%<1THENL1%=0
1470 IFL2%>NTHENL2%=N
1480 INPUT"■■SCREEN OR PRINTER  S■■■";O$:O$=LEFT$(O$,1)
1490 IFO$="S"THEN1520
1500 IFO$="P"THEN1590
1510 GOTO1480
1520 PRINT"□"
1530 FORQ=L1%TOL2%
1540 PRINT"■"Q"■";"  ";A$(Q)
1550 NEXTQ
1560 PRINT"■PRESS A KEY TO GO ON"
1570 GETO$:IFO$=""THEN1570
1580 GOTO170
1590 OPEN3,4
1600 FORQ=L1%TOL2%
1610 PRINT£3,Q;"  ";A$(Q)
1620 NEXTQ
1630 FORQ=1TO3:PRINT£3:NEXTQ:CLOSE3
1640 GOTO170
1650 REM SWITCH ACTIVE DEVICE
1660 INPUT"□DEVICE NUMBER ";D1%
1670 IFD1%=1 THEN 1710
1680 IFD1%=8THEN1710
1690 IFD1%=9THEN1710
1700 GOTO1660
1710 D%=D1%:GOTO170
1720 REM SUBROUTINE
1730 PRINT"□■"Q:PRINT"■■CALLSIGN      ";B$(1)
1740 PRINT"NAME           ";B$(2)
1750 PRINT"LOCATION       ";B$(3)
1760 PRINT"EQUIPMENT      ";B$(4)
1770 PRINT"AERIAL         ";B$(5)
1780 PRINT"LAST WORKED    ";B$(6)
1790 PRINT"■■■PRESS ANY KEY TO CONTINUE"
1800 GETKY$:IFKY$=""THEN1800
1810 PRINT"..CONTINUING SEARCH"
1820 RETURN
1830 REM.SUBROUTINE
1840 FORO1=1TO5
1850 L=LEN(X$):W=1
1860 Z$=MID$(X$,W,1):IFZ$="$"THEN1880
1870 W=W+1:GOTO1860
1880 B$(O1)=LEFT$(X$,W-1)
1890 X$=RIGHT$(X$,L-W)
1900 IFLEFT$(X$,1)="$"THENX$=RIGHT$(X$,LEN(X$)-1):GOTO1900
1910 NEXTO1
1920 B$(6)=X$
1930 RETURN
```

Option 6 is an "edit" mode. Enter the record number for the record to be edited and overwrite each part as necessary. Don't forget the <cr> at the end of each field, whether or not it has been changed.

Option 7 enables records to be saved to tape or disc. Enter a filename when requested. If the disc is used, the save and replace same name is permitted.

Option 8 will print tabulated fields of each record to the printer.

Option 9 will list the full record string to the screen or printer.

Option 10 permits the active device to be disc or tape.

When using the database for the first time, check option 10 first for which device is in use. The default is 8 for the disc. Change to 1 for tape operation if required.

Any mistakes in normal data entry, option 3, may be corrected using option 6, the edit mode.

Finish by saving the log with option 7. This can be loaded back using option 2 next time the program is used, noting the correct filename. There should be space for about 1000 records, each of about 50 characters. Different filenames could, however, contain records of all 'G****' contacts or all made on '80mtrs', etc.

As memory fills up, garbage collection delays become apparent. The program compiles very easily and this is to be recommended if one has access to a compiler. G4BDM can supply the program compiled with the DTL-64 compiler and turbo'd on tape for £3.00, or on disc for £4.00 adding 50 pence for postage*(ii)*. The DTL compiler speeds operation many times and contains its own garbage collection routines which are superior to those in the CBM.

I hope CBM owners will find this program of interest and I hope that more such programs for other machines will feature in this series from time to time.

References.

(i). Mr. T. Rowe, G8NNU, 68 Coburg Road, Montpelier, Bristol BS6 5HX.

(ii). Mr. Alan Morris, G4BDM, 67 Meanwood Avenue, Marton, Blackpool, Lancs. FY4 4LU.

REVIEW

KW Ten-Tec Model 4229 High-Power Aerial Tuning Unit Kit

E. H. TROWELL, G2HKU

A REMINDER of the days when KW Electronics, then of Dartford, Kent, had available a range of kits for the home constructor in addition to their ready-built equipment, is the KW Ten-Tec Model 4229 High Power Aerial Tuning Unit Kit rated at 2kW RF power. This unit is also available ready made, individually tested and known as the Model 229 from KW Ten-Tec Ltd., of Chatham, Kent.

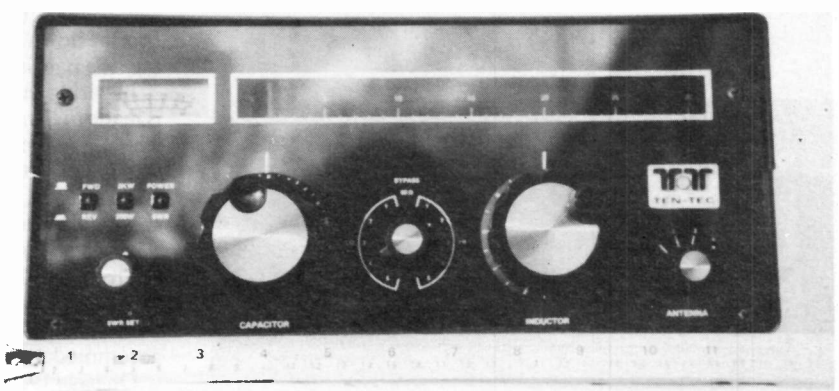
The kit is very well packed in some 6 boxes, 18 packets and three heavy gauge polythene bags contained in a transit box similar to those used for the Argosy and Century 22 transceivers. An 8-page Owner's Manual (as supplied with the ready-built version) and a 20-page Assembly Manual are provided. The latter contains interior and exterior photographs together with detailed assembly drawings and step-by-step instructions. The quality of all parts used is, as one has come to expect from this company, first class.

The ATU

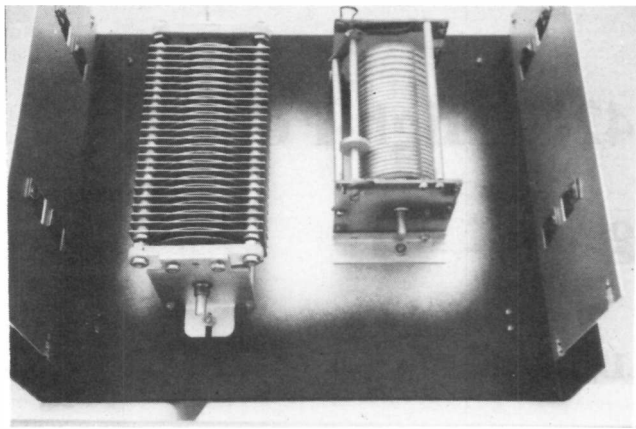
The tuner is described as a reversible "L" circuit covering the entire range between 1.8 and 30 MHz and capable of matching the nominal 50-ohm unbalanced output of transceivers or linears into a wide range of unbalanced or balanced load impedances. The maximum output matching range at full power is 3000 ohms with the maximum balanced load through the balun of 500 ohms. The variable capacitor (only one is used) is rated at 3.5kV.

When assembled the cabinet size is 5½" high by 12½" wide by 13¼" deep, finished to match the current KW Ten-Tec range in black with bronze lettering and fitted with the usual stainless steel tilt bail and weighing 9lbs.

Front panel controls are, top left, the illuminated meter reading on the top scale 0-2kW, on the second scale 0-200 watts, the lowest indicated reading being 10W, and the lower one reads SWR. Below this are three push button switches, the left one reading FORWARD/REVERSE power or SWR depending on the position of the third push button which selects either POWER or SWR readings. The centre button selects either of the power ranges. In the bottom left corner is the SWR SET control which has an easy setting feel to it. Next to these is the large CAPACITOR tuning knob, similar to the tuning control of the Argosy and Corsair but graduated 0-10, and is a direct drive to the wide spaced capacitor. Tuning is fairly broad and a reduction drive is not really warranted. Next to this is the eleven position heavy duty silver plated switch offering five low and five high impedance matching positions with a centre by-pass of 50 ohms. Balancing the panel layout the rotary inductor tuning knob is next and controls the illuminated slide-rule type dial which is calibrated 0-30 and is 8 inches in length; this enables very accurate setting of the inductor tuning as each of the 30 scale divisions is sub-divided into a further 10 divisions by the calibrations of the tuning knob. As this is also calibrated in ten half-divisions it means that, in theory, there is a setting accuracy of one-in-six-hundred which should satisfy the most critical operator. For rapid movement this knob is fitted with what could be termed a "rotary handle" by means of which the torque of the "roller coaster" coil connection is reduced for easy tuning. In the bottom right corner is the four position aerial selector switch, the first three positions being for



Front view of the completed KW Ten-Tec Model 4229 high-power ATU kit.



Showing assembled variable capacitor and inductor. Note the position and mounting of the side panels.

co-ax feed only, while the fourth can be used for single wire, co-ax, or balanced line systems.

The rear panel contains at top left three wing nut terminals for balanced line and single wire feed, below these are four co-ax aerial sockets and a fifth, to the right, is the input socket. A wing nut terminal for earthing and a 12 volt DC input phono type socket for the dial lamps complete the panel which has lettered connection instructions.

Construction

There is no overall parts list so it is not possible, when unpacking the boxes and bags, to check if anything is missing. It is a good idea to separate the nuts and washers into their various types and sizes as in some cases there is only one-sixteenth of an inch difference between them.

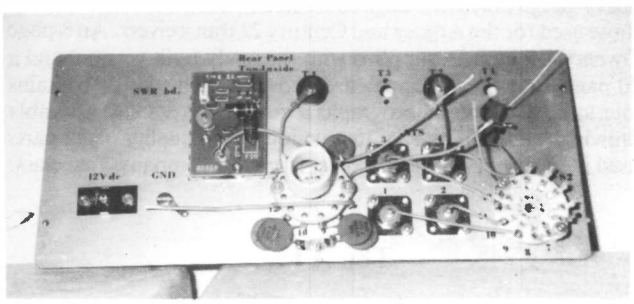
Assembly of the kit presented no real problems but, as KW Ten-Tec suggest, read the whole of the manual first and proceed in the sequence outlined. It is a good idea to mark the assembly manual with any addendum notes prior to commencing construction. The first item is rather unusual being the actual construction of the 500pF wide-spaced variable capacitor rated at 3.5kV. Careful attention to the manual is required here as the ceramic end plates should not be subjected to too much stress. In assembling the rotors as shown in the Assembly Manual, ten of the spacers had to be filed internally to fit over the shaft. When the variable capacitor is finally assembled it is wise to check for play in the rotor shaft at the ball-bearing end and adjust as required. Particular attention should be paid to the mechanical adjustments outlined on page 7 of the manual with regard to the alignment of the front and rear end plates.

The variable inductor is supplied ready wound with silver plated wire on a ceramic former. A nice point here is that the roller contact pulley and the contact shaft upon which it travels are also silver plated. Page 7 also starts the assembly of the inductor, and in "item 2" it was noted that the 5/16" machine screws mentioned were in fact 3/16" and therefore not long enough to enter the tension springs. Two suitable BA screws solved the problem. A further point in this section puzzled the writer, this being the reference to 'flat end of each spring' as there did not appear to be a 'flat end'! If, however, the word 'flat' is replaced by 'open' then the operation is obvious.

The assembly of the SWR board on page 9 (not numbered in the writer's manual) was straightforward apart from C25 and C26 which were not marked with their capacity. This had to be determined by a process of elimination as other components were mounted on the board. After completion of step 1 the threaded stand-off spacers were soldered to the foil. (A 60W iron was found necessary here.)

Fig. 7 on page 10 of the manual shows the meter switch board and assembly. In "item 7" the black caps would not snap in place and no reasonable amount of pressure would encourage them to do so. Glueing in place proved quite satisfactory. Contained in the parts box for this unit was a metal plate with two screws, no mention of these items being made in the assembly instructions. However on page 16 their purpose was explained during the course of assembling the front sub-panel.

The balun coil assembly instructions need to be read carefully and the 16 s.w.g. Teflon-coated, silver plated stranded wire used should be kept under tension as much as possible during the actual winding process. The remainder of this wire is used for all wiring connections except for the dial lamps. (An interesting point here is that this Teflon-coated wire is actually recommended by the ARRL for RF wiring use.)



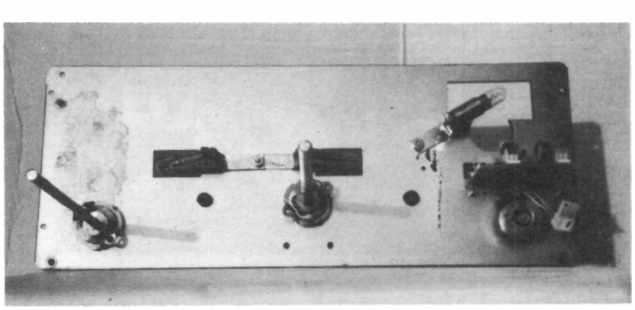
Internal view of rear panel with SWR board in position; note the coil located above S1.

In the side plates assembly (items 4 and 5), the clips can best be fitted by inserting the flat blade of a screwdriver through the square holes (after the clips have been started in position) and bearing down on the clip. The flanges on these clips actually space the side panels from the cabinet.

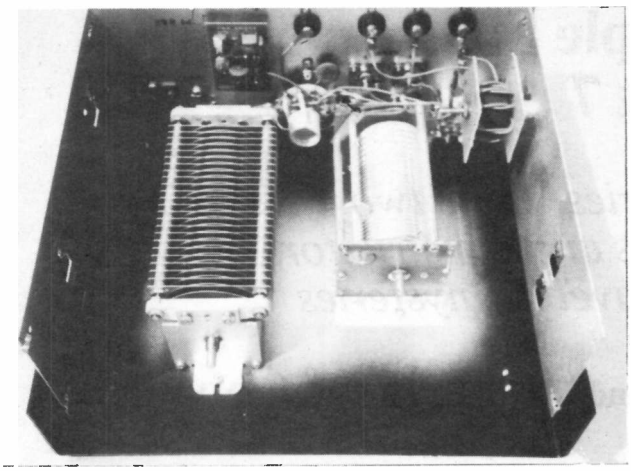
In wiring the rear panel assembly "item 1", page 14, reference is made to 'length of blue Teflon wire' while in further items 'lead wire' is mentioned: these are both the same wire, *i.e.* blue Teflon. In "item 7" the 'flat solder lug' is the type which has internal locking teeth, while in "item 14" the switch tag should be supported when enlarging the hole. In "item 7", page 16, under Rear Panel Assembly, no locking washer was supplied.

Front Sub-Panel Assembly "item 1", page 16, the hole for mounting the potentiometer is at the bottom left of the panel. In "item 3" the 3/16" long screw was not long enough to accommodate two pilot lamp holders and a 3/8" was used.

On page 19 under Final Wiring and Assembly, "item 5", it was found that the lexan plastic panel was slightly oversize when offered up to its fixing position together with its painted



Inside view of front sub-panel showing switch panel in position on right.



Rear panel in position. Note SWR board above variable capacitor and balun in right corner.

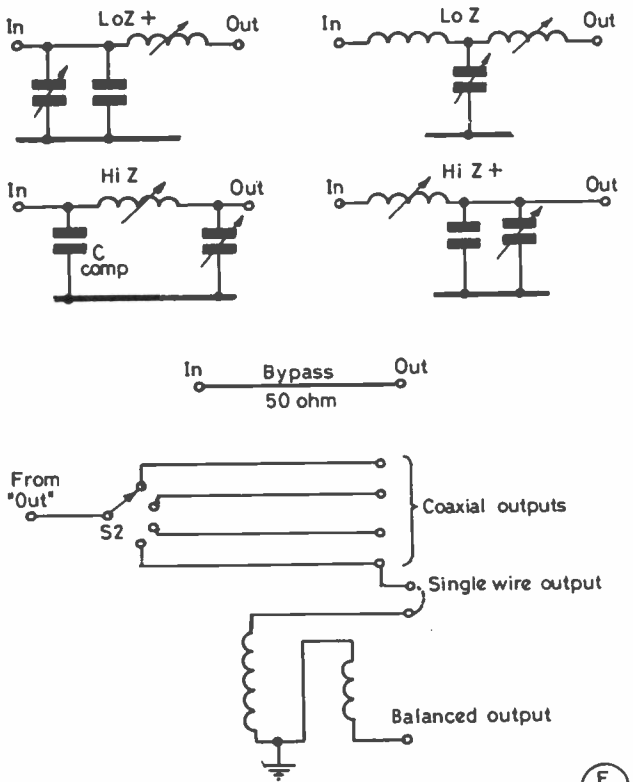


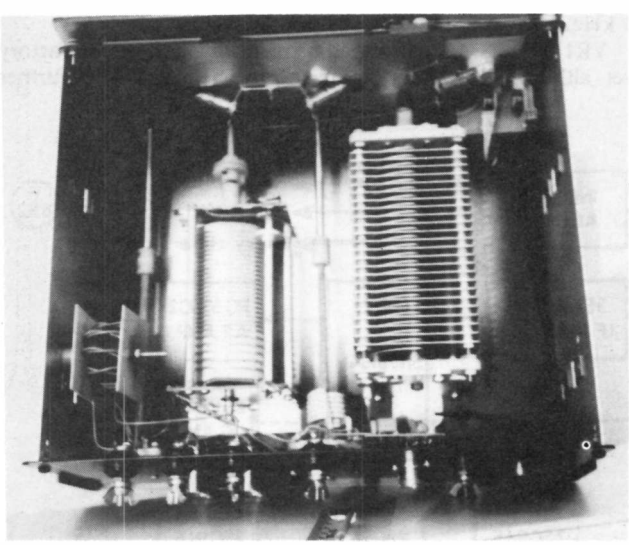
Fig. 1 TUNER CONFIGURATIONS (Selected by S1)

E 865

aluminium front panel. This resulted in a slight bowing of the plastic and was overcome by temporarily bolting the plastic panel to the aluminium one and very carefully filing the plastic panel to the exact size of the panel to which it is bolted. The plastic protective film should remain in place until filing is completed; if the lexan panel is marked — it's permanent!

On completion, the wiring and rotation of the controls for free movement was checked. The final alignment and testing was carried out in accordance with the instructions in the Owner's Manual with no problems encountered.

The 'L' type matching network has, to some extent, been ignored for amateur use as, in order to cover both a wide range of aerial loads and also a wide range of frequencies, two differing circuits are required. If the aerial impedance is less than 50 ohms the variable capacitor needs to be across the transmitter, whereas if the impedance is higher the capacitor must be across the aerial. The diagrams in Fig. 1 illustrate the variety of matching circuits available in this tuner, all being selected by the low/high impedance switch on the front panel between the two large capacitor and inductor tuning knobs. Within the circuits shown, and still switched by this same switch, are a variety of fixed capacitors in parallel with the variable capacitor. These can be switched into circuit if required as the frequency is lowered, and more capacity is necessary to match a given load. An advantage of this type of tuner is that it always provides a two-pole low-pass response to aid harmonic rejection.



The completed ATU with top wrap-around cover removed.

The writer has for many years used the G5RV aerial and quite apart from being a personal friend of Louis and therefore biased(!) has had excellent results on all bands between 1.8 and 30 MHz, including all the new bands using a variety of tuner units. However the KW Ten-Tec unit described proved to be easily the most versatile used with this aerial and has enabled a better match to be obtained and retained than with any of the other units. It was possible to achieve a virtual 1:1 SWR on any band and, after noting the readings, to return to the same position. Little, if any, adjustment was required when moving frequency within a band (the impedance switch setting once determined for a particular band does not, of course, require further adjustment anywhere within the band in use).

Various other aerials were tried including the Cushcraft ATV-5 vertical on the new bands, J-Beam 4-over-4 two-metre slot(!), long wire and 15 feet of wire. Surprisingly it was possible to obtain a reasonable match with all of these. However this does not suggest that either Messrs Cushcraft or J-Beam would be happy to have their aerials used in such a manner! It was not possible to try loading up the proverbial bed spring as although two are already in use, they form part of the earthing system.

The transceivers used had outputs variable from 3 watts to the maximum output from the homebrew linear and no problems were encountered using the tuner either in matching or signs of overheating. Continuous checks for TVI were carried out with a colour TV monitor, none was encountered. The unit was a pleasure to build and operate and can be confidently recommended.

A final thought — could KW Ten-Tec be persuaded to resurrect the Argonaut, in kit form?

Practical, Simple Sideband Part 7

in this special series, these two well-known designers and constructors get together to unravel its mysteries

REV. G. C. DOBBS, G3RJV and IAN KEYSER, G3ROO

MLX Board Update — by G3RJV

"A Little Knowledge is a Dangerous Thing"

IN Parts 3, 4 and 5 of this series (*Short Wave Magazine*, Aug./Sept./Oct. 1986) I described the use of the MLX Board, a surplus SSB Processing board from the U.S.A., to build a simple single-sideband transceiver for one amateur band. The G-QRP Club imported several batches of these boards and the feedback from those who were lucky enough to buy the boards indicates that successful transceivers have been built from the circuitry I supplied.

When that circuitry was evolved all that G3ROO and I had to work on was an application circuit of the board for a range of transceivers called the MLX Transceiver. So the circuits came from our understanding of how the boards had been used by a particular manufacturer and the circuit diagrams of the boards themselves. Since that time I have received some information issued by the actual manufacturers of the boards, Mizuho, and another application circuit for the board used by Dentron in the U.S.A.

The information came through the kindness of "Mike" Michael, W3TS, an avid amateur radio constructor and reader of *Short Wave Magazine*. Mike also included circuits which he has used with the board. It seems that the board was once issued as an item in its own right and called the SG-9 Board, but to save confusion I will stick to our own invented designation: the MLX Board.

Useful Information from The Manufacturer

The manufacturer's manual, although useful, is written in "Japanese" English and contains several repeats and obvious points. I have attempted to glean the most useful items from the text.

Preset Controls

There are three preset variable resistances on the board, designated VR1, VR2 and VR3. On the samples of the board which have appeared in the U.K., VR3 is missing. In Part 3 of this series I advised constructors to use the screened leads which are connected to terminations for VR3 to provide a front panel control, or find a suitable preset control which fits the board hole spacing and replace the missing VR3. The latter is the best choice as once set this control should not require re-adjustment. I advised a value of 10KΩ, although a higher value, up to 100KΩ, may be required for some microphones.

VR3 is the microphone gain adjustment and is factory adjusted in examples of the board which include the control mounted for the Mizuho M-1 microphone, which is a dynamic microphone of 600Ω impedance at 1kHz and −68dB sensitivity at 1 kHz.

VR1 is the carrier balance adjustment which should be factory set, although I could gain some improvement by careful further

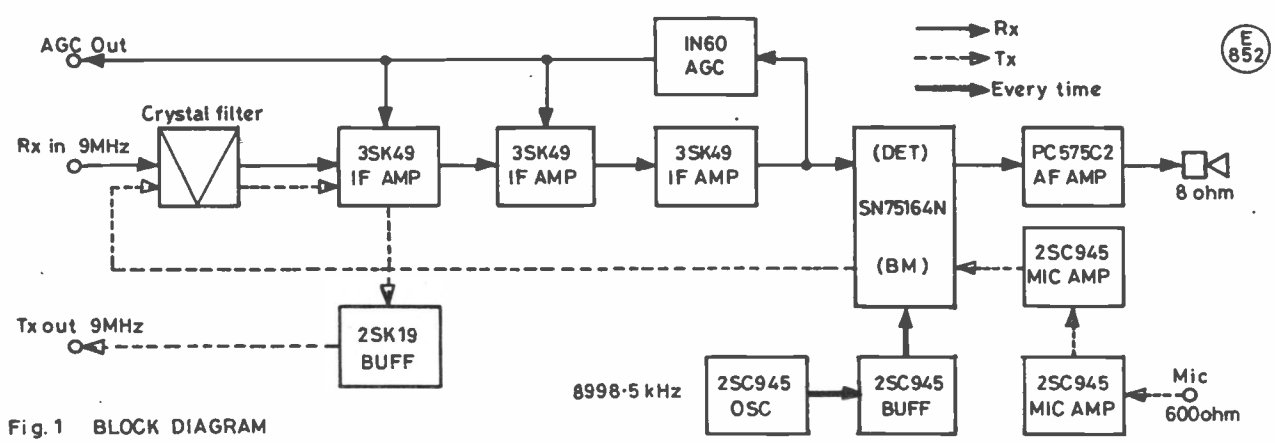


Fig. 1 BLOCK DIAGRAM

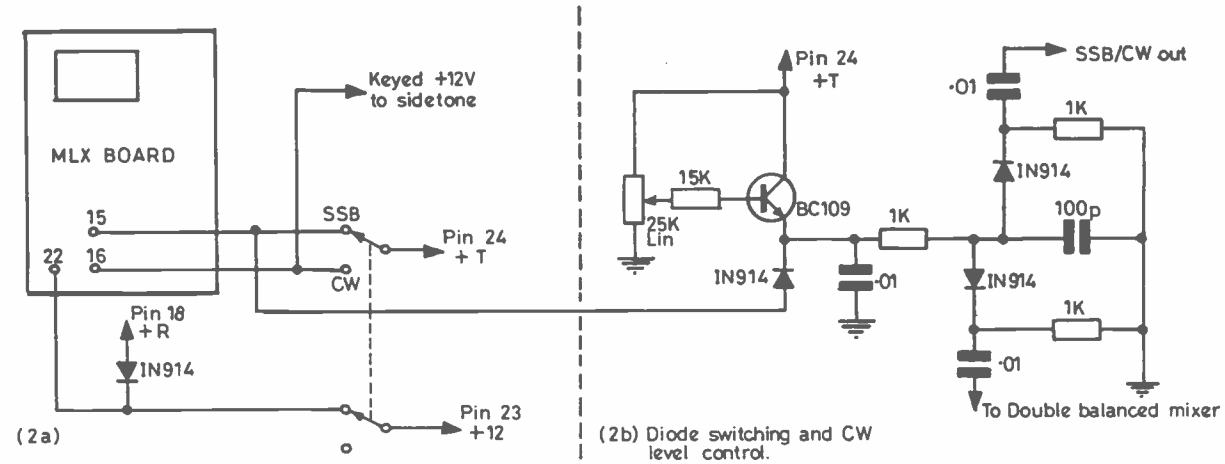


Fig. 2 CW/SSB SWITCHING.

adjustment on most of the samples of the boards I tested. VR2 is the S-meter zero adjustment control; this should set the meter to zero under no-signal conditions but in practice I found it had to be set a little higher to register anything like meaningful readings of signal strength. We were right in our guess of the required meter, the manual quotes 200μA, which makes most of the cheap surplus tape recorder meters suitable for the job.

Brief Description of Board Functions

See Fig. 1.

Transmitter:

The voice signal from the microphone is amplified by a two-stage microphone amplifier (Q5/6) and fed to the SN76514N, double-balanced mixer integrated circuit. The resultant double-sideband signal is fed to the crystal filter to produce a 9 MHz SSB signal. This signal is then amplified by the first MOSFET IF amplifier (Q2) and a source-follower buffer stage (Q1) provides a low impedance output.

Receiver:

The 9 MHz signal at the input is filtered by FL1 and then amplified by three MOSFET IF stages (Q2/3/4). Part of this signal is used to provide an AGC voltage, rectified by D4/5, to control the voltages on the IF amplifier gates. An AGC voltage line is available at pin 11 to control external RF stages. This voltage varies from 0 to approximately −1.5 volts depending upon the signal strength. The amplified IF signal is fed to the SN76514N for balanced detection; during transmission this device is diode switched for balanced modulation. The detected output is amplified by a 575C2 integrated circuit audio amplifier.

Standby Circuit:

Two transistors, Q10 and Q11, provide switched 12 volt lines

Manufacturer's Specification

TRANSMITTER:	
Output Frequency:	9.00 MHz
Modes of Operation:	A3J and A1 (SSB/CW)
Carrier Oscillator:	8.9985 MHz
Carrier Suppression:	Better than 40dB
Side-band Suppression:	Better than 40dB
Output:	120mV into 50Ω
Microphone Input:	Low Impedance (600Ω advised)
RECEIVER:	
Input [IF] Frequency:	9.00 MHz
Input Impedance:	500Ω
Selectivity:	Less than 4.8 kHz at −60dB
Passband Width:	More than 2.4 kHz at −6dB
Audio Output:	1 watt at 8Ω
Power Requirements:	Transmit — 60mA (max) Receive — 60mA (under no signal condition)
Size:	22mm high x 102mm wide x 87mm deep.

Table of Values
MLX Board
(see SWM Aug. '86, pp. 224-225)

R1, R42 = 560R
R2, R6, R13, R17, R39, R43, R46, R47, R51 = 10K
R3, R12, R18, R20 = 15K
R4, R28, R29, R41 = 22K
R5, R16 = 100R
R7 = 6K8
R8, R21, R44 = 51R
R9, R19 = 470K
R10, R11, R14, R15, R22, R25 = 220R
R23 = 4K7
R24 = 390R
R26 = 150K
R27, R31, R34 to R38 = 1K
R30, R32 = 820R
R33, R48 = 47K
R40 = 8K2
R45 = 27K
R49 = 150K
R50 = 120K
R52 = 470R
C1 to C4, C6 to C13, C15, C17, C27, C29, C30, C34, C35, C37 to C40, C47, C49, C52, C54 = 0.01μF disc
C5 = 2pF disc
C14 = 6.8μF tant.
C16 = 100pF disc
C18, C19 = 0.47μF elec.
C20, C32, C43, C44 = 4.7μF elec.
C21 = 0.047μF disc
C22, C23, C33, C42, C45, C48, C50 = 0.001μF disc
C24, C36, C57 = 33μF elec.
C25, C28, C31, C59 = 10μF elec.
C26 = 0.0047μF disc
C41, C46 = 100μF elec.
C51 = 47μF elec.
C53 = 220pF disc
C55 = 470pF disc
C56 = 18pF disc
C58 = 0.1μF mylar
C60 = 470μF elec.
C61 = 220μF elec.
VR1 = 100K P.C. trim pot
VR2 = 500R P.C. trim pot
VC1 = 35pF
IC1 = SN76514
IC2 = 575C2
Q1 = 2SK19
Q2 to Q4 = 2SK49
Q5 to Q10 = 2SC945
Q11 = 2SA719
D1 to D3, D10 = MC301
D4, D5, D9 = IN60
D6, D8 = RD82EB
D7 = 1S1588
CH1 to CH4 = 1mH
CH5, CH7 = 470μH
CH6 = 10μH
T1 to T3 = IF can variable
X1 = 8.9985 MHz xtal
FL1 = filter, xtal 9 MHz

Note: all resistors are ¼-watt.

for transmit and receive functions. For the operation of external circuits the maximum currents available are:
Transmit circuits: 160mA.
Receive circuits: 50mA.
If a larger current is required for external transmit function circuits, the transmit supply line may be used to energise a relay to switch on 12 volts directly from the main power line. Such a relay (12 volt coil) would be added between pin 24 and ground. In practical terms this means that external driver and power amplifier stages could not be powered directly from the onboard 12 volt transmit line.

CW Operation

As we guessed, but had not seen circuits for, the frequency offset facility provided for the carrier oscillator at pin 22 is designed for shifting the carrier frequency for CW operation. As the manual says:
"During reception, the carrier frequency is the same as that for SSB (8998.5 kHz). During transmission the carrier frequency is shifted up approximately 800 Hz with a diode switch. Therefore, a "zero-in" position can be obtained by setting the dial to produce an 800 Hz beat with the signal of the received station".

In Part 1 of this series, we described how this offset facility could be used to provide sideband switching for multiband SSB operation or choosing the high side carrier frequency (9001.5 kHz) for lower band operation. Slight modification of the oscillator circuitry around Q8 is required to shift the frequency this far. Refer to Fig. 5 on page 227 of *Short Wave Magazine,* August 1986, for this circuit change.

Fig. 2 shows the CW operation circuit used by W3TS based upon this information. It is important to note that this system uses the original 8998.5 kHz carrier insertion crystal supplied with the board, so the VFO signal required on bands up to 7 MHz must be on the high side of the IF frequency. For example, W3TS used a VFO of 10.8 to 11.00 MHz for his Top Band (1.8 to 2.00 MHz) transceiver built using the board. Eighty metres would require a VFO from 12.5 to 12.8 MHz and 40 metres a VFO over 16 MHz, both of which are a little high for the simple construction of a stable variable oscillator. However, higher frequencies will mix on the low side: for example the common 5.0 to 5.5 MHz could be used for 20 metres.

W3TS points out the usefulness of being able to change from SSB to CW and allow the receiving station to be able to copy either mode on the same receiving frequency. This is useful if band conditions change and CW can be used to maintain contact, perhaps by using the microphone press-to-talk switch. The other operator will be able to hear an 800 Hz tone CW signal without retuning his receiver. The circuit is set up using a frequency counter to monitor the carrier oscillator frequency which is set to allow an 800 Hz offset. The frequencies required are:

CW Transmit:	set CVT1 trimmer to 8999.0 kHz.
CW or SSB Transmit:	set CVT2 trimmer to 8998.2 kHz for 800 Hz tone.

The bottom part of the circuit included in Fig. 2 shows the W3TS diode switching arrangement for using a passive double balanced mixer (SBL-1) for both transmit and receive switching and the provision of a CW drive level control. If such a passive mixer is to be used for both transmit and receive mixing an impedance matching transformer is required between the 50Ω port of the mixer module and the receiver input point (500Ω) on the board. W3TS used a ferrite FT37-43 core with a ratio of 18 turns to 5 turns.

Well — I hope the above adds to the body of information available for this useful little SSB Circuit Board. It is an easy way to get a homebuilt SSB transceiver onto an amateur band. There are several about — listen out for them.

★ ★ ★ ★ OBLAST CORNER ★ ★ ★ ★

NIGEL CAWTHORNE, G3TXF

CHASING oblasts on the HF bands provides an interesting challenge for newcomer and old-time DX'er alike. The USSR is divided into 184 administrative regions called 'oblasts'. A station's oblast can usually be identified directly from the callsign.

Table 1 which can be used for identifying oblasts worked or heard has two check columns. One is for "All-Time" and the other for "1987 In-Year". The "1987" column is for keeping a record of those oblasts worked/heard during the year. The "All-Time" is for the all-time score (including 1987).

For the "In-Year" table everyone starts off at 'zero' on January 1st each year. Old-timers and newcomers start out the year on an even footing.

1986 Table Results

Congratulations to Mike, G4AYO, and to Brad BRS1066, leaders of the 1986 In-Year Oblast Worked and Heard tables respectively. G4AYO's 166 in-year oblast worked score (only 18 away from a full-house of 184) was well up on last year's leading score of 150, as was Brad's 162 in the SWL section. Brad wins the SWL table for the second year running.

Thanks to all those who regularly sent in entries. You can use your 1986 score as your target for 1987. The promised turn-around in HF propagation for 1987 should help get a few more oblasts on the HF bands.

Rare Oblast News

There have been several reports of activity from super-rare oblast 175, UA8V. Barry, VK5BS, worked UZ9OWM/UA8V during the CQ WW CW contest. QSL info. was given as UA9OBA. Mike, G4AYO, and G3TXF (who was operating at the time from GJ0AAA as part of a contest DX-pedition to Jersey) both report hearing the same station from elusive 175 oblast during CQ WW CW, but were both unable to get a QSO.

According to the table of U.K. 'wanted' oblasts based on info. supplied by readers of *Oblast Corner,* no-one so far has made a QSO with UA8V (175), and only one has with UA8T (174).

Tom, K1KI, notes that rare oblast UI8U (55) is scheduled to be active in late January or February with UB5ZX operating as UB5ZX/UI8U.

Mailbag Reports

Brad, BRS1066, reports some good 160m. openings with UA9QDA (134), UA9JEL (162), UA9XQ (090), UF6VBC (013), UL8CWW (028), RA6YAG (102) and UA6YHQ (102) all in the

Oblast		ALL TIME	1987	Oblast		ALL TIME	1987	Oblast		ALL TIME	1987	Oblast		ALL TIME	1987
1A	169			6P	96			B-E	60			I-F	47		
1C	136			6U	115			B-F	70			I-G	54		
1N	88			6W	86			B-G	78			I-I	51		
1O	113			6X	87			B-H	71			I-L	48		
1P	114			6Y	102			B-I	73			I-O	50		
1Q	120			8T	174			B-J	67			I-Q	185		
1T	144			8V	175			B-K	72			I-T	52		
1W	149			9A	165			B-L	77			I-U	55		
1Z	143			9C	154			B-M	59			I-V	181		
2F	125			9F	140			B-N	57			I-Z	56		
3A	170			9G	141			B-P	58			J-J	40		
3D	142			9H	158			B-Q	64			J-K	182		
3E	147			9J	162			B-R	81			J-R	42		
3G	137			9K	163			B-S	74			J-S	41		
3I	126			9L	161			B-T	79			J-X	183		
3L	155			9M	146			B-U	65			L-A	179		
3M	168			9O	145			B-V	66			L-B	16		
3N	132			9Q	134			B-W	68			L-C	28		
3P	160			9S	167			B-X	62			L-D	29		
3Q	121			9U	130			B-Y	82			L-E	25		
3R	157			9W	84			B-Z	69			L-F	27		
3S	151			9X	90			C-A	188			L-G	190		
3T	122			9Y	99			C-C	9			L-I	17		
3U	123			9Z	100			C-I	8			L-J	19		
3V	119			0A	103			C-L	5			L-K	24		
3W	135			0B	105			C-O	7			L-L	26		
3X	127			0C	110			C-S	10			L-M	22		
3Y	118			0D	111			C-W	6			L-N	31		
3Z	117			0F	153			D-N	2			L-O	20		
4A	156			0H	106			D-D	1			L-P	23		
4C	152			0I	138			D-K	3			L-Q	18		
4F	148			0J	112			F-F	12			L-R	178		
4H	133			0K	139			F-O	15			L-T	21		
4L	164			0L	107			F-Q	14			L-V	30		
4N	131			0O	85			F-V	13			L-Y	176		
4P	94			0Q	98			G-G	4			M-M	36		
4S	91			0S	124			H-A	191			M-N	34		
4U	92			0U	166			H-B	180			M-P	177		
4W	95			0W	104			H-E	44			M-Q	33		
4Y	97			0X	129			H-H	43			M-T	184		
6A	101			0Y	159			H-W	45			O-O	39		
6E	109			0Z	128			H-Y	46			P-B	38		
6H	108			B-A	75			I-A	189			Q-G	37		
6I	89			B-B	76			I-B	53			R-R	83		
6J	93			B-C	80			I-C	49			T-J	187		
6L	150			B-D	63			I-D	173			T-U	186		

Table 1. Operating aid and checklist for oblast chasing. Use this list to keep your "All-time" and "In-Year 1987" oblast records. Send your "All-Time" and "In-Year 1987" totals to G3TXF to appear in the next "Oblast Corner" in the April issue. Deadline and address at the end of the article.

log. Brad now has 100 oblasts confirmed (all bands).

Two new ones for John, G4WSX, were UF-V (013) in the form of UP2BBM/UF and UP3BA/UF and UA0Y (159) in the form of RV0YF. Oblast 159 is also a special catch because it is the only part of the USSR in Zone 23. A QSL received from UA9AN/UI in UI-F (047) was a surprise new one for John, who runs 40 watts to a half-size G5RV.

Steve, GW4BKG, has made a year-end count of USSR callsigns

OBLASTS 'WORKED' TABLE

Station	*1986 (max 184)*	*All-Time (max 184)*
G4AYO	166	174
G4OII	159	167
G3TXF	152	172
G4WSX	147	154
G4ZFE	141	145
G0BZV	138	138
G4PWA	13?	175
G3PMR	129	135
G4UNH	127	145
GW4BKG	126	152
G4UNH	120	144
G3YRW	106	135
G4OBK	96	152
G4DJX	87	115
G4XRX	84	140
G4ZZG	82	84
GM0CBX	76	85
G0CGV	66	67
G4TWX	65	120
G4XRV	65	65
G4LZZ	53	90
G4XTM	51	93
G4VFG	44	77
G3URA	42	91
G4YIR	36	53
VK5BS	—	116

OBLASTS 'HEARD' TABLE

Station	*1986 (max 184)*	*All-Time (max 184)*
Brad BRS-1066	162	176
Frank BRS-88557	153	174
Eddie 9H1-15357	131	149
Tony BRS-87156	120	135
SWL Philip Davies	115	127
Norman BRS-28198	105	116
Ken BRS-88465	77	77
SWL Ray Williams	76	108
Maurice BRS-32601	67	148
SWL Angela Sitton	66	66
SWL Mrs G. Cooke	60	112
Graeme BRS-44984	48	105
Luciano G1VDW	47	88
SWL Neil Melville	—	158

Table 2. Send your entries for the '1987 in-year' and 'All-time' tables to reach G3TXF by *February 28th* for the April issue. The 'All-time' table is based on current oblasts only (max 184).

worked which has reached 1,551 different USSR callsigns and 153 different USSR prefixes. Steve wonders if anyone else keeps this sort of record, and if so what their totals might be.

The writer doesn't keep a summary record of individual calls worked, but a recent count-up of cards in G3TXF's QSL shoe-boxes totalled 1,713 different USSR calls for which cards had been received.

Rupert, G4XRV, found UA4C (152), UC-O (007), UC-W (006), UT-J (187) and UT-U (186) for new ones. Rupert will be using his year-end score of 65 as his target for next year.

Jim, G0CGV, uses a G5RV at 33' a.g.l. and has a number of rarer oblasts on his first entry. He will be hunting more UA stations in 1987.

Richard, G4ZFE, logged UA0WW (104) and UI9GWA (054) for all-time new ones. He enjoys trying out some Russian on CW and says that this turns a 'rubber-stamp' QSO into a more interesting contact.

Barry, VK5BS, notes that there were good conditions from South Australia to UA during October and November; Barry says that the tough areas from VK5-land are UA6, UF, UG, HU, UI, and UM. VK5BS was looking forward to a hot Christmas with temperatures approaching 40°C!

The last five for the year worked by Russ, GM0CBX, were UA3IGO (126), UA3ZEJ (117), UB5GGI (078), UB5TCS (079) and UA3SEO (151) bringing his score for the year to 76.

Ted, G0BZV, found EK4AH (oblast 133) and U3KM during CQ WW CW; he has found that oblast chasing has added more interest to DX ing!

Alex, G4UNH, is still waiting for a QSL from a UD to complete his USSR republics. A QSO with UI8OAN (050) was Alex's last new one for 1986.

Speedy QSLs

Ted, G3DRN, the RSGB's hard-working QSL Manager, has supplied some interesting statistics following those published in the December '86 *Oblast Corner* concerning QSLs from the USSR.

Of a random bundle of 100 in-coming USSR cards analysed at the RSGB Bureau in early December, Ted found that three were for QSO's made in the previous month, 26% were up to six months old, 50% up to nine months, 19% up to twelve months and just 2% were for older QSOs. The average, according to Ted's calculations, was about eight months; over 50% of cards arrive within eight months of the QSO.

But as Ted reminds us, a chain is only as strong as its weakest link, and if users of the QSL Bureau do not keep properly stamped envelopes with their sub-manager, there will be delays. G3DRN tells the story of the two amateurs who complained to RSGB Hq. One said he hadn't received any cards for three years. When this was looked into, it was found that the amateur hadn't ever sent any envelopes to the Bureau. The other was also complaining of non-receipt of QSLs. This time it was found that there were indeed envelopes in the Bureau but that only six cards had accumulated for the amateur in a year. The Bureau sub-managers usually wait until there is a reasonable number of cards to fill an envelope before posting it, unless it is marked otherwise on the envelope.

Helping the QSL Bureau

There are several things that QSL'ers can do to help the QSL Bureau manager deal with his cards as quickly and easily as possible. Probably the most important is to send the cards to the Bureau in order and not just in a random pile. The better they are sorted (alphabetically by country), the faster the QSL Bureau manager will be able to sort them into the correct out-going piles.

It is much easier and quicker for the QSL manager to go through a pile of accurately sorted cards, than it is to handle a pile of totally jumbled out-going QSLs. It is also equally important to keep a good stock of sensibly sized stamped and self-addressed envelopes with your sub-manager to receive in-coming cards.

Also make it easier for the QSL manager by writing the call-sign to whom the card is being addressed clearly on both sides of the cards. Avoid having a jumble of callsigns on the card in similar writing. The callsign of the station to whom the card is addressed must be obvious at first glance and not hidden away in small writing in among the text of the card. Bold, clear callsigns will help speed your cards through the Bureau to their destination.

Parcels of cards are sent out from the RSGB Bureau to the major bureaux on a weekly basis, including Box 88.

Table Entries

Send your entries for the "All-Time" and "1987 In-Year" oblast heard/worked tables to reach G3TXF at "Holt Cottage", Kingston Hill, Kingston-upon-Thames, Surrey KT2 7JH, by **February 28th** to appear in the April issue.

Many thanks to Tom K1KI (USSR *Tidbits*), IARU/ARRL and Dex W4KM (translations from *Radio*) for items extracted. Good hunting es DSW!.

VHF BANDS

NORMAN FITCH, G3FPK

PERCHED on the North Downs your scribe has a superb view to the northwest right across London. The scene at the start of what could be a long spell of Arctic weather is real Christmas card stuff — crisp, fresh snow and brilliant sunshine with the outside temperature minus 10°C. It is times like these when the advantages of working from home are fully appreciated. Although the barometric pressure is high, these winter, polar anticyclones do not usually bring good tropo. conditions.

The 1986 Tables

38 readers entered the Annual VHF/UHF Table last year, well down on the record 1985 total. Top honours go to Bob Nixon, G1KDF, from Ormskirk (LNH) who amassed 251 points. He was sixth in 1985 and his improved performance was due to much more 23cm. activity. Tony Collett, G4NBS, from Hardwick (CBE) was a close second with 240 points. He operated on all four bands, but of course only the best three count for points: he was seventh in 1985. In third place was Haydn Barker, G6XVV, from Braithwell (YSS) with 228 points, one better than his 1985 total which earned him fourth place. Four readers scored over 200 points in 1986 but only three used all four bands. There was a 50/50 split between Class A and B licensees, about par for the course.

Nine readers entered scores for the 4m. band with only five points separating the first four. John Wilkinson, G4HGT, from Leeds (YSW) came out top with 65 points. One point behind was Jerry Russell, G4SEU, from Nuneaton (WKS) and one point behind him was Martyn Jones, G4TIF, from Leamington Spa (WKS), each of whom worked six countries. The only one to notch up seven was Dave Lewis, GW4HBK, from Pontllanfraith (GWT) who was fourth with 60 points. This was an excellent performance bearing in mind Dave's geographical location.

On 2m. there were 36 entries and nine scored 100 or more points. The band leader was G1KDF who found 94 counties, no less which, with his 24 countries, gave Bob a final total of 118 points. Only one point behind was Colin Morris, G0CUZ, from Dudley (WMD) who worked the most countries, 30, helped by his MS activity. G6XVV was third with 113 points and eleven readers contacted more than 20 countries. An interesting statistic is that average scores were up from 70 in 1985 to 77 last year.

26 readers operated on 70cm. and once again, G1KDF led the field with 96 points, one more than his 1985 total. In second place was Paul Brockett, G1LSB, from Spalding, (LCN) with 83 points, while G4NBS was joint third with G6XVV on 80 points. G1LSB and G4NBS each notched up 21 countries and nine entrants worked more than ten countries in 1986.

The 23cm. band attracted nine entries and G4NBS came first by a wide margin with 66 points — 48 counties and no less than 18 countries. In second spot was Bryn Llewellyn, G4DEZ, from Southend on Sea (ESX) with 13 countries and a 40 points total. Joint third with 37 were G1KDF and Philip Ruder, G6MGL, (LDN).

Finally to the 1986 CW Ladder, top of which was Pat Billingham, G4AGQ, from Farnham, (SRY) the only participant using all four bands. He scored 482 points, 435 of them on 2m. In second place was Mike Honeywell, G0ABB, from Warsash, (HPH) with 384 points and who operated on 2m, and 70cm. June Charles, G4YIR, (ESX) used only 2m. and her 318 points earned her third spot. 20 readers entered this table, four using 4m. and eight 70cm. the bulk of the action being on 2m. as expected.

The existing tables seem quite popular so we will carry on as before. A regular query is what counts as a county. As far as all the G countries are concerned, there are 78 as listed in the January *RadCom,* being the administrative variety. The 26 counties in the Irish Republic also count making a possible total of 104. The countries are the *ARRL's* DXCC ones plus Shetland (GM) and Sicily (IT9). Consideration is being given to a 6m. table of some kind and it would be sensible to start this if and when the band is released to Class B licensees.

Award News

There are three new members of the 144 MHz QTH Squares Century Club this month. No. 73 was issued to the *Petöfi S. Radio Club,* HG8KAX, (KG16g) from Mezöberény on December 31 1986. They have 118 squares confirmed, 68 being on CW mode, the rest on SSB. Unfortunately no propagation modes were indicated in their certified list but judging by the dates, there were quite a lot of *Es* QSOs with EA, F and British stations over the years. There were seven *Ar* contacts identifiable from the tone A reports. No station details were given.

Keith Boleat, GJ6TMM, (YJ70j) was issued with certificate no. 74 on Jan. 10 for 101 confirmed. All QSOs were on SSB, 92 *via* tropo., six *via Es* and three by *Ar* mode. Best tropo. DX is SK6HD (GS68j) at 1,466 kms., best *Es* being 9H1CG (HV13b) at 2,004 kms. and best *Ar* GM4TXX (XP03e) at 779 kms. Keith was first licensed in February, 1983 and began with a *Belcom* Liner-2 and 8-ele. *Jaybeam Yagi.* The current station comprises a *Yaesu FT-290R, 100W Microwave Modules* amplifier and a 16-ele. *Tonna Yagi.* The site at La Pouquelaye is 220ft. *a.s.l.* on the north side of St. Helier. Keith likes 2m. contests and came second in the *RSGBs* Sept. 1985 and May 1986 events. In May 1985 he started on 70cms. the station consisting of a *Yaesu FT-790R at one watt to a 24-ele. Parabeam.*

Chris Ploeger, PA2CHR, (CL10h) from Oosterbeek was issued with certificate no. 75 on Jan. 12 with stickers up to 225 confirmed. He was PE0CHR and the QSLs date back to 1976. 216 contacts were on SSB, six on CW and three on FM. Propagation-wise, 145 QSOs were on tropo., 33 *via* MS, 27 *via Es* and 19 *via Ar.* On Oct. 26 last, Chris worked W5UN (EL29) *via* the Moon on CW. No personal or equipment details were included, unfortunately.

ANNUAL CW LADDER

Final Placings at December 31, 1986

Station	4m.	2m.	70cm	μWave	Points
G4AGQ	33	435	13	1	482
G0ABB	—	382	2	—	384
G4YIR	—	318	—	—	318
G4ZVS	—	249	—	—	249
G4SFY	—	221	—	—	221
G4OUT	—	217	—	—	217
G4ARI	—	164	43	—	207
G4EIB	—	207	—	—	207
E15FK	—	142	1	—	143
G4PPV	—	133	—	—	133
G4VOZ	72	—	38	—	110
G4EZA	—	109	—	—	109
G4XUM	—	105	—	—	105
G0DJA	—	100	—	—	100
G2DHV	13	62	1	—	76
GW4HBK	56	—	—	—	56
GU4HUY	—	53	—	—	53
G4TJE	—	52	—	—	52
G0FB-G/PA	—	42	3	—	45
G0FOT	—	32	2	—	34

No. of different stations worked in 1986.

Haydn Barker, G6XVV, member no. 68 of the 144 MHz QTHCC, was awarded his 125 sticker on Jan. 2 and now has 139 confirmed. 22 cards were sent and two were for MS contacts, EA1YV (VC) and HG8IH (KG), one *via Ar* with GM1JKJ/P (YP), the rest being tropo. QSOs.

The 42nd. VHF Century Club certificate for 70cm. has been issued to Tony Collett, G4NBS, on Jan. 9. His station now comprises a *Trio* TS440, an HBW transverter from *SSB Electronics* using a high level mixer, an *MM* 100W amplifier and *Gasfet* masthead preamp. The antenna is a 21-ele. *Yagi* at 33ft. the site being 200ft. *a.s.l.* 8 kms. west of Cambridge. Tony was first licensed as G8GXE in 1971 when he was living in Slough. He moved to the present QTH in March, 1984 but did not get going until April, 1985.

G4NBS has also been issued with 2m. VHFCC certificate no. 390 on Jan. 9. He has two station options on the band, the

first an old *Yaesu* FT-221 with the *muTek* board, the second a *Trio* TS-711E which can give out about 30W. A solid state PA is used with either set-up to give a maximum of 180W, the antenna being a 9-ele. *Yagi* at 30ft. Certificate no. 391 was issued to GJ6TMM, with his QTHCC award, on Jan. 10. For details of SWM awards, send an *s.a.e.* either to the new address at the end of this feature or to G3FPK, *(QTHR)*.

Beacon Note

On May 16 last year, there was an early *Es* opening towards Russia in which John Palfrey, G4XEN, (NHM) reported hearing a beacon UO5OID on 144.310 MHz. This could not be found in any current lists but John has now solved the mystery, thanks to YO4BZC, on the 20m. VHF net. It is located at KN24DL which is OG square, the QRB from John's QTH being 2,180 kms. No other details were forthcoming as to power and antennas, though. More beacon data in the next section.

Repeater News

Geoff Booth, G8DZJ, has sent a press release concerning GB3SE. This is a repeater at Stoke-on-Trent (SFD) although the exact QTH was not stated, the locator is given as IO82WV. The licence was granted in early November and it was switched on at 2100 on Nov. 21. It receives on 1,291.075 MHz and can be heard on 1,297.075 MHz, *i.e.* RM3. Access is by a 1,750 Hz toneburst and if the received signal is more than 5 kHz high or low, the letter "H" or "L" is sent in Morse code. The callsign is given in MCW.

GB3SE incorporates a crystal oven designed to keep the temperature constant within plus/minus 0.2°C, ". . regardless of the exterior air temperature." The TX and RX frequencies are derived from the same crystal so that the difference is a constant 6 MHz. The RX uses a PLL audio discriminator which can follow off channel signals, reproducing the recovered audio with minimum distortion. The repeater is currently running 6W *e.r.p.* and the antennas are two *Alford* slots giving omni-directional, horizontal polarisation.

When not in repeater use, GB3SE becomes a beacon sending its callsign in FSK once every 35 seconds. Every eighth callsign is sent in MCW. When switching from beacon to repeater mode, the letter "T" is sent and when the repeater mode has finished, a 400 Hz tone of one second duration is sent. For more information, send an *s.a.e.* to G8DZJ who is *QTHR*.

The Satellites

The memory condition of *O-10's* OBC continues to deteriorate but nevertheless, this satellite is still giving a reasonable service. However, QRP use is essential which means 100W *e.r.p.* or less. Due to current eclipse problems the transponders should not be used between *Mean Anomaly* values of 200 to 020.

The Japanese are still experimenting with *FO-12* before concluding a proper operating schedule. There are no reader reports about this latest "bird." The Soviet satellites *RS-5* and *RS-7* have survived a long eclipse period but their batteries are now badly degraded, the one in *RS-5* not being able to hold a charge. When the load on the power supply increases, the voltage quickly drops and the transponder shuts down. It has to be commanded back on by a ground station. According to PA0DLO, the long rumoured launch of *RS-9* and *RS-10* could have been in January, but we will believe that when we hear them.

Colin Morris, G0CUZ, was so bored with the poor tropo. conditions over the Christmas holiday that he operated through *RS-5* and *RS-7* when they were in continuous sunlight. Using CW, he worked D, G, HG, I, OK, OX, OZ, OE, UA1, 3, 4, 6 and 9, UB5, UO5, UL7 and W1.

On the hardware side, *AMSAT-UK* secretary Ron Broadbent, G3AAJ, advises that the PCBs for the *FO-12* demodulator are available and that the similar ones for *O-10*, which will be perfect for the *Phase 3G* satellite, are on the shelf. An *s.a.e.* to *AMSAT-UK* at 94 Herongate Road, London, E12 5EQ will bring all the details. The group is now reachable by Telex, no. 295141. Answer TXLINK G. Key 019896741 and send message.

Contests

The 70 MHz *Cumulatives* get underway on Feb. 1 with the remaining sessions scheduled for Feb. 15, March 1, 15 and 29. There is only one section and the times are 1000 to 1200 local. The 144 MHz CW contest is on Feb. 8, from 0900-1500 and will enable some useful points to be accumulated for this year's CW Ladder, This is another one section affair.

On Feb. 22 there is the 432 MHz Fixed Station and Affiliated Societies Contest from 0900-1500. This is a Single-op. and Multi-op. event and the "team" part follows the lines of the 144 MHz event which was introduced in 1985 except that a team is three instead of five stations. However you can still enter on an individual basis as in any other contest. The complete rules were in the January *RadCom*.

23 CENTIMETRES ANNUAL TABLE

Final Placings at December 31, 1986

Station	Counties	Countries	Total
G4NBS	48	18	66
G4DEZ	27	13	40
G1KDF	30	7	37
G6MGL	26	11	37
G6XVV	27	8	35
G1DOX	30	5	35
G4MUT	14	6	20
G6AJE	3	1	4
G4AGQ	1	1	1

The weekend March 7/8 sees the first major event, the 144/432 MHz and SWL Contest, 1400-1400 being in three sections;- Single-op., Multi-op. and SWL. Single band entries for 144 MHz only will not be accepted but do not let that stop anyone from participating so that points can be given to others.

The German *DUBUS Magazine* is sponsoring five VHF/UHF Contests this year with the aim of furthering DX activity. They are open to all European amateurs and are scheduled for the first weekend in March, May, July, September and October from 1400 to 1400 GMT. This means that the first one coincides with the aforementioned 144/432 MHz event. The various sections are made up from the band, single or multi-op., and CW only or mixed mode, so, for example, a phone only 2m. operator would be in the 144/Single/Mixed section — as there is no phone only category. You call "CQ DX test" on CW or "CQ DX Contest" on phone. Exchanges are the usual RS(T) and serial number and the *European QTH locator* not the Maidenhead one, so if you are a newcomer weaned on Maidenhead, better work out your E-QTHL.

The scoring is based on one point *per* QSO, regardless of distance multiplied by the total number of primary locator squares worked, *e.g.* ZL, AM, EI, etc. so 300 QSOs with 41 squares would be worth, 12,300 points. Only direct contacts are valid; no repeater, satellite or *E-M-E* QSOs. Entries for each contest should be sent no later than the last day of the month in which they occur. The 144 MHz entries go to DK3UZ at P.O. Box 38, D-2358 Kaltenfirchen, German Federal Republic, and entries for 432 MHz and above go to DL4EA at Velberter Str. 9, D-4000 Duesseldorf 1, German Federal Republic. So to repeat, if you hear stations calling "CQ *DX* Contest" please do them the favour of giving your European QTH Locator and not the Maidenhead one.

Concerning the idea of a *Short Wave Magazine* contest of some sort, this has been put on the proverbial back burner for a while since our new owners, *PW Publishing Limited*, already sponsor a contest through *Practical Wireless*.

Packet Radio

Andy Witts, G1DIL, secretary of the *Midlands AX-25 Packet Radio Users Group, MAXPAK*, has written to say that the group is working with the *RSGB* to provide a live demonstration of PR at the National Convention on March 27 and 28. In conjunction with *BARTG* and *RAYNET*, three stations will be operational in the hall with activity centred on the *RAYNET* island stand in the middle of the hall. The group is seeking support for its GB3AP *Digipeater* project. Further inquiries to G1DIL at 56 Stephenson Drive, Perton, Wolverhampton, WV6 7UY.

Nordic Meeting

In the December VHFB, brief mention was made of the Scandinavian VHF/UHF Meeting on June 5-7. More information is to hand now and the venue is the Overnasgarden Motel at Mariehamn in the Aland Islands. The motel is about ten minutes walk from the ferry and lodging there costs FIM 200, whatever that is. The organisers are asking for papers, in English, to be submitted for possible inclusion in the programme of events. From *DUBUS* 4/86, it would appear that planning is still in the very early stages but the person to contact for the latest information is Peter Lytz, OH2AVP, Strandprom. 28, SF-10300 KARIS, Finland. From the U.K. Peter's home telephone no. is 010 358 11 31160 or at work, 010 358 0 2992134. There is a camping/caravan site nearby.

Six Metres

Dave Ackrill, G0DJA, (WMD) has just completed a *Practical Wireless* "Meon" 144/50 MHz transverter and with half a watt has worked locals and G0CPJ in Nottingham. His antenna is a *Quad Loop,* and a small amplifier is contemplated plus getting the antenna onto a rotator. Dave hears the GB3NHQ beacon and copied pings from GB3SIX on Dec. 12 in the *Geminids.* In a later letter he reports working GW3MHW (PWS).

Ken Osborne, G4IGO, (SOM) has been active on MS. In the *Geminids* he completed with LA6QBA (FT) and GM4YPZ (YQ) and in the *Quadrantids* on Jan. 3 and 4, GM4NFC, GM3WOJ, GM0FRT three times, GW4LXO, G4VXE and LA2AB. Alex McCreadie, GM0BPY, has written that ". . there seems to be remarkably little activity on 6m. in GM and therefore contacts have been rare." In the four *Auroral* events of Nov. 24-30, he called frequently but the only station heard was GI0EYC on the 25th who said he also found the activity very low.

Paul Turner, G4IJE, (ESX) reckons people may not be giving the band a chance and says there is more activity than some poeple make out. He has made about 1,350 QSOs since Feb. 1 1986 with 12 countries in 45 squares and is QRV most evenings, averaging four or five QSOs. He suggests that 10W to a dipole is not really good enough and that 20-25W output to a 6-7 dB gain antenna at least 30ft. *a.g.l.* is necessary if you want to work many stations. During the *Geminids,* random SSB MS activity on 50.350 MHz was quite high and Paul completed with GM4FDT, LA6QBA 7 times, GM4YPZ 5 times, GM3WOJ 3 times and LA9UX. There were many 10-15s. bursts at high strength and best reflexions were on Dec. 12/13.

G4IJE found the *Quadrantids* even better and from 1200-1500 on Jan. 3 he worked GM0FRT, GM3WOJ, GI0EYC, EI6AS, GM4ISM and GM4NFC all on random SSB. There were many 30s. bursts but generally at lower levels than in the *Geminids,* few exceeding S5. The shower seemed to be over by the late evening of the 3rd but the radiant was not well placed for north/south MS contacts in the evening. Paul reports regular weekend MS activity on 50.350 MHz with LA6QBA on from 0610 and GM/GI stations appearing from 0700. His all-time MS total on 6m. is now 637 QSOs.

Finally, Paul would like to hear from any GM or GI on 6m. who uses a *BBC* computer as he would like to try some packet radio experiments. He has written to software tailored for MS use but not compatible with AX-25, more like the Cambridge system. Tests with LA6QBA are contemplated and Paul is *QTHR* in the 1986 *Callbook.*

John Baker, GW3MHW, (PWS) mentions many new stations, both newer licensees and old-timers, appearing with home built QRP gear and lists over three dozen recently heard. He has been listening for ZB2VHF, last copied on Dec. 2 and which is now on top of "The Rock."

Four Metres

In an end-of-year report, John Wilkinson, G4HGT, (YSW) who led the 1986 table, reports no hearing of ZB2BL last year. John's equipment consists of an *Icom* IC-202, 144/28 MHz transverter and *PW* "Meon" to 4m. The PA is a home made 4CX250B and the antenna a 3-ele. *Yagi.* Jerry Russell, G4SEU, (WKS) managed to work GB4MTR in all 13 locations, at GM4ZUK's QTH by MS and at GI3ZTL's "by a miracle" he reckons. He would like to thank all the operators of this unique callsign and all those 4m. folk who helped make it all worthwhile. He has drafted the Award Certificate in collaboration with G4WND and so far G4EPA, G4CAJ, G4HGT and G3UKV have claimed the "Gold" version.

FOUR METRES ANNUAL TABLE

Final Placings at December 31, 1986

Station	Counties	Countries	Total
G4HGT	59	6	65
G4SEU	58	6	64
G4TIF	57	6	63
GW4HBK	53	7	60
G4VOZ	51	5	56
G4NBS	47	5	52
G4MUT	35	4	39
G4AGQ	17	3	20
G2DHV	9	2	11

On the operating scene, Jerry mentions *Quadrantids* MS QSOs with EI2CA/P and EI9FK/P with GM0FRT heard. He says that a supply of *Pye* 'Westminster" low band FM transceivers have become available in the Midlands and are being crystalled up for 70.26 MHz. He has an A200 PA unit in his car giving full legal power. Roger Banks, G4WND, (SFD) also worked EI2CA/P (IO63WC) in 4 mins. by tropo. assisted MS on Jan. 3 but took two hours to complete with EI9FK/P in IO51/VL. CM0FRT, alias GM4ZUK (IO87WB) was a sked completed in 7 mins. on one 15s. burst and GW4HBK was also worked in 4 mins.

Roger mentions the GB4MTR awards and asks those claiming to send the log extracts to either him or G4SEU with £1.35 when individually signed and numbered certificates will be issued by return. He is "driving hard" for a *4m. News-letter* and asks for news of DX-peditions, articles, etc., to put in it, including requests from foreign stations for cross-band skeds to 6m. or 10m. G4WND promises to be very active on MS and conventional modes this year and is equipped for high speed CW using a *Commodore* Vic-20 computer, the only one which does not obliterate the band. His station comprises an *Icom* IC-271E and *MM* transverter with 100W amplifier, the antenna being a 7-ele. *ZL-Special* with elevation; a 4CX250B amplifier is being built.

John Jennings, G4VOZ, (LEC) reports the CW contest on Dec. 14 ". . again proved to be a turn-out of the faithful . ." although it did give him welcome points for the tables. He also mentions the "Westminsters" and suggests anyone interested contact either him or G4SEU for the name of the supplier. GW3MHW has a QQV06-40 with no emission and has advertised for ". . a good secondhand one." He has worked EI2CA, G2AOK, G3CUN, G3UKV, G3APY, etc. though. Finally, Dave Lewis, GW4HBK, (GWT) has been suffering from winter noises so has been busing modifying and building gear, rather than trying to compete with all the thermostats, presumably.

Two Metres

First the MS activity and G0CUZ reports rather poor results from the long distance skeds in the *Geminids.* The only "real DX" one completed was with EA7TL (XW). Colin completed with SM4POB (HU) and probably with SK4BX/4 (GU) all on CW. SSB skeds were successful with SP9EWO (JK) and IW5BML (FC) who runs a mere two kilowatts to sixteen 20-ele. *Yagis.* Random CW contacts were completed with TK5EP (EB), DF7DJ/P (GH) and YU3ES (GF). As predicted, Colin found this shower reasonably good on Dec. 13, 20-22h and 03-07 on the 14th. In the *Ursids* on Dec. 22 around midday, a test with OE3JPC (II) produced a good, quick MS QSO but nobody else was QRV it seems.

G0CUZ thought the *Quadrantids* shower excellent in the afternoon of Jan. 3 and again at 22-03h on the 3/4th. Best completed QSO was SP8AOV (LL) in 22 mins. on CW and other successful CW skeds were DF1ZE (FH), OK3CPY (JI)

and EB5EHX (ZZ). He made random QSOs with HG2NP (JH) and SP9AMH (JK) on CW, also a 2 mins. SSB one with OK3LQ (II). Bob Nixon, G1KDF, (LNH) did a lot of listening in the *Quadrantids* and heard very good pings from I, OE, OH, SP and YU but totally spoilt by newly-licensed G and EI stations calling "CQ MS" continuously, obviously with no idea of the correct procedures. The advice must be that, if you are uncertain how to operate on the random SSB frequencies, then either just listen to what the "regulars" are doing or better still, have a QSO with one of them before a major shower. Far better that than making a fool of yourself and being a nuisance to others.

Ken Osborne, G4IGO, completed with EA3XDU (BB) on CW on Dec. 12 and with YU3EW (IG) on SSB random on the 13th. In the *Quadrantids* on Jan. 4, random SSB brought OE6WIG (HG). John Palfrey, G4XEN, (NHM) writes concerning a proposal to amend random procedures, "I would like to express my disgust at suggestions to change the system of random calling to reply on a 'QSY' frequency dependent on call. The people making this suggestion need only think for a few minutes to understand why it is doomed." He points out that nobody ever took up the idea to spread out according to the last letter of your call, did they? He reckons the only change needed is to 2½ mins. periods on CW throughout *IARU* Region 1.

TWO METRES ANNUAL TABLE

Final Placings at December 31, 1986

Station	Counties	Countries	Total
G1KDF	94	24	118
G0CUZ	87	30	117
G6XVV	88	25	113
G3FPK	80	26	106
G4YCD	82	23	105
G6ECM	79	24	103
G4HGT	78	23	101
G1SWH	88	13	101
G6HKM	74	26	100
G4NBS	72	22	94
G1DOX	83	11	94
G4WXX	79	14	93
G1LSB	70	22	92
GW6VZW	64	19	83
G8XTJ	65	17	82
G4TGK	62	18	80
G1PDW	63	17	80
G6XRK	60	17	77
G4MUT	60	16	76
G4SEU	62	14	76
G4YIR	57	18	75
G4DEZ	51	21	72
G6OKU	63	9	72
G1CRH	56	12	68
G4TIF	50	17	67
G6AJE	52	14	66
GU4HUY	53	11	64
G4EZA	46	13	59
G4AGQ	45	13	58
G1EHJ	49	6	55
G8RWG	45	9	54
GM0GDL	40	13	53
G2DHV	39	7	46
G6MGL	27	9	36
G1HGD	17	4	21
G6CSY	11	4	15

On the operational side, John worked SK4BX/4 and I6WJB (JN72) on Dec. 13. At 0515 on the 14th, after nil from LZ1AG, he heard a long, loud CQ from TK5EP on random CW and worked him in minimum time, G4OIG and G0GFW following. He says reflexions were brilliant at the time. I7HCB (JN71) was worked on Jan. 2 at 01-02. Nil from YO3JW or SV0EC on the 3rd and UR1RWX not completed. The shower really got going from 1200 and worked were EA6FB on Ibiza, HG6KVB (KN07) on one SSB burst, SM4POB on random CW and UB5BAE (MJ) on random CW 2225-2310; 17s. burst.

Your scribe had adapted DL5MCG's MS Efficiency program from *DUBUS* issue 1/86 for the little *ZX-81* and it is proving a very useful one. It was a bit of a squeeze getting his 40 col. program to fit the 32 cols. maximum on the *Sinclair* machine, though.

Next the tropo. happenings which were a non-event in December judging from your letters. Gerry Schoof, G1SWH, (MCH) worked GU2FRO (SRK) on Dec. 23 for his last table point in 1986. In his round up of 1986 letter, G4HGT mentions he has never worked LX but comments that it took G8GXP 15 years to do it so reckons he has plenty of time. His station consists of an *Icom* IC-202 and 4CX250B PA, 150W to an 11-ele. *Yagi*.

The only significant DX for G4NBS was OZ1BJF (HP) on Bornholm Is on Dec. 1. The following weekend, Tony was on for a short time in the contest and GU1HTY and GD4IOM were the only noteworthy DX. In the Fixed station event on Dec. 7, G4XEN had 199 QSOs, best DX being DL5BAC at 658 kms. Colin Ford, G4ZVS, ended the year with 249 on CW. On Dec. 16, he contacted GM0BQM/P (DGL) who was 1,200ft. *a.s.l.* under flat conditions.

For Mike Johnson, G6AJE, (LEC) new ones for 1986 in December were G1SEW, (HWR), G6ZME (SPE) and GW4WDX (GNM) all on the 7th. Ela Martyr, G6HKM, (ESX) worked nothing new in December but mentioned that the OZs attributed to her 70cm. activity last issue were in fact 2m. QSOs. To her surprise, she found she had won the Zone C section of the *RSGB* 144 MHz Trophy Contest last September when the certificate arrived on Jan. 5.

Mike Atkinson, G8ZVM, (CNL) in his 1986 report, thinks he was probably the first station on the mainland to work joint-operator station CT3BX/CT3DK at 2317 on July 19, 1986. He sent a colour print of his handsome cat sitting on the rig. (The cat that adopted your scribe also delicately steps among all the gear on the operating desk but prefers a *Sainsburys* cardboard box to snore in all day long). Mike's station comprises a *Yaesu* FT-225RD with *muTek* board, two times 4CX250B amplifier, 62ft. mast and two "Chinese copies" of the *Cushcraft* Boomer antenna, all the latter home made. His QTH is 450 ft. *a.s.l.*, well out in the country.

In the December contest, Paul Baker, GW6VZW, (GWT) in spite of the mediocre conditions, worked G1GEY (TWR), G4KUX (DHM), GD4IOM and GU1HTY. He has got off to a flying start this year, the first five days bringing 22 counties and five countries, the latter G, GW, GU, GJ and ON.

Seventy Centimetres

First the bad news *via* G1KDF that EI8EF (Co. Donegal — VO) has probably ceased operation on the band as he plans to start up on 6m. instead. The last table points for G1SWH last year were provided by GI4SAM (SWN) on Dec. 24 and GD8EXI on the 28th to make it 17 counties and five countries. John Quarmby, G3XDY (SFK) worked EI5FK (VL) in the early hours of Nov. 30 and is now up to 131 on the band. As on 2m., G4NBS's only DX was another Bornholm Is. station, OZ1FYW, on Dec. 1 after QSYing from 2m. Tony has been doing some research through his logs and finds he has not worked EA and GJ on the band even though 1986 brought him 21 other countries in 72 squares.

70 CENTIMETRES ANNUAL TABLE

Final Placings at December 31, 1986

Station	Counties	Countries	Total
G1KDF	80	16	96
G1LSB	62	21	83
G4NBS	59	21	80
G6XVV	63	71	80
G6HKM	52	18	70
G1DOX	50	8	58
G0CUZ	43	14	57
G6AJE	43	11	54
G6MGL	33	13	46
G4YCD	39	7	46
G4MUT	34	9	43
G1EHJ	36	4	40
G4VOZ	34	5	39
G4TIF	25	12	37
G4HGT	27	9	36
G4SEU	30	4	34
G4DEZ	26	7	33
G6OKU	25	2	27
G1SWH	17	5	22
G6CSY	13	3	16
G1HGD	13	2	15
G4AGQ	11	3	14
GM0GDL	8	4	12
G4EZA	9	1	10
G8RWG	4	1	5
G2DHV	2	1	3

By the middle of the year, G8ZVM hopes to be QRV on the band using a home made amplifier with an *RCA* 7650 and two long *Yagis* — 24ft. booms, to boost Cornish activity. GW4HBK has built a 70cm. ATV converter and 150mW transmitter using PCBs from *BATC*. Both items are working and Dave is now looking for a cheap vision source.

Microwaves

G0DJA is planning to tidy up his microwave equipment this winter and is planning to mount a spare 10 GHz head and small *Short Backfire Antenna* on his mast. This *SBA* is only about six inches in diameter but has a gain of 15dBd on 3cm. To encourage discussion about microwave activity, there is a new net on 144.575 MHz the first Wednesday each month at about 8pm local time; other enthusiasts are welcome to call in. Dave is contemplating building a TNC for packet radio now that

the local PR repeater, GB3AP, is on on 144.650 MHz. There are plans to link it to PR repeaters on 1.3 GHz.

G3XDY mentions FC1GXX (ZF) on Nov. 29 and G3AUS (DVN/YK) on 23cm. and 13cm. respectively. G4NBS's only 23cm. activity was in the *Cumulatives*. Tony made 23 QSOs on Dec. 2 in above average conditions E/W at the start but on the 18th, he only had 13 contacts in flat conditions with low activity. In the five sessions, he worked 55 different stations. G3IGQ, G4DEZ, G6OYL, G8HHI and PE1EWR were contacted in every one and best DX was G1DOX on Dec. 2 at 300 kms. Nothing was heard from the NE in any session.

G6AJE is building for 23cm. after working some excellent DX on the October contest out portable with the *Warrington Contest Group,* G3CKR. Graeme Caselton, G6CSY, does much portable work and plans to have 5W of RF on 23cm. this year. He also hopes to get going on 13cm. with the goal of perhaps achieving the first ever *WAB* Basic Award on the band. Keith Hewitt, G3DER, (YSS) has not written for some time and sent a brief note outlining his squares tally at the beginning of December. He now has 70 squares on 23cm. and 60 points in the All-time 13cm. list.

G6HKM and her husband Roy, G3PMX, are now QRV on 23cm. using *Icom* IC-1271E and 25-ele. loop antenna loaned by a friend. The antenna is presently on a temporary 12ft. mast and a masthead pre-amp. is on order. Colin Redwood, G6MXL, (DOR) started up on 23cm. from home in VHF NFD, best DX thus far being HB9AMH/P using just 2W through 25 metres of *H-100* cable to a 23-ele. *Tonna Yagi* at 25ft. His QTH is just 15ft. *a.s.l.* and badly screened; the 600ft. Purbeck Hills are only two miles to the south. G6XVV is another reader who is building equipment for 13cm.

Miscellany

Congratulations to Mervyn Rodgers, ex-GM6XPI, now GM0GDL in Alva (CTR). In his letter, G4AGQ mentions the topic of sex on CW, meaning how do you tell the gender of the person you are talking to on the key? Names like Arthur, Harry, etc. are obviously male, but what about Pat, Sam, Chris, Terry, Jo, etc? Pat himself usually mentions something like "Name is Pat, OM. . . " Your scribe has observed a similar effect on SSB when the person with the girlish voice says its name is Nigel and he is 14 years old.

The item on noisy *Ambassador* telephones in December VHFB set John Fitzgerald, G8XTJ, (BKS) off on a hunt to track down his local nuisance to some office premises nearby. He telephoned *BT* on Dec. 9 but no action had been taken up to Jan. 7 following the usual, "We'll look into it" promise. At 400m. distance, the QRM from this instrument makes 2m. untenable to the west with 100 kHz of QRM. *BT's* man from Special Faults suggested there could be six systems in the building.

ANNUAL VHF/UHF TABLE

Final Placings at December 31, 1986

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	23 CENTIMETRES Counties	23 CENTIMETRES Countries	TOTAL Points
G1KDF	—	—	94	24	80	16	30	7	251
G4NBS	*47*	*5*	72	22	59	21	48	18	240
G6XVV	—	—	88	25	63	17	27	8	228
G4HGT	59	6	78	23	27	9	—	—	202
G1DOX	—	—	83	11	50	8	30	5	187
G1LSB	—	—	70	22	62	21	—	—	175
G4SEU	58	6	62	14	30	4	—	—	174
G0CUZ	—	—	87	30	43	14	—	—	174
G6HKM	—	—	74	26	52	18	—	—	170
G4TIF	57	6	50	17	25	12	—	—	167
G4MUT	35	4	60	16	34	9	*14*	*6*	158
G4YCD	—	—	82	23	39	7	—	—	151
G4DEZ	—	—	51	21	26	7	27	13	145
G6AJE	—	—	52	14	43	11	3	1	124
G1SWH	—	—	88	13	17	5	—	—	123
G6MGL	—	—	27	9	33	13	26	11	119
G3FPK	—	—	80	26	—	—	—	—	106
G6ECM	—	—	79	24	—	—	—	—	103
G6OKU	—	—	63	9	25	2	—	—	99
G4VOZ	51	5	—	—	34	5	—	—	95
G1EHJ	—	—	49	6	36	4	—	—	95
G4WXX	—	—	79	14	—	—	—	—	93
G4AGQ	17	3	45	13	11	3	*1*	*1*	92
GW6VZW	—	—	64	19	—	—	—	—	83
G8XTJ	—	—	65	17	—	—	—	—	82
G4TGK	—	—	62	18	—	—	—	—	80
G1PDW	—	—	63	17	—	—	—	—	80
G6XRK	—	—	60	17	—	—	—	—	77
G4YIR	—	—	57	18	—	—	—	—	75
G4EZA	—	—	46	13	9	1	—	—	69
G1CRH	—	—	56	12	—	—	—	—	68
GM0GDL	—	—	40	13	8	4	—	—	65
GU4HUY	—	—	53	11	—	—	—	—	64
G2DHV	9	2	39	7	2	1	—	—	60
GW4HBK	53	7	—	—	—	—	—	—	60
G8RWG	—	—	45	9	4	1	—	—	59
G1HGD	—	—	17	4	13	2	—	—	36
G6CSY	—	—	11	4	13	3	—	—	31

Three bands only count for points. Non-scoring figures in italics.

Finale

This sub-heading has a more poignant meaning this time now that the title of *Short Wave Magazine* has been sold to *PW Publishing Limited*. However, although nothing definite has been agreed yet between the new owners and your scribe, this feature, with your support, will continue, along with the long-established awards programme. For the immediate future, all that changes is the address to which you should send your news which is;— "VHF Bands," SHORT WAVE MAGAZINE, Enefco House, The Quay, Poole, Dorset, BH15 1PP. *73 de G3FPK.*

VHF Bands deadlines for the next three months;—

March issue — February 4th
April issue — March 4th
May issue — April 1st

Please be sure to note these dates

"Tonight's talk is called 'Conquering your RAE Nerves'. . . ."

REVIEW

Yaesu-Musen FT-290R Mk. II Handheld Transceiver

GLEN ROSS, G8MWR

THE FT-290 is dead, long live the FT-290 seems to be the shout going up from Yaesu as they replace the existing Mk. I model with the new Mk. II. Who can blame them? The original model took virtually all the market for a rig of its type, the only competition coming from the Standard stable with a rig running less power and using smaller batteries. Trio gave up right from the word go! If you wanted a small do-anything, go-anywhere rig this had to be the one.

It was not *all* plain sailing, though, because the rig had its faults. The transmit linearity on SSB was certainly somewhat suspect, but could be improved if you knew the tweaks to apply, and the cross-mod performance was rather poor. Attempts to improve sensitivity by fitting 3SK88s only made the cross-mod problem worse by some 18dB or so. The matching to the whip aerial was way out on the early sets and required a matching section of coil and capacitor to put it right. The S-meter needed a strength 5 signal to move it and anything over S8 sent it round the end stop.

The New Model

At first glance one could easily get the impression that this is just a cosmetic facelift of the original with a larger LCD and the various buttons repositioned, but a glance inside, or even better at the circuit diagram, will show that for all practical purposes this is a brand new rig firmly based on the principle features that made the old one such a big hit world wide.

Gone is the terrible recessed aerial socket that you could not get the plugs into or out of. It has been moved to the front panel location of the original whip aerial. (Did anyone manage not to break a whip on a FT-290?) The socket itself has been changed to a BNC type and the rig comes with a helical whip.

Those fiddly little switches for the noise blanker, high or low power and the dial light have also migrated to the front and we now have the luxury of a real RIT control with its own knob — no more pressing buttons to bring the main tuning control knob into its clarifier role.

Power Supply

The battery pack is no longer an internal fitting but comes as a separate pack which clips on to the back of the rig. This can be removed and a 25-watt PA module clipped on in its place. When this is done all the connections such as the ALC are made automatically and the rig even switches the dial lights on for you. You cannot use the battery pack with the high power PA, for obvious reasons, and the rig is capable of making use of external power supplies ranging between 8 to 15 volts. The clips which retain the packs are made of plastic and do not inspire a great deal of confidence in their lasting ability, but one must assume that Yaesu have done the homework and that things will not fall apart with time.

What Will It Do?

The modes on offer are USB, LSB, FM and CW and the tuning rate varies with the mode selected. Instead of the old "two speed" rates of tuning we now get three. For FM these are 12.5, 25 and 50 kHz, while on SSB and CW the rates are 25 Hz, 100 Hz and 2.5 kHz. These are well selected and on SSB the 25 Hz is a great improvement over the old 100 Hz steps and gives the feel of a real VFO instead of the pan-pipes effect when tuning through a carrier. As if this were not enough, new panel buttons allow the use of 100 kHz and 1 MHz steps on all modes for quick QSY'ing around the band.

The Memories

A modern rig without the all-singing, all-dancing bit is unthinkable and we get them all in full measure here. There are two VFOs each displaying frequency, mode, step and offset information on the LCD. All the information on mode, etc., can also be stored in the memories and if, for some strange reason, you should want to use a strange frequency split this can be done by using memories 1 and 2 to store the information. There is also the facility to have a priority frequency stored in memory 1 and this is checked every two seconds, the rig locking on to it if a signal is found.

There is the usual array of memory and band scanning using the VFOs or memories in various frequency steps depending on the mode in use.

LEDs and Things

We get the usual two LEDs to indicate 'busy' and 'transmit' states, but there is an unexpected bonus here in that the green LED doubles as a modulation level indicator and the red one also gives service as a low voltage indicator. It starts flashing when the supply volts drops to 8.5 volts, although this is in fact about the same point at which the rig stops operating. The S-meter is the same small one used in the earlier version but at least it now seems to have a rather more sensible scaling than it did before.

Getting Technical

Trying to wade your way through the eight sheets of circuits is a little daunting and the handbook provides no information on servicing or setting-up from which useful information can be obtained. The unit contains two main circuit boards mounted in the conventional fashion and a control board mounted on the front panel mouldings. Most of the small components are now of the chip variety taking you one step nearer to dealer-only servicing.

The receiver is a double conversion job with IFs at 13.988 MHz and 455 kHz, the second IF only being used on FM. The first two stages in the receiver are dual-gate FETs and these are followed by two monolithic filters to give a good roofing characteristic. The signal then passes through the noise gate and splits and goes separate ways depending on whether it is FM or SSB. On FM the signal continues through an MC3357 which does all the usual chores like down conversion to 455 kHz, where the signal passes through a ceramic filter before demodulation. It then passes through a squelch system which is derived from the residual noise and then goes to the communal AF amplifier and output stages.

On SSB and CW the signal passes through a multipole crystal filter and then through more IF amplification before being demodulated. The AVC is the usual audio derived variety. Injection frequency to the demodulator is varied according to the mode in use and for CW the offset is 700 Hz, resulting in a beat note that may be a little low for some tastes.

Frequency Generation

This is a complex procedure indeed and is generated by an MC145145 under the control of a microprocessor which also looks after all the other functions of the rig. A VCO generates the final frequency minus the first IF. On FM transmit a VCXO is

frequency modulated with input from the microphone after it has been tailored and clipped, and on CW we have the luxury of a sidetone generator feeding signals into the audio system.

The Spec.

First of all a few general comments. With the possibility of a forthcoming shift to 12.5 kHz spots on the band it was interesting to see that the filters in the rig would be adequate for the job. The strong signal handling was considerably improved over the Mk. I version and the transmit linearity was also much better. The sensitivity was good and there should be no need for a preamp even if the 25-watt PA is used. The transmit power and receive sensitivity are very complimentary. The SSB filter was not as good as the old one and Yaesu at least admit this as the spec. is reduced from 4.8 kHz to 60dB down to 5.2 kHz; except under severe lift conditions this should not present a problem. The transmit audio on FM was a little strange, there being a certain amount of over-deviation at low frequencies and a very marked roll off above about 2 kHz; these effects combine to give a slightly heavy and somewhat muffled quality to the speech, although the effect is not excessive. On transmit the rig is remarkably short of spurious outputs and obviously a lot of work has gone into cleaning up this aspect of the rig.

Some Figures

The receiver sensitivity figures for 12dB SINAD are 0.14 microvolt on SSB and 0.17 microvolt on FM, and these figures were obtained right across the band.

The power output on transmit was essentially the same across the band at 2.7 watts on high power and 0.35 on low. These powers hardly changed when the supply voltage was changed from 13 to 9 volts. The current consumption on high power was 1 amp and about 0.6 amp on low power. Again changing the voltage made little difference.

The adjacent chanel selectivity was measured as the level of signal required to degrade a wanted signal by 6dB from an original 12dB SINAD. At plus 12.5 kHz the increase of level was 54dB and at minus 12.5 kHz 46dB was measured, which indicates some asymmetrical shape factor on the filters. The figures at plus and minus 25 kHz were both 78dB.

Spurious emissions were measured at not less than −67dB and at the fifth harmonic they were down to −88dB; these figures are really excellent.

S-meter calibration was checked at 0.5 microvolt for S1, 5 microvolts at S9 and 24.7 millivolt at end of scale. The FM deviation was a little high at nearly 7 kHz at 350 Hz and about right, at 5.1 kHz, at 1.5 kHz. The tone burst was definitely down at only 2.9 kHz but the local repeaters did not seem to mind. The frequency calibration was excellent, showing a measured plus 63 Hz compared to the frequency counter after a warm-up period of 10 minutes from a cold start.

General Comments

What can one say except that it will continue the tradition of the earlier version? Yaesu have got another world-beater on the market. It is easy to drive, it has all the facilities one could reasonably want in a rig of this type and the performance is better than the original in every way. On the minus side there is the rather thin 'plasticy' feel to the clip-on add-ons and an incredibly crude plastic rod to do the dial light switching when the PA is plugged in. To balance things up the noise blanker works well and the back-lit display with larger digits and more information is excellent, being very easy to read at night. All the usual facilities are provided by buttons on the microphone and the extra clarifier knob is a delight.

In two words then, "buy one." I did.

A Spectrum Wavemeter

P. B. BRODRIBB, G3ONL

ONE of the most useful items of test equipment for frequency measurement is the absorption wavemeter. Consisting basically of an inductor and a capacitor, it indicates the presence of a signal and does not itself generate spurious signals that can mislead; it is this simplicity that makes it mandatory for the radio amateur.

Unfortunately the simple absorption wavemeter must be inductively coupled to the circuit under test. This makes it difficult to use where no inductor is present or in those awkward situations that abound in modern compact circuitry. Its sensitivity is low and depends upon the sensitivity of the indicating device, yet there are many instances where knowledge of the frequencies present in a circuit would be useful. It is all too easy to forget that oscillators, mixers and even amplifiers can generate unwanted frequencies. When peaking tuned circuits it is comforting to know

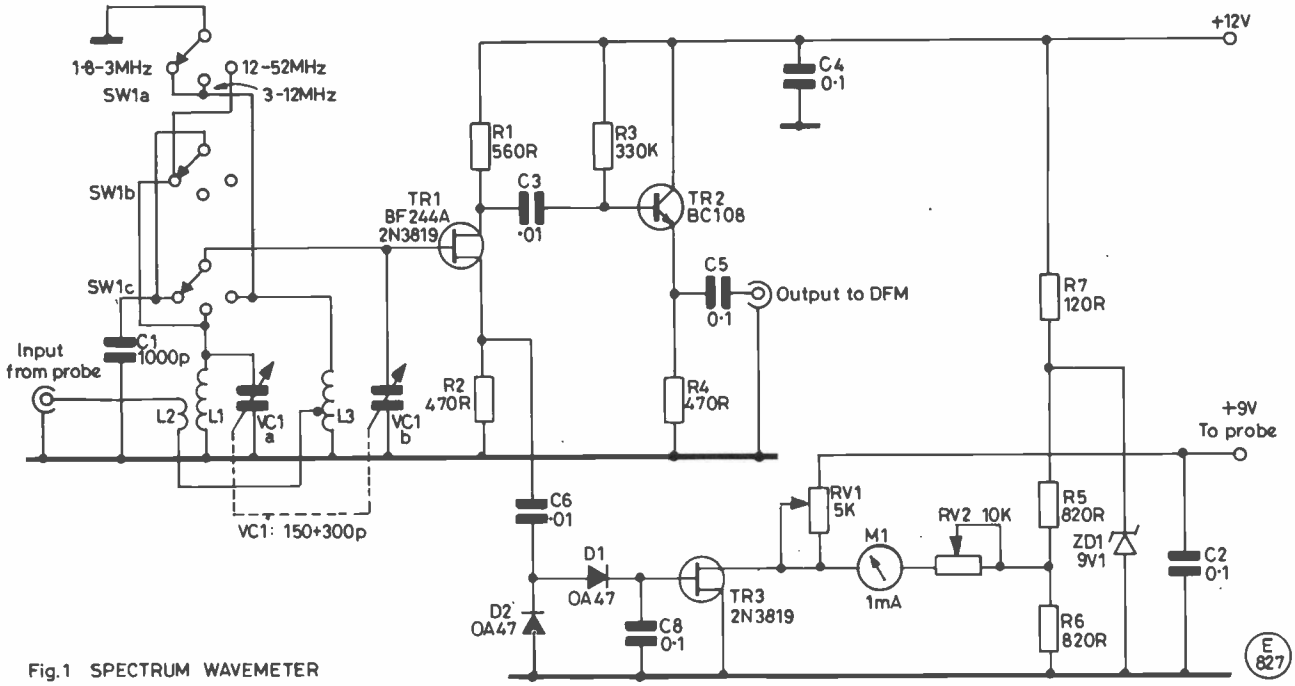


Fig. 1 SPECTRUM WAVEMETER

Tables of Values

Fig. 1

R1 = 560R ¼W
R2, R4 = 470R, ¼W
R3 = 330K, ¼W
R5, R6 = 820R, ¼W
R7 = 120R, ¼W
RV1 = 5K lin.
RV2 = 10K log
C1 = 1000pF poly.
C2, C4, C5 = 0.1μF disc
C3, C6 = 0.01μF disc
VC1 = 150-300pF
TR1 = BF244A or 2N3819
TR2 = BC108, etc.
TR3 = 2N3819
D1, D2 = OA47
ZD1 = 9.1V zener diode
L1 = 25t, 26 swg close wound on 10mm. dia. former with iron dust core
L2 = 4t, wound at earth end of L1
L3 = 9t, 26 swg evenly spaced to a length of 12mm. on 7mm. dia. former with iron dust core; tap 2t from earth end
SW1a, b, c = 3-pole 3-position rotary

Fig. 2

R1 = 100K, ⅛W
R2, R5 = 2K2, ⅛W
R3 = 1K, ⅛W
R4 = 100R, ⅛W
C1, C2 = 0.01μF disc
C3 = 150pF
C4 = 0.1μF disc
L1 = 8t, 38 swg on ferrite bead
TR1 = BF244A
TR2 = BF495
T1 = *see* Fig. 3

that the indicating device is responding to the design frequency and not to a harmonic or some other unwanted product.

The instrument described here is basically an absorption wavemeter with input taken from a wideband probe and an amplified output to increase sensitivity.

Input is taken to one of three tuned circuits selected by a rotary switch. The unused circuits are short circuited to prevent unwanted resonances. Tuning is accomplished by a two-gang capacitor: one section has a capacitance of 150pF and the other section has a capacitance of 300pF. These capacitors may be junk box two-gang types with plates removed or separate capacitors ganged together. With the inductors shown these capacitors give tuning ranges of 1.8 to 3 MHz, 3 to 12 MHz and 12 to 52 MHz. The lowest range is covered by switching in additional capacitance across the middle range inductor. Higher Q-factor, and hence greater discrimination, could be obtained on this range by switching in an entirely separate inductor instead of additional capacitance but this would entail more complicated input circuit switching. The arrangement shown seems to be adequate. A 6:1 drive mechanism and *Letraset* numbering complete the tuning assembly.

The signal is amplified by an FET, TR1, whose high input impedance helps to maintain a high Q-factor for the tuned circuits, thus helping to discriminate between signals. However the instrument is not intended for examining close-in components

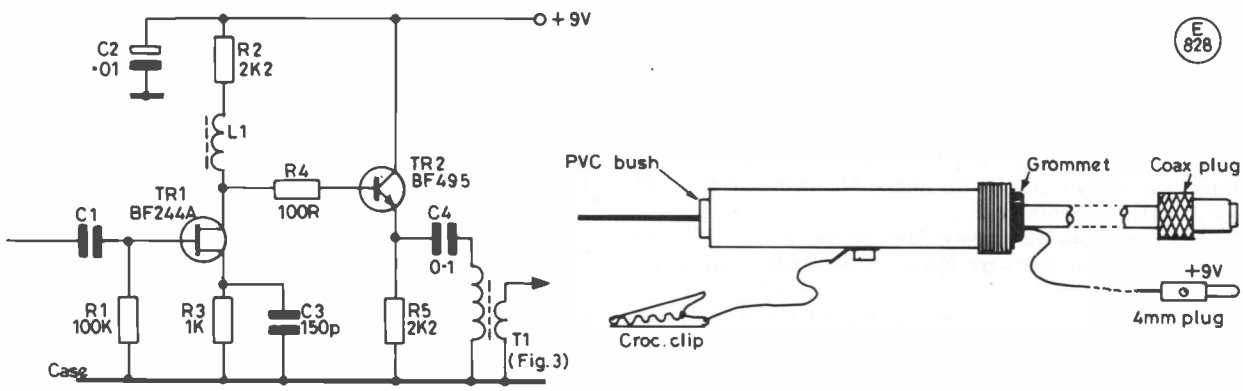


Fig. 2 PROBE CIRCUIT DIAGRAM

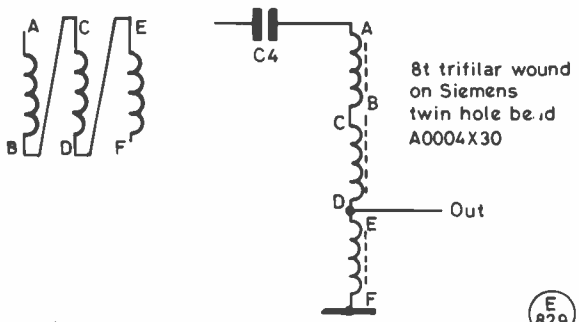


Fig. 3 PROBE OUTPUT TRANSFORMER T1

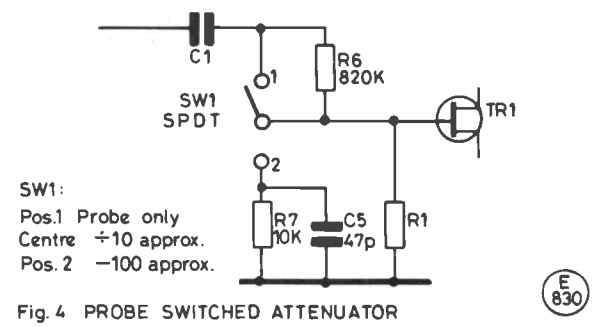


Fig. 4 PROBE SWITCHED ATTENUATOR

such as sidebands. A spectrum analyser and a healthy bank balance are necessary for this!

Output is taken from the source of TR1, rectified and passed to a DC amplifier to feed the indicating meter. The sensitivity control allows a reference signal (*e.g.* a fundamental) to be set to full scale and other frequencies (*e.g.* harmonics) to be compared with the fundamental. Output is also taken from the drain of TR1 and may be used to drive a digital frequency meter; this enables a more precise frequency measurement to be made than is possible from the dial calibration alone. Construction is on copper strip *Veroboard* except for the inductors and the 1000pF capacitor which are mounted on the switch.

Housing the probe depends upon what is available. The author's probe is housed in a screw cap cylinder measuring 2.5in. by 0.5in. that once contained twist drills; again construction is on a strip of *Veroboard* which holds all the probe components including the transformer. It may be helpful to use ⅛W resistors unless a larger cylinder is available. A larger container would permit a switched attenuator to precede the probe input (Fig. 4). This would be a worthwhile addition enabling the probe to be used in situations where more than a few millivolts exist.

The 'Mk. 1' version of the wavemeter had only two ranges. The 'Mk. 2' version described in this article adds the range 1.8 to 3 MHz and brings the 'set zero' control out to the front panel. The probe is the larger version incorporating the switched attenuator (Fig. 4); it is built into a container which once housed solder.

CLUBS ROUNDUP

By "Club Secretary"

New Club

OUR first one is a letter from **Clacton** in which there is a proposal to form a club in the area. The contact address is as shown in the Secretaries Panel, and we understand the Hq. address will be the Eldorado Club, The Broadway, Jaywick, Essex. The inaugural meeting was in fact on January 14, but as the letter to us was sent to the wrong address and took a while to be forwarded on, it 'missed the bus.'

Aberdeen is to be found every Friday evening at 35 Thistle Lane, Aberdeen, from 7.30. On February 6 they have a junk sale, and on 13th they debate the motion that 'Amateur Radio would improve if all repeaters were closed down tomorrow' — speakers on either side welcome. February 20 is down for a talk on VHF/UHF DX-ing with a less-than-average station, by GM4OBD, and February 27 is beginners' night; GM4ZUK offers a 'Beginner's Guide to Four Metres.' March 6 is once again a junk sale.

Thursday nights at Pen-y-Fal Hospital, Abergavenny, 7.30-9.00 are the times to find **Abergavenny & Nevil Hall** crowd; look for the room above Male Ward 2.

Acton, Brentford & Chiswick are based on Chiswick Town Hall in High Road, Chiswick, London, where they meet on Tuesday, February 17 for a talk by G6UZV on propagation by meteor scatter.

Ariel exists for all radio enthusiasts, whether licensed SWL, constructor or whatever, who are employed by the BBC, and they have stations at many of the sites. Get the details from the Hon. Sec. — *see* Panel.

Next we have **BARTG** and here the interest is RTTY, AMTOR, packet radio and other modes falling under the general heading of 'Data Comms'. Details from the Hon. Secs. at the address in the Panel.

Again, for details of the **Basingstoke** Hq. and activities, we have to refer you to the Hon. Sec. — *see* Panel for his details.

BATC is for the amateur TV enthusiasts, whether colour or monochrome, fast scan or slow. Details from the Hon. Sec. — *see* Panel.

At **Biggin Hill** the gang is based at Downe Village Hall, which is next to the "George and Dragon" at 24 High Street, Downe, Kent. Although we aren't told so in as many words, it looks like the third Tuesday of each month; however, a check with the Hon. Sec. is indicated as the newsletter hints at the possibility of a move of Hq.

At **Borehamwood** they say they meet on the second Tuesday of each month, but give no other details, save that the telephone contact is G0DDJ on 01-207 3809 for details, and the Hon. Sec's. address (*see* Panel).

Turning to **Braintree** we can hunt for the Community Association Centre, next door to the bus station in the centre of Braintree, on the first and third Monday of each month, starting at 7.30p.m.

Every Thursday evening the **Bredhurst** group members foregather at Parkwood Community Centre, Rainham, Kent. On February 5 G3FXB will talk about amateur radio in Russia, and on 19th Tony Skinner demonstrates antique broadcasting receivers. The Rainham Radio Rally is on Saturday 28th. Thursday dates not mentioned are natter and construction nights.

Our next entry is from **North Bristol** which has a place at Self-Help Enterprises, 7 Braemar Crescent, Northville, Bristol, every Friday evening. If you go there on February 13, you will also find the Bristol TV FM Group giving their lecture and demonstration; so you can join two clubs at once!

On to **Bristol City RSGB** where the events are in the Small Lecture Theatre, University of Bristol, University Walk, Clifton, Bristol. On February 23, G8IMB will be talking about packet radio, starting at 7.30 p.m.

All the **Bury** detail available in the newsletter is that they are to be found at the Mosses Community Centre, Cecil Street, Bury, every Tuesday evening; the formal main meeting is on the second Tuesday, and the details are given in the 'events calendar', a page which seems to have been omitted from our copy of the newsletter. Oh, well!

We turn now to **Central Lancs** where first and third Mondays are booked at Priory Club, Broadfield Drive, Leyland; other details from the Hon. Sec., or go along for a visit.

On February 3 the **Chelmsford** group has a rig testing session with Steve Oakman, G8MRO, while on March 3 they have a talk on kite antennas. The venue is Marconi College, Arbour Lane.

Stanton Room, Charlton Kings Library is home to the **Cheltenham** crew and they are there on the first and third Friday of each month, alternating natters with formals. We know they have several items already set up, but the AGM may produce others, so why not go and see?

Every Wednesday the **Chesham** group heads for Bury Farm, Pednor Road, Chesham. More details from the Hon. Sec. — *see* Panel.

The **Chichester** members all hurry towards North Lodge Bar, County Hall, Chichester on the first and third Tuesdays of each month. More details from the Hon. Sec.

For the current details of what is going on at **Chiltern** we must refer you to the Hon. Sec., though we believe they still meet in the Science Block, Sir William Ramsey School, Rose Avenue, Hazlemere, High Wycombe, on second and fourth Wednesdays.

Colchester has a talk on a private aeroplane flight to the South of France by G3CO, on February 5, and a talk on BBC *Radio Essex* on February 19; both are at the club Hq. at Colchester Institute, Sheepen Road, Colchester, starting at 7.30 p.m.

Coventry meets every Friday evening at Baden-Powell House, 121 St. Nicholas Street, Radford. February 6 is a quiz night, and 20th is down for mini lectures; the 13th and 27th are both nights-on-the-air.

For the details on **Crawley** doings in February at Crawley Leisure Centre, Haslett Avenue, we have to refer you to the Hon. Sec. — *see* Panel — as our listings stop in mid-January!

All Saints Parish Rooms, at the junction of Beulah Hill and Church Road, London SE19 (opposite the IBA mast) is the Hq. of the **Crystal Palace** group; on February 21 they have their AGM and Constructional Contest, starting at 8 p.m.

The **Derby** 'hymn sheet' is yet another one to stop dead at the end of January . . . but at least here we can say that they are at 119 Green Lane, Derby every Wednesday; they have the whole top floor to themselves.

The **Dover** area is served by the club called SE Kent YMCA, meeting as they do at the YMCA, Godwynehurst, Leyburne Road, Dover, each Wednesday. February 4 and 18 are natter sessions, and on 11th they have an evening of films. February 25 is down for a talk on air traffic control.

Up to **Dumfries** where the club Hq. is still the Cargenholm Hotel, New Abbey Road, Dumfries; the gang is there on the first and third Monday of each month and we are promised that shortly we will have a sight of the future programme.

Dunfermline now, and for the details we must refer you to the Hon. Sec. — *see* Panel for the vital statistics.

On February 4 at **Edgware** the talk will be on electromagnetic compatibility (EMC) given by G4IUZ. February 26 is the informal, with the station on-air, and some Morse by G4IUZ too. The venue is at Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

Now the **Exeter** details; the main meeting on the second Monday is at the Community Centre, St. Davids Hill, Exeter. February 9 is a talk by Mr. Credgington on BBC engineering techniques. However, they also get together informally at the Scout Hut, Emmanuel Road, on the first, third and last Mondays.

Thought of **Fareham** implies Portchester Community Centre, Westlands Grove, Portchester; February 4 and 18 are natter nights, but on 11th there is a talk on interpreting receiver specifications, and on 25th G4VNM talks about telecomms within the electricity supply industry.

The **Farnborough** crowd meets at the Railway Enthusiasts' Hq., 103 Hawley Lane, Farnborough, apparently on the second and fourth Wednesday — but a forty-plus page newsletter doesn't even mention the forward programme dates! Hence we must refer you to the Hon. Sec. — *see* Panel.

The Scout Hut, Bath Road, Felixstowe is now the Hq. of the **Felixstowe** group; February 9 is the social evening and the month's visit is on February 16 when they go to the Raynet Centre at Ipswich Police Hq. February 23 is also shown as a social session, and on March 9 they have a joint 'do' with the CSMA, visiting the Sainsbury Superstore at Warne Heath.

Up at **Fylde** they have the meetings at the Kite Club, Blackpool Airport, on first and third Tuesdays. February 3 is the second part of a talk on Amateur TV, and on 17th G3AEP and G8GG get together for a talk on simple D/F.

At **Grafton** the membership is rising again after the move to the new Hq. at *TS Wizard,* White Hart Lane, London; meetings are on the second and fourth Fridays of the month.

For details of the **Grimsby** Hq. address and programme details each Thursday we must refer you to the Hon. Sec. — *see* Panel for the needful.

On the third Tuesday of each month the **Halifax** crowd foregathers at the "Runing Man", Pellon Lane, Halifax; on February 17 they have a junk sale, and on March 17 they entertain RSGB's RR2, G4EJP.

"The Silver Cup" pub, St. Albans Road, is home to the **Harpenden** group, the formal meetings starting at 8 p.m. February 3 sees a talk on AX25 achieved on a BBC computer for packet radio, while on 17th they try and put it all into practice.

The **Harrow** crowd is to be found nowadays at Harrow Arts Centre, High Road, Harrow Weald, where they are in session on Fridays, normally in the Roxeth Room.

The third Wednesday of each month is the **Hastings** formal meeting, at West Hill Community Centre. In addition they have informals at Ashdown Farm Community Centre every Friday evening, not to mention RAE classes, a Raynet group meeting and so on at the same place.

The **Hereford** Hq. at the Civil Defence Hq., Gaol Street, Hereford, is used on the first and third Friday of each month. At the time of writing we don't have details on the programme because they have a meeting, due about when this is being written, to call up a programme for the year to come.

Turning to the **Ipswich** listings we find them at the "Rose & Crown", 77 Norwich Road, Ipswich, where they have a room separate from the bars, so juniors are welcome; they are there on the second and last Wednesday, although dates are sometimes altered to avoid a clash with another club with a special attraction, or occasionally one finds some of the gang in the club room on Wednesdays when no meeting is shown, when they are usually doing Morse.

Over the water now, to Eire, and this means **IRTS**; this one combines the function of a national society, and a local club, and either way it is the proper route for any enquiries about amateur radio in Eire. Details from the Hon. Sec. — *see* Panel.

Still over the water, **Lagan Valley** has changed its meeting place to be at The Harmony Hill Arts Centre, 54 Harmony Hill, Lisburn, Co. Antrim, where they are normally to be found on the second Monday each month. Visitors welcome, of course.

The **Lincoln**Hq. is at the City Engineers' Club, Central Depot, Waterside South, Lincoln. On February 4 and 18 they have activity nights; on 11th they hope to have G0BTA and G6IGM on 10 GHz TV, while on 25th there is a junk sale. Additionally, they hope to have GB0RAG operating during the week February 21-28 for the Bishop Grosseteste College rag week, at the college.

Now we go on to **Loughton** where the locals have a place at Loughton Hall, Rectory Lane, Loughton, Essex. On February 13 they have a talk on electrical safety by G6FWT, and February 27 is an informal with films from the RSGB library.

Our next stop is at **Macclesfield** where the Hq. is at Fermain Club, Oxford Road. February 3 is a construction evening, and on

Names and Addresses of Club Secretaries reporting in this issue:

ABERDEEN: D. Travis, GM4GXD, Gorsedd, Kirkton, Chapel of Garioch, Inverurie, AB5 9HF. *(Pitcaple (04676) 251)*
ABERGAVENNY: J. B. Davies, GW4XQH, 109 Croesonen Parc, Abergavenny, Gwent NP7 6PF. *(0873) 78674*
ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. *(01-992 3778)*
ARIEL (BBC): T. Butler, 333A Bush House, London.
BARTG: P. & J. Beedie, GW6MOJ/GW6MOK, Ffynnonlas, Salem, Llandeilo, Wales SA19 7NP. *(0558) 822286*
BASINGSTOKE: A. Windsor, G1OQU, 28 Mendip Close, Buckskin 2, Basingstoke, Hants RG22 5BP.
BATC: T. Brown, G8CJS, 25 Gainsborough Drive, Adel, Leeds LS16 7PF.
BIGGIN HILL: R. Senft, G0AMP, Mill Hay, Standard Road, Downe, Kent BR6 7HL. *(0689) 57848*
BOREHAMWOOD: I. Rosenberg, 11 Parkside Drive, Edgware, Middx.
BRAINTREE: D. Brades, 3 Coldnailhurst Avenue, Braintree CM7 7SL. *(0376 44908)*
BREDHURST: K. Fay, G0AMZ, 37 Sandringham Road, Rainham, Gillingham, Kent ME8 8RP. *(0634 376991)*
BRISTOL CITY RSGB: C. Hollister, G4SQQ, 34 Battersby Way, Henbury, Bristol BS10 7SU. *(0272 508451)*
BRISTOL (NORTH): A. Booth, G4YQQ, 656 Southmead Road, Filton Park, Bristol BS12 7RD. *(Bristol 690404)*
BURY: M. Sivieri, G4ZTB, 47 Ramsay, Bacup, Lancs.
CENTRAL LANCS: D. W. Fowler, G4YWG, 22 Larchwood Crescent, Leyland PR5 1RJ. *(0772 432275)*
CHELMSFORD: A. C. Mead, G4KQE, 9 Abraham Drive, Silver End, Witham, Braintree, Essex CM8 3SP.
CHELTENHAM: T. Kirby, G4VXE, 29 Tivoli Road, Cheltenham, Glos. GL50 2TD. *(0242 36723)*
CHESHAM: J. Alldridge, G6LKS, 95 Rose Drive, Chesham HP5 1RT.
CHICHESTER: C. Bryan, G4EHG, Marmanet, Salthill Road, Fishbourne, Chichester, Sussex PO19 3PZ. *(Chichester 789587)*
CHILTERN: C. Dunn, G4KVI, 24 Mynchen Road, Beaconsfield, Bucks.
CLACTON: R. Taylor, 14 Meadow Way, Jaywick, Essex CO15 2SQ. *(Clacton-on-Sea 430466)*
COLCHESTER: F. R. Howe, G3FIJ, 29 Kingswood Road, Colchester. *(0206 851189)*
COVENTRY: W. Hahn, G3UOL, 91 The Chesils, Coventry CV5 9NA. *(0203 414684)*
CRAWLEY: D. L. Hill, G4IQM, 14 The Garrones, Worth, Crawley, W. Sussex RH10 4YT. *(Crawley 882641)*
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. *(01-699 6940)*
DERBY: J. Anthony, G3KQF, 77 Brayfield Road, Littleover, Derby DE3 6GT. *(0332) 772361*
DOVER: J. Saueressig, G0ADK, 8 The Ridgway, River, Dover. *(Dover 823226)*
DUMFRIES & GALLOWAY: J. Young, 22 Hallmeadow Place, Annan, Dumfriesshire DG12 6BZ.
DUNFERMLINE: D. Young, GM0DYD, 4 Primrose Avenue, Rosyth, Fife KY11 2SS. *(0383 413440)*
EDGWARE: J. Cobley, G4RMD, 4 Briars Close, Hatfield, Herts. *(Hatfield 64342)*
EXETER: R. Donno, G3YBK, 8 Mincinglake Road, Exeter EX4 7EA. *(0392 78710)*
FAREHAM: A. S. Chester, G3CCB, 'Deva Wood', 44 The Ridgeway, Down End, Fareham, Hants. *(0329 288139)*
FARNBOROUGH: T. Fitzgerald, G4UQE. *(Adress wanted) (0276 29321).*
FELIXSTOWE: P. J. Whiting, G3YQC, 77 Melford Way, Felixstowe IP11 8UH.
FYLDE: H. Fenton, G8GG, 5 Cromer Road, St. Anne's, Lytham St. Anne's, Lancs FY8 3HD. *(Lytham St. Anne's 72517)*
GRAFTON: J. Kaine, G4RPK, 74 Camden Mews, London NW1 9BX. *(01-267 1000)*
GRIMSBY: T. Matthews, G3RGC, 38 Foxhill, Wybers Wood, Grimsby, South Humberside DN37 9QL.
HALIFAX: D. L. Moss, G0DLM, Beechwood Lodge, Lightcliffe, Halifax HX3 8NU. *(0422 202306)*
HARPENDEN: E. P. Simons, G1BJC, Batford Farm, Common Lane, Harpenden, Herts. AL5 5DN.
HARROW: D. Atkins, G8XBZ, 25 Maxwell Close, Rickmansworth, Herts. *(0923 779942)*
HASTINGS: D. Shirley, G4NVQ, 93 Alfred Road, Hastings, Sussex. *(Hastings 420608)*
HEREFORD: F. E. G. Cox, G3WRQ, 35 Thompson Place, Hereford. *(54064)*
IPSWICH: J. Tootill, G4IFF, 76 Fircroft Road, Ipswich, Suffolk IP1 6PX. *(0473 44047)*
IRTS: G. Gervin, EI8CC, 185 Elton Court, Leixlip, Co. Kildare, Eire.
LAGAN VALLEY: W. J. Jackson, GI4TCS, 21 Carnreagh, Hillsborough, Co. Down BT26 0LJ.
LINCOLN: Mrs. P. Rose, G4STO, Pinchbeck Farmhouse, Mill Lane, Sturton-by-Stow, Lincoln LN1 2AS. *(Gainsborough 788356)*
LOUGHTON: D. Thorpe, G4FKI, 44 Townfield Road, Flitwick, Beds MK45 1JF.
MACCLESFIELD: J. Thornley, G1NUS, 270 Hurdsfield Road, Macclesfield, Cheshire SK10 2PN. *(0625 24534)*
MAIDSTONE YMCA: P. Martin, G0BUW, *address wanted. Tel: (0622 30544)*
MAXWELLTOWN: C. D. S. Rogers, GM4NNC, 5 Elder Avenue, Lincluden, Dumfries DG2 0NL.
MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB. *(021-422 9787)*
NENE VALLEY: M. R. Byles, G6UWS, 108 Kingsway, Wellingborough, Northants. *(0933 71189)*
NORFOLK (Coll. of Arts & Tech): E. Haskett, G4OZG, 23 Gloucester Road, Gaywood, Kings Lynn, Norfolk PE30 4AB. *(0553 768701)*
PONTEFRACT: C. Mills, G0AAO, 27 Pendennis Avenue, South Elmsall, Nr. Pontefract, W. Yorks. *(0977 43101)*
POWYS: M. Smith, GW4DWX, Tonn Marr, Welshpool, Powys. *(Welshpool 2068)*
POOLE: P. Dykes, G4XYX, 68 Egmont Road, Poole.
RAIBC: Mrs. C. Clark, G1GQJ, 9 Conigre, Chinnor, Oxon OX9 4JY.
RAOTA: G. R. Jessop, G6JP, 32 North View, Eastcote, Pinner, Middx. HA5 1PE.
READING: S. J. Wilson, 6 Pendennis Road, Freshbrook, Swindon, Wilts SN5 8QD.
SARUG: P. Newman, G4INP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ.
SOUTH BRISTOL: L. Baker, G4RZY, 62 Court Farm Road, Whitchurch, Bristol, Avon BS14 0EG.
SOUTHDOWN: R. Evans, G4VOS, Oakside Waldron, Heathfield, Sussex. *(Heathfield 3168)*
SOUTH ESSEX: A. Smith, G4FMK, 8 The Parkway, Canvey Island, Essex SS8 0AA. *(0268 683805)*
SOUTHGATE: D. C. Elson, G4YLL, 200 Churchgate Road, Cheshunt, Herts EN8 9EL.
SOUTH LAKELAND: R. Pearce, 72 Queen Street, Dalton-in-Furness, Cumbria LA15 8EH.
SPEN VALLEY: I. F. Jones, G4MLW, 54 Milton Road, Liversedge, Heckmondwike, W. Yorks. *(Heckmondwike 409739)*
STOCKPORT: M. Betts, G4FFW, *address wanted. (061 224 7880).*
STOURBRIDGE: C. Williamson, G4IEB, 7 Hanbury Hill, Stourbridge DY8 1BE.
SURREY: J. Simkins, G8IYS, 18 Riding Hill, Sanderstead, Croydon CR2 9LN. *(01-657 0454)*
SUTTON & CHEAM: G. Plucknett, G4FKA, 32 West Road, Malden Rushett, Chessington.
SUTTON COLDFIELD: A. D. Turner, G8TUR, 10 Jervis Crescent, Sutton Coldfield, W. Mildlands B74 4PW. *(021-353 2061).*
TODMORDEN: Mrs. V. Mitchell, G1GZB, Parrock Farm, Shore Green, Todmorden, W. Yorks OL14 8SF. *(Todmorden 7572)*
TWICKENHAM & TEDDINGTON: J. Taylor, G0AKN, 89 Lion Road, Twickenham, Middx. TW1 4HT. *(01-891 2820)*
UK FM GROUP (NORTHERN): Mrs. J. P. Laughton, G4UNA, Claremont, Main Street, East Ardsley, Wakefield, Yorks. WF3 2AP.
VALE OF EVESHAM: M. J. Butler, G4UXC, 16 Clevedon Green South Littleton, Evesham, Worcs. WR11 5TY. *(0386 831508)*
VERULAM: G. Wimpenny, G4OBH, 30 Faircross Way, St. Albans, Herts. *(St. Albans 52003)*
WARRINGTON: P. Forster, G0CBN, 6 Birchdale Road, Paddington, Warrington, Cheshire WA1 3ER. *(0925) 814005*
WELWYN-HATFIELD: K. Dunwell, G4WLG, 24 Nursery Gardens, Welwyn Garden City, Herts. AL7 1SF.
WIMBLEDON: G. E. Cripps, G3DWW, 115 Bushey Road, Raynes Park, London SW20 0JN. *(01-540 2180)*

10th they have G0DMU giving the low-down on hi-fi. February 17 is a committee meeting, and on 24th they have an open meeting. Those wanting more details can get them from the Hon. Sec. — *see* Panel for his address and telephone number.

Friday evenings are the ones for members of **Maidstone YMCA**; as the club name implies they are based on the Maidstone 'Y' Sportscentre, Melrose Close, Maidstone, and they alternate natter sessions with RAE and CW thrown in, and more formal meetings with a junk sale, films, talks or whatever.

Normally the **Maxwelltown** group has the first and third Wednesday at the Tam o'Shanter Inn, Queensberry Street, Dumfries, and weekends are spent at the club site out of town; however, the arrangements may vary, so check first with the Hon. Sec. — *see* Panel.

The **Midland** club members seem to be very coy about their Hq. — nary a mention in their newsletter! Luckily we know they have a place in Henstead House, Henstead Street, Birmingham. For more details, contact the Hon. Sec. — *see* Panel — or get on S17 and give G8GAZ a call.

The **Nene Valley** group continues to be based at the "Prince of Wales", Well Street, Finedon, Northants, starting at about 8 every Wednesday evening. More details from the Hon. Sec. — *see* Panel.

Norfolk College of Arts & Technology has a club, covering the Kings Lynn area. Every Thursday evening they can be found in the Radio Shack, rear of St. James' Boy School, Hospital Walk, Kings Lynn; and every Friday evening at the same place they have a Morse class too. Start time is 7.30 on Thursdays and 8 p.m. on Fridays.

On Thursday evenings the **Pontefract** club members head for

their Hq. at Carleton Community Centre, where our letter says they have the top floor, but we believe they may be on the ground floor, so best check on arrival. February 19 is the formal session and this is the Raynet AGM.

Now to **Powys** and here again it is Thursday evenings, at the Cricket Pavilion, Lymore Park, Montgomery. To find this, take the road out of Montgomery towards Chirbury, B4386, but just before you come to the end of the built-up area turn right down the private road and carry on for a mile, until the cricket field and its pavilion appear on your left.

The **Poole** group has had problems in nailing down their speakers in time to advise us, but they now have February 27 for the RSGB tape/slide talk on Solar Cycle 21, and on March 27 an 'Introduction to 10 GHz.' Find them on the last Friday of the month at Commander's House, Constitution Hill Road, Poole.

RAIBC is the one for those who are invalid or blind, whether licensed amateurs or SWLs. This month we must mention their member Charles Kirk of Yeadon, who at the age of 83 has passed both parts of the RAE and regained his old call G4CL first issued in 1938. We hope his effort encourages many more OTs to get back on the air. Details on RAIBC from the Hon. Sec. — *see* Panel.

Talking of old-timers, their own club is **RAOTA** and to qualify you have to demonstrate an interest in amateur radio for twenty-five years; get the details from the Hon. Sec. — *see* Panel.

Meetings of the **Reading** club are held at the "White Horse" in Emmer Green, Reading, on alternate Tuesdays, and the first meeting of 1987 was on January 6, so we make the dates February 3 and 17. More details from the Hon. Sec. — *see* Panel.

SARUG is the group which is interested in application of Sinclair micro-computers to amateur radio activities in any way; details from the Hon. Sec. — *see* Panel.

At **South Bristol** we can find the locals every Wednesday evening at Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol. February 4 is a talk 'Can I repair it?' by G4VBU, and on 11th they have a 70cm. activity evening. February 18 is a magazine exchange evening, and on 25th they have an HF activity evening. The lecture on March 4 is on cables and connectors.

The **Southdown** crowd has a main meeting on the first Monday of each month at Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, plus informals on Tuesdays and Fridays of each week, at Wealden Council Offices, Vicarage Field, Hailsham. However, the current issue of the newsletter gives January 7 for the AGM and February 4, which are Wednesdays . . . Perhaps you should contact the Hon. Sec. for the current situation — *see* Panel!

The **South Essex** group is based on Canvey Island, at The Paddocks, every Wednesday evening. This is the venue for their Mobile Rally, slated for March 15. February 4 is another talk on PMR by Dave Pring, and on 11th G3OA gives a history of Top Band. February 18 is a junk sale, and on 25th G0ASN talks about a 50 MHz transverter.

Holy Trinity Church Hall (Upper) in Green Lanes, Winchmore Hill, is the Hq. of the **Southgate** club, where on February 12 they have a talk by G4KZD on computer technology, and on February 26 an informal gathering.

Our next stop is **South Lakeland** and here they have a place at the Norweb Sports & Social Club room at the rear of the Ormsgill Hotel, Barrow-in-Furness, where new members and visitors are welcome on the first and third Thursdays of each month.

Old Bank Working Men's Club, Mirfield is the home of **Spen Valley** on Thursdays; on February 5 the talk is of satellite TV, and on 19th bee-keeping, by G4PHR. The evenings in between are 'noggin and natter' dates.

New Home

Stockport now meets at the Blossoms Hotel at the junction of Bramhall Road and the A6. February 11 is a junk sale, and on 18th they have an informal session in the bar. February 25 was still to be finalised as to programme at the time of their letter. Doubtless the difficulty will have been resolved by now but you could check with the Hon. Sec. — *see* Panel.

Now to **Stourbridge** where they gather at the Robin Woods Centre, School Street, off Enville Street, Stourbridge, on the first and third Monday of each month.

The **Surrey** crowd is to be found at *TS Terra Nova,* 34 The Waldrons, South Croydon, on the first and third Monday from 7.45 p.m. the latter usually being the informal.

Now we must head for **Sutton & Cheam** and Downs Lawn Tennis Club, Holland Avenue, Cheam. On February 2 they have a natter night in the bar, and on 20th a video on QRP. February 26 is down for a visit to the UoSAT control station at Surrey University, and on March 2 there is another natter night in the bar.

February 9 at **Sutton Coldfield** is down for a talk by G4AAL on Operation Raleigh, and on 23rd they have a computer evening. Both are at Sutton Coldfield Public Library.

February 2 is the AGM for **Todmorden**, at the Queen Hotel, Todmorden, and on 16th they have a chat night at the same venue.

New One

This one is called **Twickenham & Teddington** and for more details the contact man is shown in the Secretaries Panel — he will be pleased to pass on details of dates, venues, activities and so forth.

Turning to **UK FM Group (Northern)** we find them on the first Sunday of every month at the Royal Hotel, Church Street, Barnsley. More details from the Hon. Sec. — *see* Panel.

"The Round of Gras" (yes, that's the right spelling!) is host to the **Vale of Evesham** group on the first Thursday of each month for the main meeting, some two miles east of Evesham, at Badsey. The informals are on the third Thursday of each month at the "Gardener's Arms", Charlton, two miles NW of Evesham. February 5 is a talk on used equipment by Allan Kelly, and on March 5 G3PGQ and G3DEF combime forces to 'Test your Spec.'

It's the second and fourth Tuesday of each month for **Verulam** at the R.A.F. Association Hq., New Kent Road, St. Albans. February 10 will be an activity evening, and on February 24 they have a talk on radio control of models by Ian Bradbury.

Every Tuesday evening the **Warrington** members are gathered in Grappenhall Community Centre, Bellhouse Lane, Grappenall, Warrington; the general form seems to be to alternate between informal chat nights and the more formal sort of thing with a speaker or films, or whatever.

Another change of Hq. now: **Welwyn/Hatfield** has its main meetings on February 2 and March 2 at their new home at Lemsford Village Hall, Brocket Road, Lemsford, near Welwyn Garden City; however the informals are still at the 9th Welwyn Garden City Scouts Hq. Knightsfield, Welwyn Garden City, on February 16 and March 16.

On the second and last Friday of every month the **Wimbledon** crowd is at St. Andrews Church Hall, Herbert Road, Wimbledon; February 13 is a mini-lecture and natter, and on 27th, they have G3VA talking about IBA television broadcasting.

On now to **Yeovil** where the locals have Thursdays booked at the Recreation Centre, Chilton Grove, Yeovil. On February 12, G3MYM talks about the L-match, and on 19th G3GC deals with D/F for the radio amateur. February 26 is a natter night, and on March 5 G3MYM returns to the fray, to discuss the grey line propagation phenomenon.

QRT

Signals the end of another pile of mail; your letters should be addressed to "Club Secretary", SHORT WAVE MAGAZINE, Enefco House, The Quay, Poole, Dorset BH15 1PP. **Note the change of address for your letters!**

("SITUATIONS" AND "TRADE")

30p per word, minimum charge £3.60. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50 per cent for Bold Face (Heavy Type). No responsibility accepted for transcription errors. Box Numbers £1.50 extra. Send copy, with remittance, to the Classified Dept., Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. Prices include VAT

TRADE

Samson (German) CMOS El-Keyers, integral adjustable paddles, silver contacts, used by professionals worldwide: ETM-5C, £89; ETM-8C (4096 bit memory), £142. Send s.a.e. for details. — **Watts, G4BM,** QTHR. (Tel: 0531-820960).

Quality walkie-talkies, private, long range, satisfaction or refund, £24.99 pair (normally £31.49). 48-hrs. delivery. — Xenon (Dept. SW9), 24 Wharncliffe Street, Barnsley, Yorkshire.

Service Manuals: most makes, models, amateur, test, televisions, vintage etc., s.a.e. with enquiries please; — **Mauritron (SWL),** 8 Cherrytree Road, Chinnor, Oxon. OX9 4QY.

Amidon toroidal cores, ferrite rings and beads. Send *s.a.e.* for data and prices. Business hours: 10-5 p.m. Tues., Wed., Fri.; 10-4 p.m. Sat. — **SMC (TMP Electronics),** Unit 27, Pinfold Workshops, Pinfold Lane, Buckley, Clwyd CH7 3PL.

FREE READERS' ADS

Exchange: FT-290 for HF transceiver, FT-101, KW-2000 etc. W-H-Y? — Quested, G0DRT, 252 Barton Hill, Drive, Minster, Sheerness, Kent ME12 3LZ.

For Sale: Marconi MK-223 Tx, 2-30 MHz, complete with PSU and manual, £65. RA-17 general coverage Rx, 0.5-30 MHz, with manual, very good condition, £100. Farnell power supply, 0-20V 3A, £8. DC power pack, 13.8V 25A, £15. S. G. Brown headphones, £5. DG7-91 2½" CRT, boxed, with holder, £8. Solartron double-beam 'scope, 15 MHz, with probes and manual, faulty EHT, hence £20. Wire dipole kit, 135ft., with heavy-duty insulators, wire balun, pulley and lanyard, £12. Heathkit decade capacitance box, 100pF to 0.1μF, £5. HF whip aerial, 10ft., £6. Five 807's, new and boxed, £6. 26 copies of *Short Wave Magazine,* March '77 to Sept. '79, £5; 17 copies of *RadCom,* May '75 to Sept. '76, £5. — G4FZG, QTHR. (Tel: 0242-580329).

For Sale; Icom IC-R70 receiver, mint condition and works-fitted 2.3 kHz IF filter, £470 or near offer. (Sussex). — Box No. 5826, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP.

Wanted: Purchase or borrow, manual for Marconi "Pacific" receiver. — Box No. 5827, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP.

Sale: Westminster W15AM low band, with accessories, £30 plus delivery. Valves: QQV03-10, -20, and most communication types for mobiles, also ceramic bases. High-voltage transformers. — Burge, GI3OTU, 6 Ashley Park, Bangor, Northern Ireland. (Tel: 0247-473759).

For Sale: Westrex RTTY PSU, 80-0-80v. at 150mA, with circuit, £10 or near offer. — Ring Kay, G4GCB, Belper 6851 (Derbys.).

Selling: Superb Sony ICF-7600D all-mode, all-wave receiver, complete with leather case, mains power unit, earpiece, batteries, external aerial etc., two months old, with free all-in maintenance contract included, £145. — Barnes, 14 Coalpit Lane, Langley, Macclesfield SK11 0DQ. (Tel: 02605-2287).

For Sale: FT-101ZD Mk. III, new WARC bands, with mic., fan, box and manual, good condition, £495. — Ring Terry, 0462-35248 after 6 p.m.

Selling: Philips D.2999 receiver, many facilities including scan, memories, direct entry, 4 months old, immaculate condition, boxed, with manuals. Offers? Looking for HF rig. — Ring Shaun, 021-525 1254.

Exchange: Blaupunkt "New York' car radio/cassette, system, with six speakers, graphic equaliser, 80-watt amplifier, superb finest top quality system (cost over £900), also as-new 9" monitor *for* HF linear or any amateur radio equipment. — Ring McCallum, G4VNG, 0733-231639.

Wanted: Belcom LS-201L, good price paid for transceiver in perfect condition. — Ring Belfast 795783.

Wanted: FRV-7700 VHF converter for FRG-700 Rx, must include 118-130 MHz and 140-150 MHz. Also out-of-date issue of International Listings Callbook. — Dunn, 24 Ashfield Crescent, Highfield Road, Chester CH1 5AU. (Tel: 0244-373132).

QRT Sale: TS-120V with DFC-230 VFO, £250. muTek TVVF144a transverter, £180. FC-700 ATU/dummy load, £75. BNOS L144-10-100 linear, £75. Homebrew 12v. 25A PSU, 2m. linear and PSU parts, SK600, transformers, caps, built RM-1 modem PCB, plus more, offers? — Ring Kevin 0243-828402, 6-8 p.m. only.

For Sale: Icom IC-202S 2m. SSB portable, fully crystalled, £125. Yaesu FT-790R 70 cm. hand-held with FNB-3 power pack, soft carrying case and charger, £220. Trio TH-41E 70 cm. h/held with VOX headset, DC/DC converter and charger, £200. All in excellent condition. — Banks, G4WND, QTHR. (Tel: Tamworth 894464).

Wanted: Astatic D.104 mic. and modern VHF communications receiver. Bristol wrenches for American socket screws. Good QQVO6-40A valve. Heathkit 3395 kHz CW filter. Collins CW filter and 3.1 SSB filter for 75S series Rx. *Short Wave Magazine* for March and July 1946 and Jan. 1949, and July and Aug. 1959. RSGB *Bulletin* for June and July 1949, and May 1954. T. & R. *Bulletin* 1930 and earlier. *Sell/Exchange: QST* and *T. & R.* since '30s, *S.W.M.* and *CQ* since '40s. HRO Senior with 13 coils and National power unit. — Baker, Ty-Top, Castle Caereinion, Welshpool, Powys.

Wanted: Ex-government MK-123 Tx/Rx complete with spares and accessories, in working order. Your price will be paid! All s.a.e.'s will be answered. — Leaman, G3POP, 26 Prospect Road, Birchington, Kent CT7 9RP.

Wanted: Old or new style RF PCB for FT-707. — Ring Tony, 0304-820118, or Ian, 0304-821588.

For Sale: A.E.A. PKT-1 packet radio controller, full AX25 Version 2 software installed, all manuals, perfect, £160. — Ring John, G4SWD, 08926-3485.

Selling: UR43 coax relays, 12v., 460 MHz, £3.50 ea. — Barnes, G3AOS, 14 Coalpit Lane, Langley, Macclesfield SK11 0DQ. (Tel: 02605-2287).

Wanted: List of pre-W.W.I radio amateurs, wartime and pre-war copies of *Radio Times, Listener,* etc. Knobs — any variety! — G3KPO, QTHR. (Tel: 0983-67665).

For Sale: Microwave Modules 70cm., 2m. and 4m. (inc. 4m. 4-ele beam) transverters, £60, £85 and £80 respectively. *Exchange:* Yaesu FRG-7 in mint condition, no mods., with 12v. lead, *for* any 2m. equipment, FM hand-held etc. But would love to swap it for an Icom IC-202! — Ring Fox, G4MDQ, 0909-566724 after 5 p.m. weekdays.

Selling: Books old and new, send s.a.e. for list. Fourteen Type FT243 crystals between 7005 and 7040 kHz, £24. *Wanted:* Solartron stabilised AC/PSU's — W-H-Y? Codar 250/S PSU and AC/PSU for Marconi "Mercury" Rx. — Marris, 35 Kingswood House, Farnham Road, Slough, Berks. SL2 1DA.

Wanted: For new project (QRP?) for the New Year, 4CX1500 or 4CX1000 valve and/or base for same. Please write with price, age, etc. — Dick, 3 Limes Road, Folkestone, Kent CT19 4AU.

Sale: Sony CRF-320 synthesized dual-conversion receiver, SW/MW/LW/FM, with built-in quartz clock timer, £240. Sony ICF-5900W, boxed, as new, £49. — Ring 01-657 0430, evenings.

For Sale: Icom IC-735 HF transceiver, 160-10m., SSB/CW/AM/FM, includes superb general coverage Rx, with manual, new and boxed, £750. Would consider part-exchange for FT-707, or W-H-Y?. MMC435/600 ATV converter, £25. MMC144/28 2m. converter, £18. — Ring Perrin, G4AFY, Kidderminster (0562) 747480.

Wanted: Short wave adaptor for Satellit 1400. — Ring Gott, York 31186.

Wanted: New, unused and boxed Hy-Gain TH6DXX. Details and price please. — Girvan, GM2FVV, QTHR. (Tel: 0786-811237 after 7 p.m.).

Selling: Reporter radio-telephone, working Pye Cambridge, £10. Pye PTC-2002 Ranger mobile radio-telephone with handbook, no case, £10. HT electrolytic capacitors, chokes, transformers, please enquire. Denco coils at 25p Yaxley switches etc. Large organ amplifier, two EL34's, £10. Drake 2B and 2C Rx's in perfect order, offers please. Sine/square wave signal generator, £5. Hoover 1/6-H.P. inductor motor with pulley, £5. Buyers collect please. — Ring Lindars, 01-647 6157.

Wanted: Service manuals and sheets for most amateur radio rigs, also 14AVQ antenna. — Ring 0288-4892 after 5 p.m.

For Sale: Yaesu FT-290R, with nicads, charger, case, manual, ⅝-wave mobile antenna and 2m. colinear antenna, the lot £320. — Ring 0256-882486.

Sale: Unused Microwave Modules MML144/1005, £103; MML28/1005, £88. Postage paid. 100 metres UR67, new; 200 metres UR57, new: offers? — Surman, G3FPD, QTHR. (Tel: 040372-3205).

I am engaged! So must reluctantly sell my Yaesu FT-480R, complete with PSU, desk mic., rotator, HB9CV and coax, yours for only £365. Hallicrafters SX-140 Rx, amateur bands only, £50. Buyers collect. — Ring Mike, G1HGD, 0926-55158 evenings only.

Wanted: Top Band transceiver, must have AM/CW, including SSB would be accepted, anything considered. Also Kenwood T-599S HF Tx. — Peter, G1TX1, QTHR. (Tel: Norwich (0603) 748338).

Wanted: S.E.M. Visa 3.5 MHz receiver. S.E.M. Transmatch/Ezitune with dummy load if possible. — Barnes, G3AOS, 14 Coalpit Lane, Langley, Macclesfield. (Tel: 02605-2287).

Wanted: Components for HF linear amp., including pair of 813's with ceramic bases, 1.5kV transformer, tuning capacitors, etc. — Ring McCarthy, Ipswich 689982.

Technical Books and Manuals

(ENGLISH AND AMERICAN)

AERIAL INFORMATION

Antenna Handbook (Orr and Cowan)	£7.75
Beam Antenna Handbook	£6.50
Cubical Quad Antennae. 3rd Edition	£6.90
Simple Low Cost Wire Antennas, by Orr	£6.20
Aerial Projects (Penfold)	£2.30
Antenna Book (ARRL) *latest 14th Edition*	£8.00
The (ARRL) Antenna Anthology	£4.50
Two-metre Antenna Handbook, F. C. Judd G2BCX	£6.35
HF Antennas for All Locations (RSGB),	£6.65
25 Simple Shortwave Broadcast Band Aerials (E. M. Noll)	£2.25
25 Simple Amateur Band Aerials (E. M. Noll)	£2.25
25 Simple Indoor and Window Aerials	£2.05
25 Simple Tropical and MW Band Aerials	£2.05
The ARRL Antenna Compendium, Vol. 1 *(new title)*	£8.95

BOOKS FOR THE BEGINNER

Amateur Radio *(Lutterworth Press)*	£9.60
Solid State Short Wave Receivers for Beginners (R. A. Penfold)	£2.25
Beginners Guide to Radio (9th Edition)	£5.45
Beginners Guide to Electronics, 4th Edition	£5.45
Beginners Guide to Amateur Radio (Newnes)	£5.45
Beginners Guide to Integrated Circuits, 2nd edn.	£5.00
Guide to Amateur Radio, 19th Edition (RSGB)	£3.40
Morse Code for the Radio Amateur (RSGB)	£1.70
Understanding Amateur Radio (ARRL)	£5.45
Radio Amateur's Examination Manual, *latest 11th edition* (RSGB)	£3.90
How to Pass the Radio Amateurs' Examination (RSGB)	£3.30

GENERAL

The Complete DX'er, by W9KNI	£8.25
Weekend Projects for the Radio Amateur (ARRL)	£3.05
Projects in Amateur Radio and Short Wave Listening *(Newnes)*	£4.20
How to Build your own Solid State Oscilloscope (Rayer)	£2.25
How to Design and Make Your Own PCB's	£2.25
Better Short Wave Reception, *(5th Ed)*	£6.20
FM & Repeaters for the Radio Amateur (ARRL)	£4.35
Easibinder (to hold 12 copies of "Short Wave Magazine" together)	O/S
World Radio & TV Handbook 1986 Edition	O/S
The World's Radio Broadcasting Stations and European FM/TV (Newnes)	£8.10
Guide to Broadcasting Stations (18th Edition)	£5.50
International Radio Stations Guide *(new ed.)*	£3.25
Long Distance Television Reception (TV-DX) for the Enthusiast *(revised edition)*	O/S
An Introduction to Radio DXing	£2.30
Radio Amateurs DX Guide (14th Edition	£2.45
Power Supply Projects (Penfold)	£2.80

HANDBOOKS AND MANUALS

Radio Communication Handbook, *5th ed.*, Vols. 1 and 2 combined (paperback), RSGB	£14.00
Teleprinter Handbook. New 2nd Ed. (RSGB)	£12.70
TVI Manual *(2nd Edn.)* (RSGB)	£2.20
The ARRL 1986 Handbook for the Radio Amateur, *soft cover*	O/S
The ARRL 1986 Handbook for the Radio Amateur, *hard cover*	O/S
The Satellite Experimenter's Handbook (ARRL)	£9.70
Test Equipment for the Radio Amateur (RSGB)	£5.75
Amateur Radio Operating Manual (RSGB) *3rd Ed.*	£6.10
Oscilloscopes — How to Use Them, How They Work (Newnes)	£5.90
Practical Handbook of Valve Radio Repair (Newnes)	£17.15

USEFUL REFERENCE BOOKS

Foundations of Wireless and Electronics, 10th Edition (Scroggie)	£10.05
Amateur Radio Techniques, 7th Edn. (RSGB)	O/P
U.K. Call Book 1986 (RSGB)	
Hints and Kinks (ARRL)	£4.30
Radio Frequency Interference (ARRL)	£2.40
Electronics Pocket Book, 4th Edition (Newnes)	£6.20
Radio Data Reference Book, *new* 5th edition (RSGB)	£8.90
Amateur Radio Software (RSGB)	£8.60
The Radio and Electronic Engineer's Pocket Book (Newnes) *new title*	£5.90

VALVE AND TRANSISTOR MANUALS

Towers' International Transistor Selector, latest 1985 Edition (Up-Date No. 3)	£14.50
Semiconductor Data Book, 11th Edition (Newnes)	£8.50
International Transistor Equivalents Guide	£3.40
International Diode Equivalents Guide	£2.60

VHF PUBLICATIONS

VHF Handbook, Wm. I. Orr W6SAI *latest* 3rd Edition	£9.75
VHF/UHF Manual (RSGB) 4th edition	£11.20

orders despatched by return of post

O/P (Out of print) THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

O/S (Out of stock) Many of these titles are American in origin (Terms C.W.O.)

Prices are subject to alteration without notice.

Available from SHORT WAVE MAGAZINE

Enefco House, The Quay, Poole, Dorset BH15 1PP. (0202-678558)

BARCLAYCARD VISA Access

Published on the last Thursday of each month by PW Publishing Limited, Enefco House, The Quay, Poole, Dorset BH15 1PP. Printed in England by K&SC (Printers) Ltd., Tunbridge Wells, Kent. Distributed by COMAG, Tavistock Road, West Drayton, Middlesex UB7 7QE, telephone West Drayton 444055, Telex 8813787. Sole Agents for Australia and New Zealand — Gordon & Gotch (Asia) Ltd; South Africa — Central News Agency Ltd.