

The
SHORT WAVE
Magazine

VOL. XXXII

OCTOBER, 1974

NUMBER 8



WORLD WIDE COMMUNICATION

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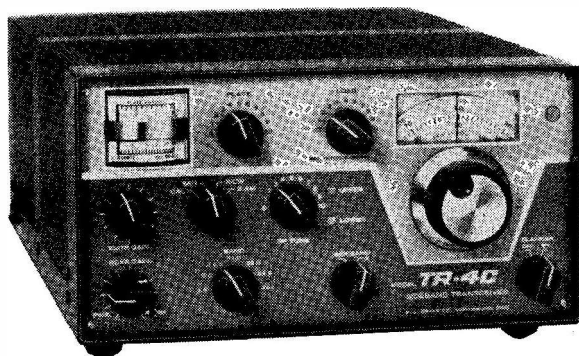
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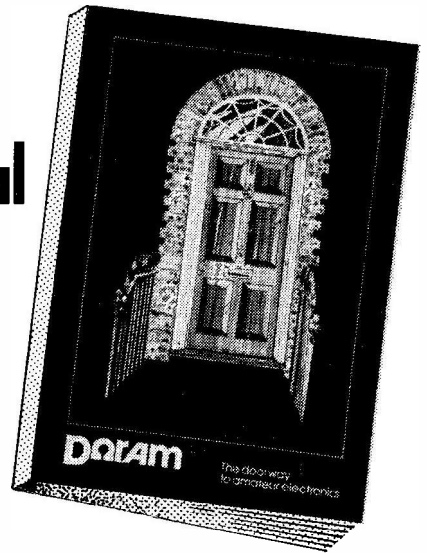
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SW/10/74

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RELAYS. Mains contact heavy duty 2v. coil 75p, carriage 10p

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ATU

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ML4 400 lb.	yd. (25p)	4p
KW Anc. Switch IP 3W with SO239	(30)	£5-39

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JOYSTICK VFA + JOYMATCH 111B (SYSTEM "A") for modern communications receivers	£26-87 del.
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JOYMATCH tuned AERIAL SYSTEM for ANY MW and SW communications or Solid State receiver	£5-71 ..
JOYMATCH Artificial Earth for MW and SW, as used on North Sea Oil Rigs	£5-71 del.
Communications HEADPHONES, 8 ohm. Suitable most modern comm. receivers	£3-08 ..
VALVES: Complete replacement set for 9R59DS and 9R59DE	£4-32 ..
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Send 4½p stamp for complete details of PARTRIDGE PRODUCTS AND TRIO QR666.

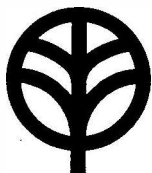


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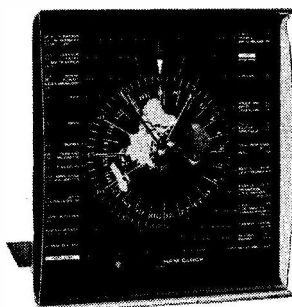


*Come and see the fabulous TRIO range
of equipment*

AT THE EXHIBITION

GRANBY HALLS, LEICESTER — OCT. 31, NOV. 1, NOV. 2

THOSE OF YOU WHO RECEIVED LAST MONTH'S MAGAZINE ARE NOW AWARE OF THE MAIN ITEMS IN THE TRIO RANGE. WE NOW SHOW YOU SOME OF THE STATION ACCESSORIES DESIGNED BY TRIO TO COMPLETE YOUR INSTALLATION.



HAM CLOCK

Have you ever wondered why the amateurs in Hong Kong are not replying? Maybe it's because they're in bed and you forgot just how many hours time difference there is! The TRIO HC2 Ham Clock is a 24 hour battery powered (up to 1 year on a single HP2) clock which gives instant readout of the time anywhere in the world. Beautifully styled so that you won't know whether to keep it in the shack or out in the home, it is a real asset to the DX chaser. At only £11 (VAT exc.) it is incredibly good value.

LOW PASS FILTER LF30

You know how difficult it has been in recent years to obtain a good low pass filter. Now the TRIO LF30 fills this need. The specification tells its own story.

POWER HANDLING	1 kW
CUT OFF FREQUENCY	30 MHz
STOP BAND ATTENUATION	90 dB
INSERTION LOSS	1.5 dB at 30 MHz
IMPEDANCE	50-100 ohms
CONNECTORS	SO239/PL259
DIMENSIONS (mm)	224 x 50 x 40

PRICE: £9 (VAT exc.)

BAND PASS FILTER BPF2

This is a specially designed band pass filter centred on 145 MHz and is intended to be used between your 2 metre equipment and the antenna. Eliminate those out of band sprogies from your transverter in one easy move.

POWER HANDLING	50W continuous
PASS BAND	144-146 MHz
STOP BAND ATTENUATION	90 dB
INSERTION LOSS	1.5 dB
IMPEDANCE	50 ohms
CONNECTORS	SO239/PL259
DIMENSIONS (mm)	150 x 50 x 50

PRICE: £8 (VAT exc.)

MC50 MICROPHONE

Matching microphone for all TRIO equipment. Contemporary styling and dual function construction allows use as hand or stand microphone. Dual impedance 600Ω/50kΩ and two coiled cords give complete versatility. Built in locking PTT switch. The TRIO MC50 is an attractive addition to any station and its performance is superb.

POLAR PATTERN
FREQUENCY RESPONSE
SENSITIVITY

Cardioid
300 Hz-9 kHz
-76dB at 50 kΩ
-56 dB at 600Ω

(which really means that it will drive any transmitter that we've tried it on)

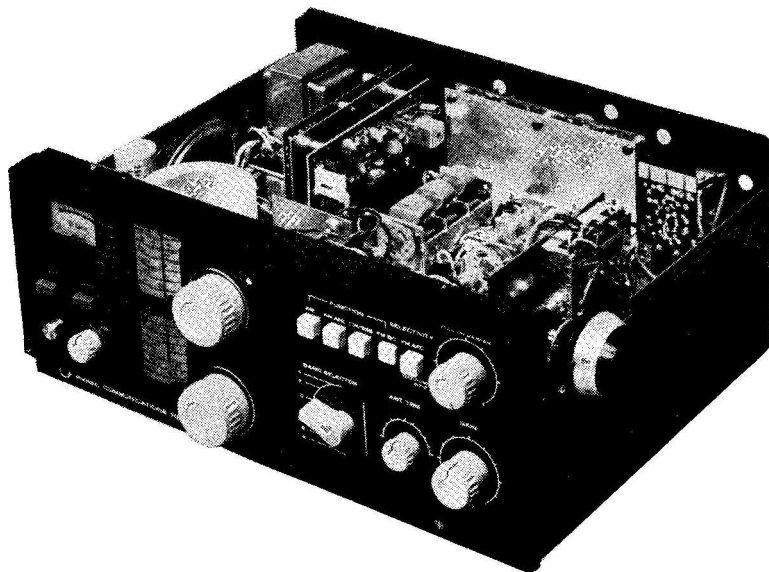
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REMEMBER THE CLASSICAL QUOTATIONS SENT IN BY CUSTOMERS IN RESPONSE TO A COMPETITION SOME TIME AGO? WE THINK THAT THEY ARE WORTH REPEATING AT A RATE OF ONE A MONTH.
 No. 1—"I SOUGHT HIM BUT COULD NOT FIND HIM; I CALLED HIM, BUT HE GAVE ME NO ANSWER."
Solomon 5, v. 6. Originally sent in by Ian Pritchard.



QR666

QR666 SPECIFICATION

FREQUENCY COVERAGE

170—410 kHz
 525—1250 kHz
 1.25—3.0 MHz

3 — 7.5 MHz
 7.5—18 MHz
 18 —30 MHz (Dual Conversion)

BANDSPREAD

3.5—4 MHz
 7—7.5 MHz
 14—14.6 MHz

21—21.5 MHz } Dual Conversion
 28—30 MHz }

MODES

SELECTIVITY

ANTENNA IMPEDANCE

SENSITIVITY

AF OUTPUT

POWER SUPPLY

AM, USB, LSB, CW
 Selectable 2.5 kHz/5 kHz at 6 dB
 50—100Ω

1μV for 10dB S/N ratio (SSB/CW)

Greater than 1.5W. into 8Ω. Internal speaker fitted

100/117/220/240v. A.C. 50/60 Hz.

External 12v. negative ground

Internal 12v. batteries

Automatic change-over to internal supply if external supply fails

362 wide x 163 high x 322 deep

7.3 kg (16.09 lbs.)

DIMENSIONS (mm)

WEIGHT

PRICE: £130 (VAT exc.)

GENERAL CHAT

We stock a great many products apart from those advertised month by month—everything in fact for the radio amateur operator. If you need any more information, our complete catalogues are available free to callers. If you require them sending by mail, postal charges being what they are today, please send us 20p in stamps because that's what it costs to send them to you!

For callers, we are open 9 am-5.30 pm Tuesday to Saturday inclusive and we are available by telephone from 9 am to 9 pm every day. Telex callers obviously have 24 hour service.

Finally, to put at rest any fears which our existing customers may have regarding service: our appointment as TRIO distributors in no way affects our total commitment to first class after sales service on anything we sell or have sold in the past.

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Western

YAESU, YOUR ASSURANCE OF QUALITY, INTRODUCE The Superbly engineered YO-100 MONITOR SCOPE



**FOR THE SERIOUS OPERATOR THE YO-100
ALLOWS YOU TO**

- ★ MONITOR YOUR TRANSMITTED SIGNAL
- ★ TUNE FOR MAXIMUM P.E.P.
- ★ MONITOR RECEIVED SIGNALS
- ★ ADJUST CARRIER SUPPRESSION
- ★ PROVIDE 2-TONE TEST SIGNAL

(Delivery is Ex-stock S.A.E. for details)

"ALL RECEIVERS 'FALL OFF' AT 30MHz!"

This has been the general opinion of receiver sensitivity performance for years and still applies to some modern equipment! However,

It does not apply to Yaesu equipment!

"You don't believe us? Then here are the facts!"

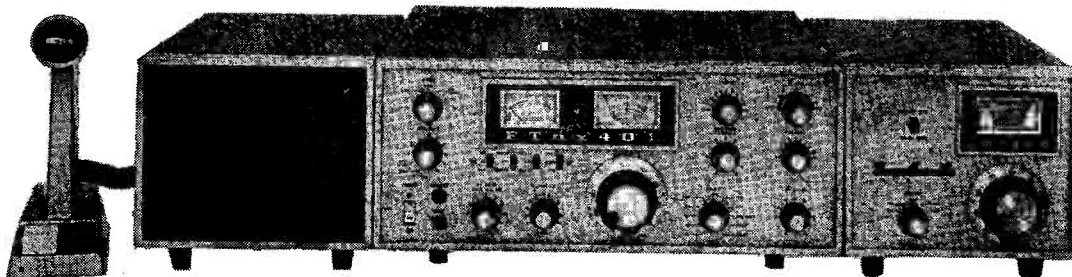
Take your pick! Either refer to the R.S.G.B. Review April 1973, or our test on an off-the-shelf

YD-844

SP-400

FT-401

FV-401



RECEIVER MEASURED PERFORMANCE

SENSITIVITY

Input Freq. MHz	S + N : N for 0.5µv emf dB	S + S : N for 1.0µv emf dB
3-6	16	22
7-1	19	25
14-2	19	25
21-2	19	25
28-7	20	26
29-7	20	26

In order to compare receiver performance figures one must determine the following:

1. "Voltage": is it emf or pd across, say 50 ohm input? There is a 6db difference!
2. The signal + noise to noise ratio (S + N : N) in dB's.
3. The frequency at which the measurements have been made.
4. The bandwidth used.

Just in the same way as one can't compare apples with oranges, nor can one compare sensitivity figures unless the same standards are used. To use a narrower bandwidth would seem to give a receiver a better noise performance. Equipment used for tests: Marconi signal generator TF2002AS, Digital Synchroniser (Marconi) TF2170AF, Power Meter TF2500.

Electronics (UK) Ltd

SPECIAL OFFER! YOUR LAST CHANCE TO BUY SP-101, £9.90, FP-75 or DC-75 FOR YOUR FT-75, £16.50 EACH (including VAT)

YAESU PRICES (free delivery by Securicor or postage on small items) Excluding VAT

HF TRANSCEIVERS/PSU's

FT-75, Few only	£115
FP-75 AC PSU for FT-75	£15
DC-75 DC PSU for FT-75	£15
FT-101B	£330
FT-200	£170
FP-200 AC PSU for FT-200	£45
DC-200 DC PSU for FT-200	£51
FT-401	£310
FT-501	£375
FP-501 AC PSU for FT-501	£53

HF RECEIVERS

FR50B + CAL	£67
FR-101S	£245
FR-101D	£330
FR-400DX	£155
FR-400SDX	£210

TEST EQUIPMENT

YC-355 35MHz AC PSU	£99
YC-355 WE 35MHz AC/DC/PSU	£110
YC-355D 220MHz AC/DC PSU	£127
YO-100 Monitor Scope	£93

SPEAKERS

SP-101	£9
SP-101B	£13
SP-400/401	£11
SP-101PB Phone Patch	£29

VHF TRANSCEIVERS/PSU's

FT-2FB 12 ch.	£115
FP-2AC AC PSU/SPKR for FB	£38
FP-2AC/B AC PSU/SPKR + Batts.	£71
SIG 200 200 ch.	£180
FT-2 AUTO AC/DC	£157

REMOTE VFO

FV50B VFO for FL50	£28
FV50C VFO for FT75	£28
FV-101 VFO for FT-101	£42
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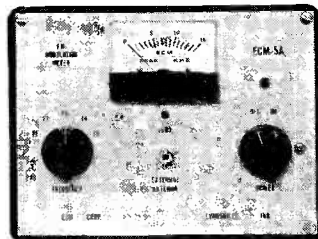
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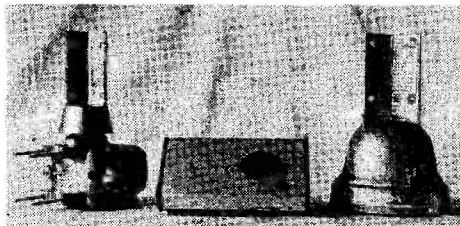
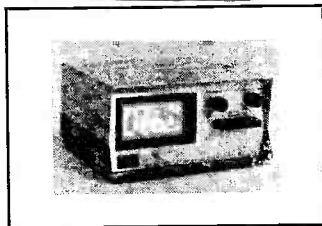
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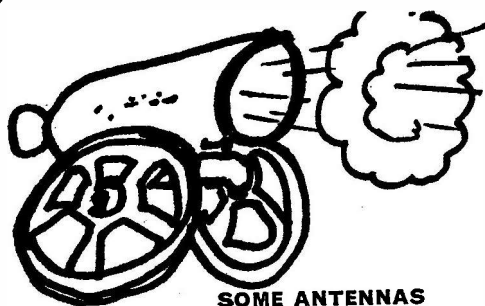
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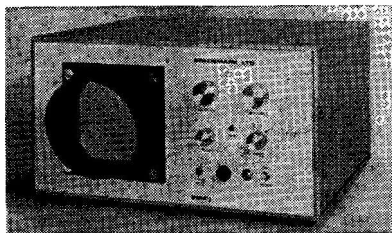
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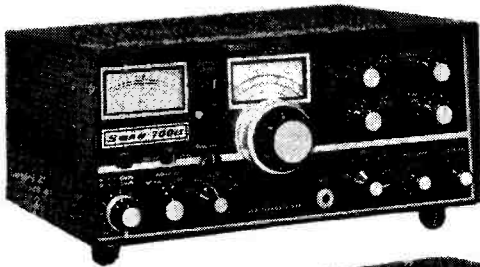
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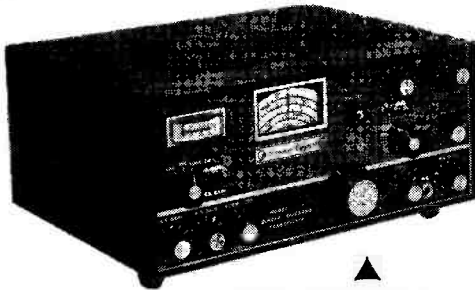


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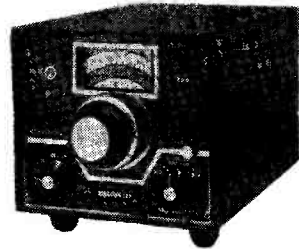
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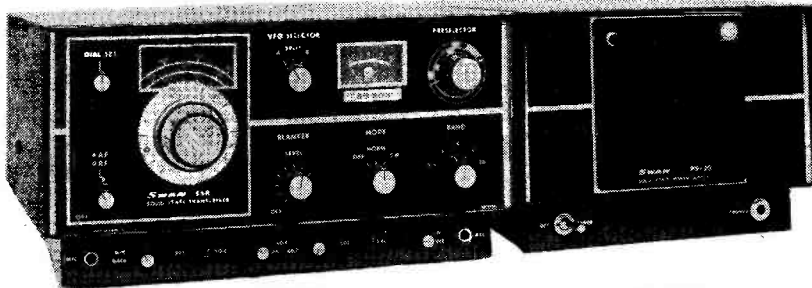


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144MHz Mosfet Converters

UPDATED SPECIFICATION

The overwhelming response to the introduction of our 144 MHz SSB receiver converter has indicated the requirement for a rightly specified converter for use with modern highly accurate 28-30 MHz receivers. To this end we have now standardised the design of our 28-30 MHz Converter using a zener-stabilised 116 MHz crystal oscillator, giving a typical read-out error of better than 1 kHz. The converter is now available in the two versions, with and without the local oscillator output facility.

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SPECIFICATION

Noise figure : 2.8dB max. Gain : 27dB typ.
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 Frequency error at 144 MHz : 3 kHz max.
 Power supply : 35mA at 12 volts.
 116 MHz o/p power : 5mW min (LO o/p version)

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1296 MHz CONVERTER

This converter has been developed using an extension of the microstrip techniques that have been well proven in our 70 cm converter design. Two versions of the design are available using either a 96 MHz or 105.666 MHz crystal to produce I.F.s of 144-146 MHz or 28-30 MHz respectively, corresponding to the 1296-1298 MHz band. We are using crystals of a very tight tolerance to minimize the offset that would otherwise be very noticeable when using a high performance 28-30 MHz tunable receiver. The multiplier chain uses three BFY 90 transistors and the mixer is fabricated using a pair of MA 4882 Schottky diodes in a balanced hybrid ring configuration. The I.F. head amplifier uses a selected low noise dual-gate mosfet to give an overall noise figure which is typically better than 8.5dB, and a gain of 25dB. Microstrip UHF circuitry ensures repeatability of this high performance design. The unit is housed in the same small die-cast box as the rest of our range of converters and is fitted with 50 ohm BNC connectors of optimum UHF performance. The converter operates from a nominal 12v. supply and is available in negative earth version only.
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We manufacture varactor triplers for 432 and 1296 MHz. Both are highly stable, with low level harmonic output, and capable of AM operation at the 50% power level. These units are aligned using swept-frequency and swept-power drive sources, the output of each unit being monitored on one of our spectrum analysers. Great attention is paid to harmonic suppression and linearity. All harmonics are greater than 40 dB down on the wanted output.

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Maximum input power at 144 MHz : 20 watts. Typical output power (at maximum input) : 14 watts. Price inc. VAT **£18.90**

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Thanks to our high turnover in used equipment we constantly require new supplies.

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To obtain any of our products. We can despatch by return of post. We give same day C.O.D. Service. You can call in here any time to look at the gear. Queries? Write or ring if you have any questions. 12 months' guarantee on our products. Paul G3MXG.

If the worst comes to the worst and it doesn't work, send it back here with £2.00 and we will make it work for you, so you can't lose.

SENTINEL DUAL GATE MOSFET 2 METRE CONVERTER—EX-STOCK

Now with much improved metalwork. 2 metre IFs available from stock :

2-4 MHz., 4-6 MHz, 9-11 MHz, 14-16 MHz, 18-20 MHz, 24-26 MHz, 28-30 MHz.

4 metre IF available from stock : 28-28.7 MHz.

2-4 MHz and 4-6 MHz use double conversion technique with two mixers and no crystal oscillator multiplication.

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ADVERTISERS' INDEX

	Page
Amateur Electronics (G3FIK) ...	408, 410
Amateur Radio Retailers Association ...	446
The Amateur Radio Shop, G4MH (Huddersfield) ...	454
Antec ...	450
Ashley Dukes (Honda) ...	450
B. Bamber Electronics <i>back cover</i> , ...	448
J. Birkett ...	445
British National Radio School	455
C. & C. Electronics ...	447
I. N. Cline (G3EMU) ...	452
Communique ...	411
Datong Electronics Ltd. ...	410
Derwent Radio ...	443
Dexbeam Ltd. ...	453
Doram Electronics Ltd. ...	398, 399
John Dudley & Co. ...	449
G3HSC (Rhythm Morse Courses) ...	452
G.W.M. Radio ...	454
Hamgear Electronics ...	454
Heath (Gloucester) Ltd. ...	414
D. P. Hobbs Ltd. ...	449
K.W. Communications Ltd. <i>inside front cover</i>	402, 403, 442
Lowe Electronics ...	451
J. S. McCaig ...	448
J. F. McMahon ...	453
Marketing Services Inter- national ...	449
S. May (Leicester) Ltd. ...	409
Microwave Modules Ltd.	406
Mosley Electronics ...	451
Mulhall Electronics ...	448
North West Electrics ...	401
Partridge Electronics Ltd.	443
P.M. Electronic Services ...	397
Radio Shack Ltd. ...	442
R. T. & I. Electronics Ltd.	444
Shure Electronics Ltd. ...	447-452
Small Advertisements ...	412
Solid State Modules	450
Southern Surplus Merchants	406
Spacemark Ltd. ...	447
S.S.B. Products ...	407
Stephens-James Ltd. ...	456
S.W.M. Publications <i>inside back cover</i> , ...	447, 456
Telecommunications Inter- national Agency Ltd. ...	449
Telford Communications...	450
T.M.P. Electronic Supplies	455
Waters & Stanton Electronics	454
Reg Ward & Co. Ltd. ...	404, 405
Western Electronics Ltd. ...	452
W. H. Westlake ...	401
Chas. H. Young Ltd. ...	401

(GB3SWM)

Vol. XXXII

OCTOBER, 1974

No. 372

CONTENTS

	Page
Editorial— <i>Exhibition</i> ...	415
Communication and DX News, by E. P. Essery, G3KFE ...	416
The Mobile Scene— <i>Pictures</i> ...	420
The RF Clipping Advantage, by D. A. Tong, B.Sc., Ph.D., G8ENN ...	422
Linear Amplifier for The HF Bands, Part I, by E. P. Essery, G3KFE ...	426
Courses For The R.A.E.— <i>Supplementary List</i> ...	428
Transistor BC/Rx Conversions for Direction Finding, by E. W. Holt, G3MHQ ...	429
Paraboloid Calculations, by R. G. Marden, G3MWF ...	430
DSB on Top Band, by B. J. Armstrong, G4BJA ...	430
Walkie-Talkie Conversions for Ten Metres, by R. P. Morris, G4CTR	432
VHF Bands, by A. H. Dormer, G3DAH ...	433
The Month with The Clubs— <i>From Reports</i> ...	437
Rules— <i>The 29th MCG</i> ...	439
New QTH's... ...	441

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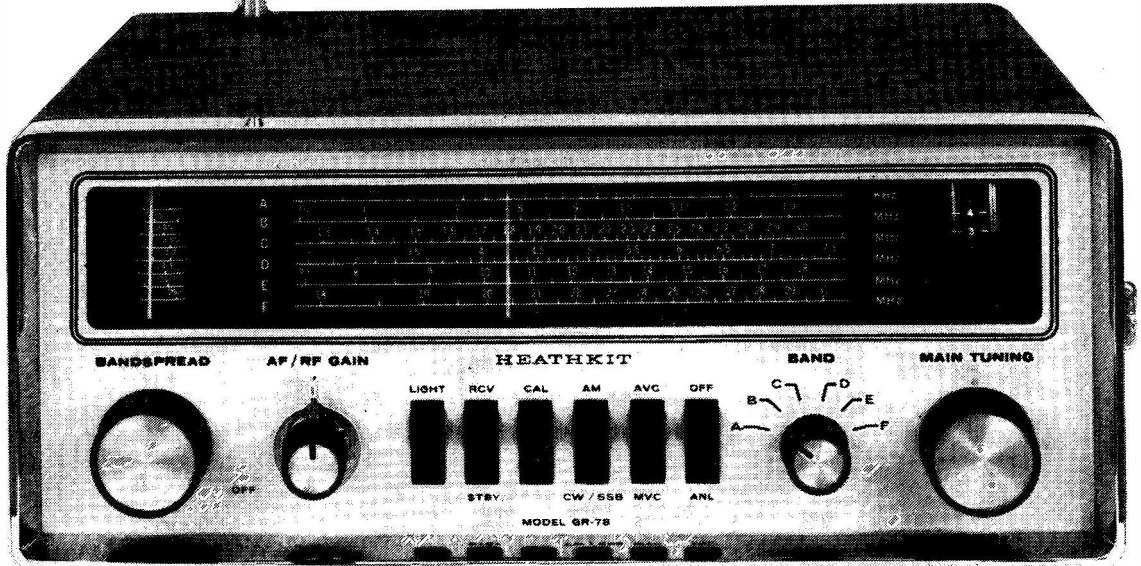
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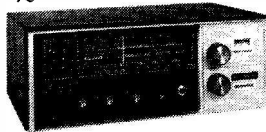
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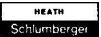


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The
SHORT-WAVE
Magazine

E D I T O R I A L

Exhibition

For the third successive year, the Amateur Radio Retailers' Association is arranging a National Amateur Radio & Electronics Exhibition at the Granby Halls, Leicester, in the heart of the Midlands.

Their first effort, in 1972, was tentative but gave promise for future success. This was followed by last year's Show, which was an undoubted success. Now we come to this year's ARRA exhibition, for which there are great expectations.

The period is for the three days October 31 to November 2 (Thursday-Friday-Saturday) and Leicester is easily reached by road and rail or coach services, with convenient local parking.

Apart from what there will be to see round the Stands, an exhibition such as this is also a social occasion, in the sense that people are there not only to see but also to be seen, and to meet their friends and over-the-air contacts. Because the whole Exhibition is under cover, with all reasonable amenities indoors, there is no dependence on the weather for its success.

* * * *

Though, most regretfully, *SHORT WAVE MAGAZINE* will not have a stand this year—because of the problem of daily staffing away from our London base, which must also be kept going—we shall be indirectly represented by the daily attendance of various members of the *MAGAZINE* organisation.

Austin Forsyth
G6FO

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

FIRST point for this time is about letters intended for CDXN—these should, please, always go *via* Buckingham, rather than be sent to your conductor direct. There are good administrative reasons for this, which need not be explained here. Suffice it to say that it does *not* cut any corners to send CDXN letters other than to the address given for this feature.

On a different note, there are perhaps few amateurs whose wives reckon on doing the outside house-painting chore! The writer has one of these few, and, one evening, as he was peacefully dreaming in the shack chair of the super-DX he would work when conditions improved, she came in to present him with a ball of wire—the remains of his Top Band long-wire after an argument between its halliard and one leg of the aluminium ladder—one disadvantage of “invisible” aerial construction! Then of course, there were the gales which slammed down over most of the country and in the process rendered the stub mast on which the 14AVQ sits somewhat skew-whiff.

G3KFE was able to visit a station locally on the Sunday of VHF Field Day, and, while sunning himself alongside the operating tent noted once again the leisureliness of it all in the contest context, as compared, with, say, the June HF Field Day. But there is still the same old magic induced by the “under canvas” atmosphere, the absence of mains power, and the pleasant conversation and healthy appetite when not actually operating. How one can fail to enjoy a field-day event is a mystery.

Let us now look at the mail and see what everyone has been up to. In summary, we can say that, no matter what the gales did, or what the level of the XXX's were (beautifully *expressive* term from the old days, much better than plain “QRN” when you think of it in terms of the report that was blotted out by a static crash!) all the people who were prepared to, as it were, shop around the bands, found something to interest them or to comment on. But won't it be great when the sunspot numbers start to rise again, and not long to wait now!

Top Band

Last time out we hinted at the possibility of a ploy to liven up the GDX aspect of Top Band. Administrative areas now replace or modify the old county idea, and also the counties remaining and should be followed as given in the *AA Handbook*, 1974, maps section. In addition there are a number of islands to count into our list, of which more anon. The one doubt is the position of the GI counties as far as this sort of thing goes, with the present situation over there; from the rarer GI counties there is hardly enough “resident” activity, and one wonders how any DX-pedition mounted to activate the rare ones could be ensured immunity from molestation. No doubt before the next issue comes out some of our GI readers will offer their suggestions and comments on this position, as we would hate to have to leave them out of such a game as this.

Turning to the islands, besides our old friends Orkney, Shetland, the four GC islands and GD, Wight is now a spot of its own, and added are the Inner and Outer Hebrides, Caldy, Lundy, Fair Isle, and Holy Isle—all inhabited, and with a nice shading in the difficulties to be overcome to reach them. We hope by adding Fair Isle we might persuade one of the tough guys like G3SVK to come out of retirement and show us how the difficult ones should be tackled!

The finalised List will appear in the November issue—in the meantime, start working those new counties!

As for scoring, one point for each area worked on SSB, two for each hooked on CW, and three for each one raised on AM; the areas to be defined as those shown in the map section of the current *AA Handbook*.

Modest prizes will be awarded, as follows; one to the chap who makes the highest AM score, another to the chap with the highest CW score, and another again to the highest total, *all modes*, score. Finally, a special prize to the person or group adjudged to have done the most to stimulate this activity, for example, by a DX-pedition, or whatever.

Starting date will be October 1, 1974 and run to September 1, 1975; this latter date will give us time to identify and contact the winners and write a story for the issue following.

In the meantime, let us all bear in mind that in a couple of years there is another of the periodical conferences to decide internationally on frequency allocations and make sure between now and then that

all our bands, and in particular 1.8 and 28 MHz, are occupied as much as possible.

Now let us turn to the rest of the Top Band news. G2HKU in Sheppey, discussing the gales, says that on September 1, their local lifeboat was out *sixteen* times to vessels in distress off Sheppey! However, unlike your scribe who is minus—as already described—his Top Band wire, at least Ted managed a CW QSO with PA0LBN and his usual SSB one with PA0PN.

W4WFL (Farmington, Conn.) has no doubt been practising with his fishing-rod, as he says operating-time was “less than abundant” during the previous three weeks. However, Morgan clearly has plans well laid for Top Band this winter, with a Drake 2B added to the stable and being modified all-same G6LX's article in *SHORT WAVE MAGAZINE* a few years back, plus a nice unused Collins TCS-5 transmitter which is also being worked-over for Top Band DX-hunting.

WIBB wrote in another context, but mentioned his provisional dates for this year's Trans-Atlantic Tests in advance of his full bulletin. The dates to book in are *November 17, December 22, January 12, and February 9*. Stew also enclosed a photograph of OK1MCW, perhaps better recalled under his earlier call of OL5ANJ, sitting in his shack at the key, with a prominent VK5HD Top Band QSL on the wall above the rig.

Another chap preparing for big things on Top Band this winter is G3ORP (Maidstone) who has scrapped his Zepp aerial and put up a “modified VS1AA”—also known as the “Windom with the G2BI tap.” The dimensions are the same as the VS1AA arrangement, but the feedpoint is fed with *coax* through a four-to-one coil balun; also there are capacitors in series with the antenna proper, to resonate it in the middle of each band 3.5 to 30 MHz, which effectively shorten it a bit on 80 and 40 metres. By these tricks, he has got the thing to give better than 1:5 to 1 VSWR over the *whole* width of all the bands, save on 7 MHz where it is 2:1—none of G8HX's “RF in the shack” problems for G3ORP! Another ploy is to use the Heathkit tower, which is well insulated from earth, with a 20-foot dural mast on top, crowned with a seven-foot car glass-fibre whip, as a broad-band vertical for Top Band—the only snag seems to be the capacitance of the tower to earth on “transmit,” although it works fine on “receive.” Perhaps it would ease the problem if the base of the tower were connected to the station earth system and then shunt-fed *à la* delta-match part-way up the tower.

Eighty

A novel method of hanging up a wire is noted by G2NJ (Peterborough) in his mention of a QSO with G3YIO/P near Tintagel. It seems the 100ft. of wire was supported by means of three eight-foot fishing rods, spaced at intervals down the wire, with his “home” end going into his car; in this, the complete rig, transmitter, receiver and el-bug was all packed into the glove box. Another one to be worked was G3FMW, both /A from Kent and twice from the home QTH in Harrogate; these contacts were all with two to three watts, while that with ON4TA, a regular one, was with one watt only at the ON end. All solid, of course.

G3ORP reckons his modified VS1AA aerial is the best on reception he has yet used; he can now hear a lot of stuff in South America that so far has been reluctant to hear him(!) but on “transmit” most of the RF seems to land in Canada. However, the QRN level appears low with this aerial, to offset against the TV timebases which seem to be quite strong. Around 0120z, VX1KE was worked, and near midnight zulu, VE1ZZ, while lots of PY's, LU's and whatever eluded his grasping fist pounding the brass.

The wanderer returns, in the form of G3DNF (Leeds) who says he has found the bands pretty unspectacular of late. However, Gordon is still in the QRP business and has been working on a super-simple CO/PA which so far goes well on Eighty but in addition can be fired up on Top Band and Forty. G3DNF is surprised after so much QRP operation on the band that he has never yet tripped over either G2NJ or G2HKU, or even heard them! One matter that got very seriously up Gordon's nose was to listen around while wielding a soldering-iron and find an AM net of G stations, complaining during their natterings (which went on for hours each day) about the CW QRM that occasionally troubled their thoughts. Perhaps the gentlemen

concerned have never heard of the band-plan. However, the real answer is for the CW men to occupy their little bit of band more intensely.

G8HX (Mansfield) says his report is "rather negative." On Eighty, mid-morning hours have seen quite a few nice long QSO's with OZ, DL, PA and ON, showing that Eighty is not by any means a local-natter band in the daytime; Frank reckons that during the day we are well off on this band from the QRM point of view with no sources of it from SW, W NW, N, or NE even, while the OK, HA, SP, and Russian stations in fact have activity round them at almost all points of the compass, which probably accounts for a lot of their R3 reports when the G station is giving them R5.

Eighty CW with his one watt—the lantern battery must be going flat!—pleased G2HKU no end by way of CW contacts with DJØGU, DM2BUI, G12DZG, GW3ASW and a YL in LA4BQ.

On an entirely different tack, one occasionally during the evenings may hear the ATC chaps, who have allocated spot frequencies of 3678, 3715, and 3752 kHz. Your conductor has had occasion to read the rule-book regarding these nets, from which it becomes clear that in the main, these stations will have an amateur call-holder in the background if not actually operating. However, it must be emphasised that these stations are quite definitely "spot frequency" and cannot move out from under amateur-generated QRM. It is clear that these ATC nets, and their other ones on VHF, are very definitely forcing-grounds for potential licensed amateurs and SWL's, so please do your best not to carve them up accidentally or otherwise—you may lose us new recruits.

QRP Club

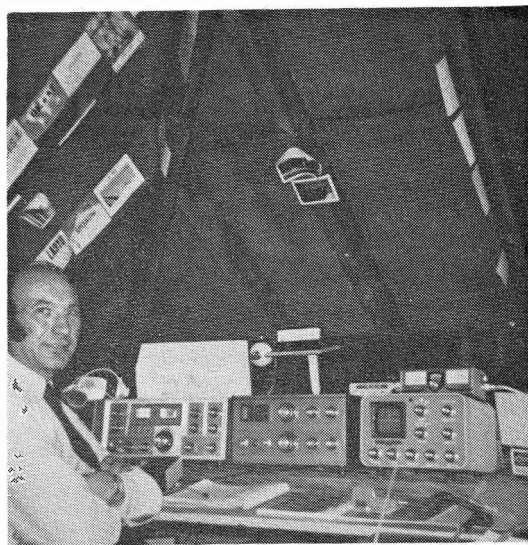
Among the QRP exponents there is a growing feeling that there should be some form of QRP Club set up, to cater for those who are interested in this facet of Amateur Radio, it having been mentioned in passing in no less than three of the current month's letters. Now, along comes another, from Rev. G. C. Dobbs, G3RJV, who would like to gauge the support for any QRP Club activity—it sounds as if between G2FWA and G2NJ, George has been heaved into the firing-line! To be serious, G3RJV has cautiously indicated that if there is enough interest, he would be prepared to do the donkey-work in trying to see a Club "off the ground" as it were. It is therefore your scribe's suggestion that anyone who has an interest in QRP operation drops a line to George, giving his own personal angle on his interest in QRP. For himself, G3RJV has an HW-7, and in addition is building a home-brew job for Top-Band and Eighty as a transceiver. An indication of QRP's impact with him is that it has brought him back to regular activity and interest that was largely lost with the old ORO rig—and best DX to date was a 579 from 4X4 while using G3PDL's home-built beam on Forty. Drop him a line—not to the Callbook address but to 61 Park Street, Cleethorpes, South Humberside DN35-7NG.

There used to be an active QRP Club in the years before Hitler's War, with an upper power limit of three watts. Remarkable communication results were obtained by the keen members, though it must be admitted that in those days QRP-success was easier than it would be now, in view of the very much higher level of QRM.

Forty

G2HKU claimed that he was all but too ashamed to mention his offerings for the month, but he seems to have done well enough; CW did for UK9AAN, while SSB was the mode for FP8DH, PQØARM and PQØNS, (both on Fernando da Noronha), SVØWEE (Crete, returning home during October) and SV1IFT, said to be the first Greek call with three letters to be issued, operating from the Thessaloniki Fair.

The aerial now up at G3ORP seems to be pretty good all round on transmit, but not as good as a ground-plane to VE. Unfortunately the local 320 kV line generates S7 to S9 hash under some weather conditions, and it will be next summer before they get around to a bit of insulator maintenance. The cure for this is a ground-plane at the back of the house which reduces the noise to about S2 to S4 under the same Wx conditions, but seems pretty useless on "transmit." Changing the theme, G3ORP reckons to get on this band after a fill-up at the local gives his strength of will a boost, and then he helps fill the cracks between the BC stations! Peter has to admit though, that on some receivers, there just isn't a crack between 7 and 7.1 MHz—he found this to be so on a certain Japanese receiver he tried recently, due to cross-modulation, when his own showed a much better situation. His 7 MHz log, all CW, shows W1VV, W1FBY, K3JH, K4MOG, PY2ZZ/9, VE2JL, PY1CMT, K4TQ, K2DNW, WA2UJM, VE2LI/2, W1WH, K4CI, VE2YU, W3NZ, W8KIT, W2HZY, TU2EF, W2FWK and K1DKX. Of this lot it is noted, no less than seven of them had beams on Forty, two elements and three elements of Yagi, a Quad with its centre at 44 feet, and a chap with a pair of phased verticals.



The station of G3ZZS, Martin Wills, 148 Churchway, Weston Mill, Plymouth, is built into the roof space and accommodates quite a line of modern gear: FT-DX401, TL-911 linear, SB-610 monitor, with appropriate ancillaries. Antennae are a trap dipole and a Minibeam HQ-1, AR22 rotated. Though the shack only gives 9 x 9ft. floor space and the roof slopes, G3ZZS says it is very comfortable and keeps him out of the way of the XYL!

G8HX reckons his only QSO of last week was that with TF5TP, in mid-morning one day—QSL's via DL7MQ.

Odd Points

G2BJY and G2BON seem between them to have stirred up quite a controversy but the general consensus is against them. G3ORP says he doesn't think it matters a cuss what the chap uses in the way of home-brew or commercial gear, Phone or CW. He knows many OT's who built Elizabethans, G4ZU minibeams and so on, and never did get the hang of the working of their creations. Peter says, and this scribe must agree with him, that the most important part of the rig is the bit between the ears. This comment, be it noted is from a professional in the game who seems in his spare time to be always building something for somebody and rarely has the shack soldering-iron switched off.

Another professional is G8HX who brings up several new points in his letter; first, he notices that most of the chirpy and drift signals to be heard on the bands are from Russian and satellite countries where they have, of necessity, to roll their own. Secondly, he says that there are many things that the average amateur cannot build simply due to the simplicity of the test-gear available to him; a CO/PA or VFO/PA is simple enough but he thinks SSB equipment in general—except in the case of made-up kits—is beyond the average amateur purely on the score of test-gear. As evidence, he mentions that during the week in question he had been testing 90-watt amplifiers like amateur modulators—each of which had to have 35 measurements made on it, using a multimeter, a valve voltmeter and a 'scope, covering valve voltages, hum, noise, gain and so on.

G3DRN (London, S.W.20) who will be known to many readers as one of the devoted band who make the QSL Bureau work so well in this country, offers his "congratulations on shooting down G2BON and G2BJY in flames." He goes on to say he, and many others, are getting very tired of the people who persist in telling us what mode of transmission to employ, the evils of using commercial equipment, and that we haven't lived if we are not members of the local Club. As he sees it, all are entitled to their opinion, but they should not seek to impose their views on others; after all, that is the very thing for which the OT's fought a War, back in 1939-45.

G3DNF finds the mode argument, CW versus Phone, leaves him cold. He personally prefers CW—Heaven only knows why, he adds. However, he is against forcing CW operation down anyone's throat while admitting there is a risk, unless more CW operators come on the air, that our CW bands will be eroded by bandplanners or by malpractice. As for home-brew vis-à-vis commercial, he doesn't give

a tinker's cuss either way, so long as you enjoy using the gear and learn how to get the best out of it—recognition of, and exploitation of, the possibilities is the essential point.

G2BJY, on the other hand, feels that the present pressure put on amateurs by the advertising material for commercial equipment of this, that and the other kind brain-washes the amateur into buying regardless of how he feels about it. He says he doesn't want to jam anything down anyone's neck, but he feels that this is exactly what is being done.

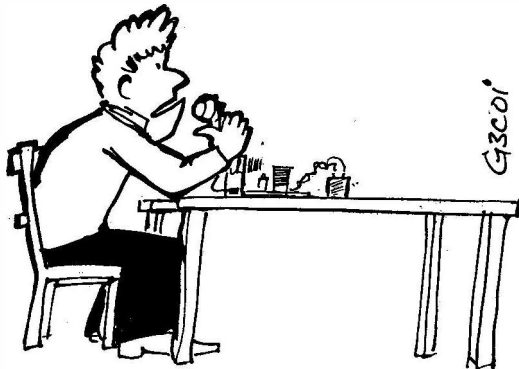
However, we must call a halt for a while to this particular controversy. All your scribe would add as a final-final is that first, he has never known anyone who didn't want to be made to buy something by advertising only—and many a trader in the amateur field has gone out of his way to stop the innocent from spending his money wrongly, as G3KFE himself recalls from long before he started writing this piece, let alone since. In the second place, one cannot accept the argument put forward by G8HX that to align an SSB rig one needs to have lots of test gear and pricey, calibrated stuff at that. Having been responsible many times for the test specification or test instruction for such equipment, he knows that all along the line one is, from the commercial point of view, balancing out an equation where on one side you have a desired level of test, while on the other you have the customer's requirement that certain figures are met when he takes delivery. The time one can allow for one piece to be tested, the throughput of pieces, the length of the production run, and other similar matters are the deciding factors. It all adds up to "de-skilling"—ugly technical term!—the method of test and at the same time speeding it up. However, as an example, the only test-gear an amateur really needs is a sensitive receiver of general-coverage potential fitted with a BFO, a single-signal receiver in the amateur bands, home-built two-tone oscillator, an RF VVM or even a sensitive multimeter fitted with a probe for sniffing RF, and, only if one is proposing to build the filter itself, a signal generator covering the filter pass and stop band which can be set to a known output voltage. The rest is time, patience, and the creator's brain and ears. By this sort of thing, the writer has set up a service SSB modulator, and when checked against the test instruction found it met the spec in all areas but one where it was on the very border-line, which in any case was set far tighter than would be needed were the gear going to be used by an amateur.

The third point is felt, surely by all who have to do with building or maintaining electronic equipment all their working day—and that is about one third of all licensed amateurs—is that we have had enough when the day is done.

Twenty Metres

This is where the hairy stuff goes on. Several brief sessions of operating have been the form of the activity at W4WFL/1, and Morgan reckoned, all in all, that 14 MHz CW was not at all bad; lots of Europeans booked in, among them a new one in OY4M and a first ever YU6 prefix contact. A switch to SSB was then made and PQØNS lifted from under the nose of the pack at the first call.

G2BJY (Walsall) has his pickings divided between several pages of several letters. UA9ABA was worked one morning and gave his QTH as Miass, repeated when queried, and Geoff wonders where that may be—it doesn't appear in G3KFE's index of places, but the *Edinburgh Atlas* shows it to be near Chelyabinsk, at a junction of the railway from the latter and from Sverdlovsk, oblast 165 in Zone



“ Will be going commercial when I can get a decent price for this rig ”

Reporting the HF Bands

17, which is correct for a call UA9A. A twenty-minute contact with PY6AM was not only a pleasurable ragchew but unusual in that PY does not for some reason often figure in the G2BJY logs, probably because of Geoff's normal operating hours.

The learner-typist at G2HKU remarks that he worked VK3NR on CW, plus KP4AXM and WBØIRL, the latter in Minnesota, and nothing more—must be the effect of too much QRP working.

G4CXM (Paris) seems an odd address but that is where he was at the time of his letter, and recounting his holiday adventures. He did manage to get in a little operating time at 4U1ITU, from which station he generated some good pile-ups and gained some experience, using an FT-101 and a TH6-DXX aerial which appeared to have a duff trap, as it only worked when it felt like it! QRM of course reared its ugly head in that the sideband splash—cross-mod, more likely—from 4U1ITU was putting paid to the operations of the Red Cross Geneva Hq., also using a six-element Yagi a half-mile away!

W1BFK (New Bedford, Mass.) wrote in an entirely different context, but Jow mentions that, as far as he was concerned, and talking twenty metres, the band was, and has been lately, just plain punk—that goes for most of us, too.

G3UZ (Goring-by-Sea) notices how, when the QRM permits and he does raise a DX station on the key, the trend is for the QSO to get shorter and shorter, and for its ending to be 55 73 and off—now what. G3UZ demands, the blazes is 55 meant to indicate? A Very Good Question. . . . In terms of stations worked, G3UZ mentions UVØBB, UH8MAX, UJ8AJ, A9XU, KV4AA, VP9HR, VP9HS, VU2WY, JA5NSR, JY6HS, PY1BDU, PY7BIN, PY7AMX, PY8RW, PY7LJ, EA8FF, C31GW, and “a few of the odd ones” like R3A, R3C, R3D, R4D, R6D, HA12WPC and our old friend in CT1, CT1/G5RV the aerial man.

21 MHz Band

Those who live in areas where it is workable in TV hours, or who have done their TVI homework and can operate in TV time, mostly all agree what a vast improvement Fifteen is over Twenty, in terms of friendliness and lack of QRM; even if the band is only open to the first hop one can still have the long ragchew type of QSO with the Europeans in comfort.

G3ORP found his VS1AA compared well against the chaps with the trap beams, and comments that it is “not much of a rat race and everybody seems so friendly.” All his contacts were SSB, including CX6AM, CE3RC, CX1BV, PY4BWB, PY3BNI, and KV4CI, clearly worked in the hour before he took off for the “Swan” to fortify himself for the late stuff on Forty already mentioned.

Conditions, says G4CXM, were “not much cop,” while he was at 4U1ITU, albeit he did his best to give the G's a chance of a QSO on Fifteen when such was possible.

G3YRR made it his business to listen on 21 MHz every night for the month August 3 to September 3, and he reports he did not manage one QSO; on several evenings there were signals on the band, but the noise level was usually pretty high. The odd thing, though, there were four Portuguese-speaking South Americans audible down at the LF end of the phone band, working locals, and in no case was a QSO heard right out. On the other hand the odd European contact made has been an informal chat about technical or similar topics, a pleasant change from the mindless exchanges of the DX pile-up. On a different tack, Charles reckons we always steer clear of controversy, and wants to know why—what a question to ask when the *Magazine* is frequently accused of being provocative!

Snippets

First, thanks to, W1WY as always, for the Contests picture. In the first place, we have the CQ WW DX Contest, Phone leg October 25-27, CW leg November 23-24, from 0001z Saturday in each case to 2359z Sunday. It should be noted that if you are in the multi-op, single transmitter class, you are limited to one band change for the purpose of picking up a new multiplier within the ten-minute period. Log copies must remain in the original form, showing duplicate contacts with no points claim; and don't forget the name and address on your Summary Sheet. Phone logs to be mailed by December 1, the CW lists by January 15, to CQ World Wide DX Contest, 14 Vanderverter Avenue, L.I., N.Y., USA 11050, with some indication, Phone or CW, on the envelope.

A note from G8PG, U.K. manager for the (low-power) Summer DL AGCW Contest, points out that the G's seem to have done

well, G8PG himself making sixth place, C3IDV (operated by G3ZXX) ninth, G4AYS and G4BWP. It sound as though the HF bands really offered up, so that IS0BDO racked up 14 countries on 28 MHz, and G3DNF did very well on 21 MHz. The next contest is on January 12, 1975, and the only change has been to adjust the power limit for the 3-watt handicap level to 3.4 watts, to allow the Heathkit HW7 to come into this category. The organisers of the Contest also say that if anyone is in trouble with scoring the log, it may be sent in and the adjudicators will score it for him. Any queries, copies of the rules, and so on, and in due course the log entries for the contest, to G8PG, who is *QTHR*.

The team of SP chaps mountaineering in the Yukon and Alaska lost two men on Mount St. Elias, reports SP9PT/VE8, and morale as a result was so low that they were winding up the expedition. After their successful previous climbs, including Mount McKinley, we must sympathise with SP9PT and his friends on their misfortune. If you seek ZM7, Tokelaus, the word at present is that it should all come to fruition on October 7.

Desroches should by now be operational with VQ9D, VQ9MR, VQ9BP and VQ9DC in the team, also Diane Cardell, wife of VQ9M1, who in his turn will be the link-man back in Mahé. Diane, incidentally, will be the first YL operator from Desroches.

Possibly an indicator of something the amateur world did not know until too late—the replica of the *Golden Hinde* which left London recently for the long sail to San Francisco, planned to call at *Clipperton Is.*!

Operation from Navassa looks likely around the back-end of November by six chaps from the U.S. South Jersey Radio Association.

ST2AY is in Khartoum, and is planned to be there for a year; he has Drake gear to a Yaesu linear and has a Quad thirty feet above the flat roof of his second-storey.

A few pirates got into that "ITU" commemoration thing some weeks back—seems like KL1ITU, KQ1ITU, KX1ITU and WX3ITU were from the Fred Phoney stable.

Finally, if you want a special prize, we hear from OH2BH that he will be in the Gambia as ZD3X during the CQ WW Phone Test in October, working on all bands—3795, 7095, 14195, 21295, and 28595 kHz—plus operation on Top Band. Anyone working him on all six hits the jackpot and gets the special prize. QSL's, by the way, to OH2NB, *QTHR*.

Signing

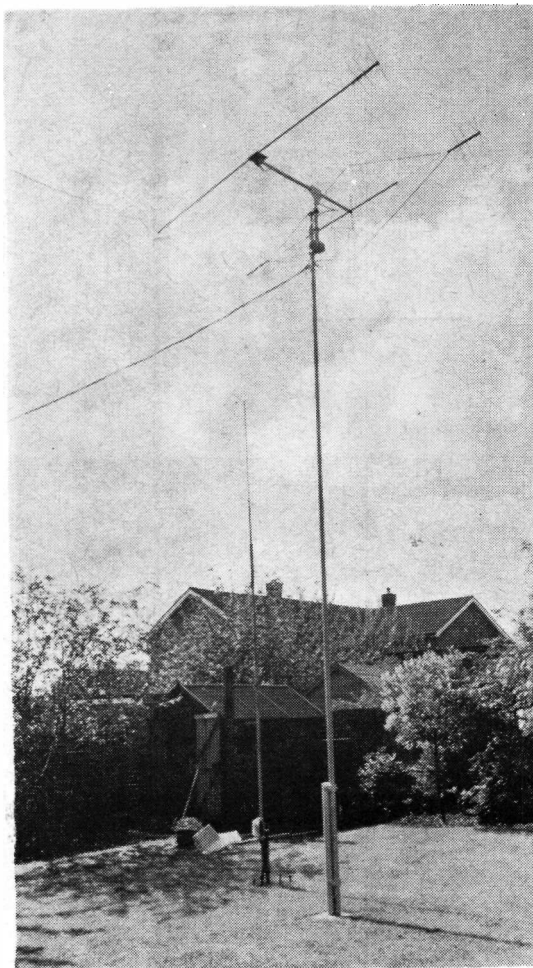
That's about it for this month. Meantime, things are tight for the next issue, at October 8, latest. Address, as always, to "CDXN," *SHORT WAVE MAGAZINE, BUCKINGHAM MK18-1RQ*.

INTERESTING COURSES FOR ADVANCED STUDENTS

The Micro-Electronics Centre of the Middlesex Polytechnic offers a wide variety of practical short courses under such headings as Introduction to Micro-Electronics, Thick-Film Hybrids and Technology, Semiconductors, MOS Devices, Practical Micro-Electronics, and subjects of related interest. Numbers for these Courses are strictly limited and, in the first instance (for details, fees and such) application should be made to: The Secretary, Middlesex Polytechnic, Queensway, Enfield, Great London, EN3 4SF (Tel. 01-804 8131).

NEW X-BAND MIXER

A microwave mixer has been developed by *Mullard* for use with the Gunn oscillator CL8632. The new mixer, CL7520, is designed for 9.35 GHz, and has a typical sensitivity of 15 μ V out for an input signal of -95 dBm and a noise level of 1 μ V. The CL8632 takes a supply voltage of 7v. and gives about 8 mW output. This new mixer and the Gunn oscillator have similar cavities and square plain flanges. They can be fitted to a size WG16 wave-guide or directly to a horn or rod aerial.



On p.92, April, we showed a picture of Sam Ellis, G3JNY, 2 St. Mary's Close, Garforth, Leeds. Here are his arrangements outside—a 14-AVQ ground-plane (with the 80m. loading coil) and an HQ-1 Minibeam, on which, on some parts of the bands, G3JNY finds the SWR is better than claimed in the specification.

"RADIO HAMS" AGAIN

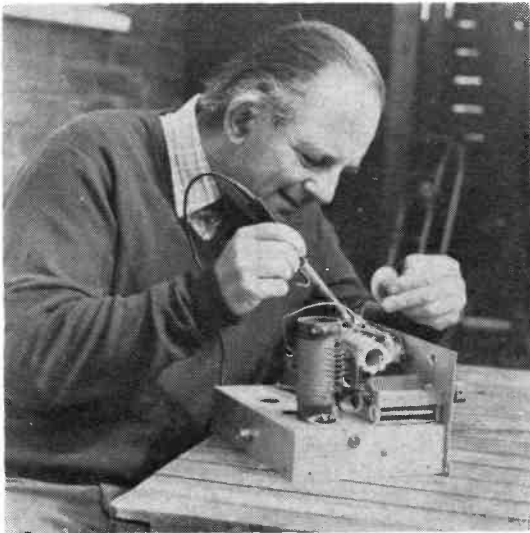
Two wretched youths, calling themselves "Radio Penelope" and apparently using stolen equipment of considerable value, have been incarcerated for several months for "broadcasting" from a council house, within the jurisdiction of the Dunstable magistrates, who very properly took a stern view of the whole escapade.

However, the press reports came out with the usual headlines about "radio hams," without explaining that these erks were pirates and not even the sort of people the Great British Public has come to know as "radio hams," meaning licensed radio amateurs. The GBP is similarly misled when the so-called hoax radio calls on shipping channels are reported.

The well arranged, well supported (and may we say, well decorated by the distaff side) trade stand of Jack Tweedy, G3ZY, of Chesterfield at Derby on August 11. He is the second from left.



The Top Band talk-in station for the Northern Mobile Rally signed G3MFJ. Looking over the chart when this was taken were G3RXS, operating, with SWL Rigby.



(Above) Seen at the Derby Mobile Rally—G4BDE/XYL were married the day before and came to the Rally as the first stop for their honeymoon! (Left) Our talented cartoonist, John Worthington, G3COI, busy on what looks like an ATU for his other station GW3COI, Bwlch Tocyn, Caerns.



For the Cornish Mobile Rally in July, the talk-in station, operated by G2ABC, was in the back of a 15 cwt. van. Looking on are members of C.R.A.C.

Group round the Lowe Electronics stand at the Derby Mobile Rally, with Bill Lowe (lower right, white shirt) looking happy and prosperous as usual. Very good business was done round the trade stands on this occasion.



Two well-known callsigns in this group at the Derby Rally—second from left G5PP, who in earlier years did so much /P expedition work on Top Band and, at right, old timer G2MF, active since the early days. Others in the group are G3XFU and G4JW.

THE RF CLIPPING ADVANTAGE

TO INCREASE TALK-POWER

D. A. TONG, B.Sc., Ph.D. (G8ENN)

THERE can be few radio amateurs to-day who have not heard of, or indeed heard, RF clippers in action. Nevertheless there seems to be a certain amount of confusion on the subject and this article is intended to help improve the situation.

Why Use Speech Processing ?

Before considering the relative merits of different techniques of speech processing it is wise to consider first why one needs it at all. Fig. 1 shows the first vowel sound in "hello" displayed on an oscilloscope. A rather striking feature, typical of speech in general, is the large amplitude of the peaks relative to the average amplitude. A transmitter with an output power capable of handling the peak without distortion will be very much under-used for most of the waveform. On the other hand if the peaks could be reduced in intensity relative to the rest of the waveform, the modulation level could be increased by the same amount. Clearly, this would give a big increase in the *average radiated power* without increasing the peak limitations, and since it is the average power which determines the "loudness" at the receiving end, an increase in the *average-to-peak amplitude ratio* is highly desirable.

This is the main function of a speech processing system. A secondary and rather simpler function is to compensate for changes in the level of the speaker's voice. A device to do this, *e.g.*, an AGC type speech compressor, need not improve the average-to-peak amplitude ratio at all, whereas any device which does increase this ratio automatically compensates for voice-level changes as well. Many operators of SSB equipment themselves function as an automatic gain control device by watching the PA anode current meter and controlling their voice level to give a more or less constant peak reading.

Compressors and Clippers

Having separated the two functions of speech processing let us consider the characteristics required in order to combine both functions. We begin by considering a typical AGC-type compressor with an "attack" time of 10 mS and a "decay" time of 1 S. Such a device when presented with a speech peak, very rapidly reduces the gain of the microphone amplifier (within 10 mS), to such a value that the peak no longer exceeds the threshold level. Since this has been done by reducing the gain, any sounds which follow the peak are also reduced in amplitude by the same factor. In speech the peaks follow each other at a syllabic rate, *i.e.*, much faster than once per second, so that the result is the same as if the microphone gain control had been reduced. The speech waveform always remains substantially unchanged from that in Fig. 1, but if you move the microphone to a different position the gain is automatically readjusted to compensate. The more sophisticated AGC-type compressors also include a "hang" circuit so that the gain remains constant between bursts of speech.

Such devices are useful for keeping a constant modulation depth but give little improvement in average-to-peak ratio and hence talk-power. To do this the decay time would have to be reduced so that the AGC circuit can follow fine details in the speech waveform. So long, however, as the time constants are non-zero (as they must be for such a device to remain stable) there will always be some unwanted gain reduction immediately following a speech peak. This means that even a syllabic AF compressor can never give the ultimate in average-to-peak ratio improvement. The situation is worsened by the fact that weak speech sounds which are important for good intelligibility often follow immediately after strong peaks and are therefore made even weaker.

If an AGC-type compressor could be built with zero attack and decay time constants would it be the ultimate? Well, such a device would then be indistinguishable from an ordinary AF clipper, and since these have been used quite extensively in AM and FM transmitters in the past, many people will know how they sound. They do indeed give a very useful increase in average-to-peak amplitude ratios with AM and FM transmitters but at the cost of quite high distortion levels which give the speech a characteristically "clipped" sound and tend to make it difficult to recognise the speaker's voice.

We see, therefore, that AF compressors cannot simultaneously give low distortion *and* a big improvement in average-to-peak ratios. You can only get one at the expense of the other, or some compromise mixture. In the limit the AF compressor reduces to an AF clipper.

Clippers and SSB

Why is it that AF clippers were widely used with AM and FM transmitters but not with SSB? The answer lies in a fundamental property of the SSB signal: Its amplitude waveform has no direct correspondence with that of the

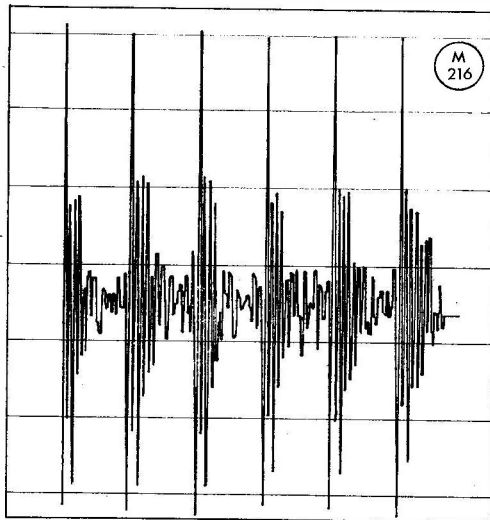


Figure 1

Fig. 1. Section of the first vowel sound in the word "hello" as displayed on an oscilloscope. The large amplitude of the peaks relative to the other parts of the waveform is typical of speech sounds in general.

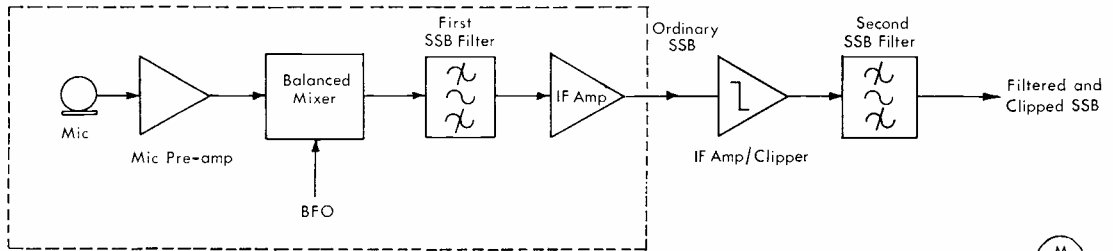


Fig. 2

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217

Fig. 2. Block diagram of a straightforward type of SSB transmitter incorporating built-in RF clipping. The parts outside the dotted line are those involved in the RF clipping.

modulating signal. If a square wave is fed into an ideal SSB modulator the SSB signal produced would have infinitely large peaks, clearly an impossible situation in practice. Although the output from an AF clipper is not an ideal square wave it does still approximate thereto and the SSB signal may well have a lower average-to-peak ratio than if the clipper were not used. AM transmitters do not show this effect because the envelope of an AM signal has exactly the same shape (or ought to!) as the modulating signal.

R.F. Clippers

A block diagram of the most straightforward type of SSB transmitter with built-in RF clipping is shown in Fig. 2. Compared with the basic SSB generator it contains two extra blocks, a combined amplifier and limiter and a second SSB filter. The extra amplifier needs enough RF gain to give the desired degree of clipping and the filter must be as good as the main SSB filter. This is because when the SSB signal is clipped intermodulation products and RF harmonics are produced and these extend far on either side of the band occupied by the actual SSB signal. It is also worth pointing out that the extra gain after the first SSB filter

means that the unwanted sideband and carrier suppression must both be improved by the same number of decibels as the extra gain.

Adaptors are available commercially to add the extra blocks to a number of existing transmitters. Although no doubt effective they have the practical disadvantages that (1) It is necessary to make RF connections within the IF section of the transmitter; (2) They tend to be expensive because of the need for a second high quality SSB filter; (3) They have to be specifically designed for a given make and model of transmitter, and (4) They cannot be used with AM and FM transmitters.

A more versatile way of getting the benefits of RF clipping is to generate the SSB completely independently of the transmitter, to clip it, and to demodulate it back to audio frequencies. If this audio signal is then fed into an SSB transmitter the result is just the same as if the intermediate conversion back to and from audio frequencies had not taken place. The great advantage, however, is that a device such as this merely needs to be connected in series with the microphone lead of a transmitter—moreover, it can be used with any kind of transmitter, even AM and FM types.

A recent example of such an "add-on" RF clipper is

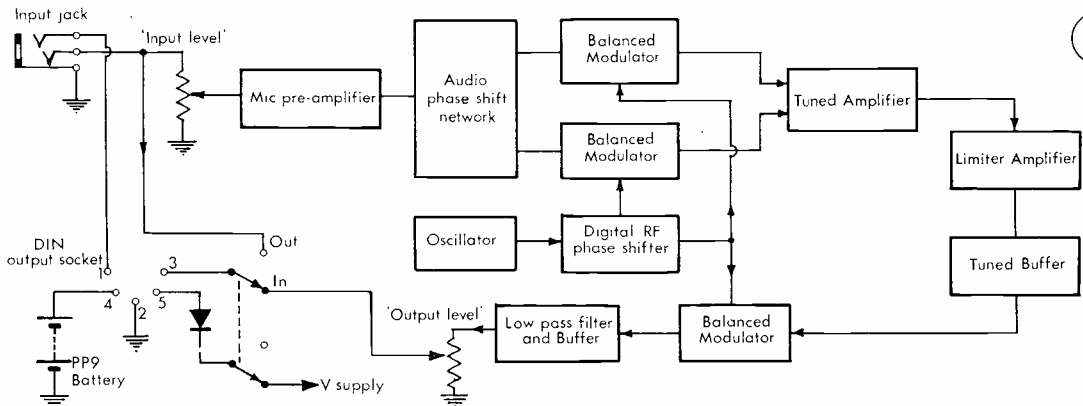


Fig. 3

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Fig. 3. Block diagram of an add-on speech clipper using the phasing method of SSB generation, as in the Datong "Universal RF Clipper."

the "Universal RF Clipper" by *Datong Electronics, Ltd.* which is shown in block diagram form in Fig. 3. The phasing method of SSB generation is used, but in an updated form which completely removes the traditional disadvantages of this technique. The improvement lies in the use of digital-type balanced modulators and digital

RF 90° phase shifters. As a result all balance or other adjustments are eliminated and the phasing method now provides the most cost-effective method of SSB generation at low frequencies. Despite the use of seven integrated circuits the whole device consumes only 6 mA from the internal 9-volt battery.

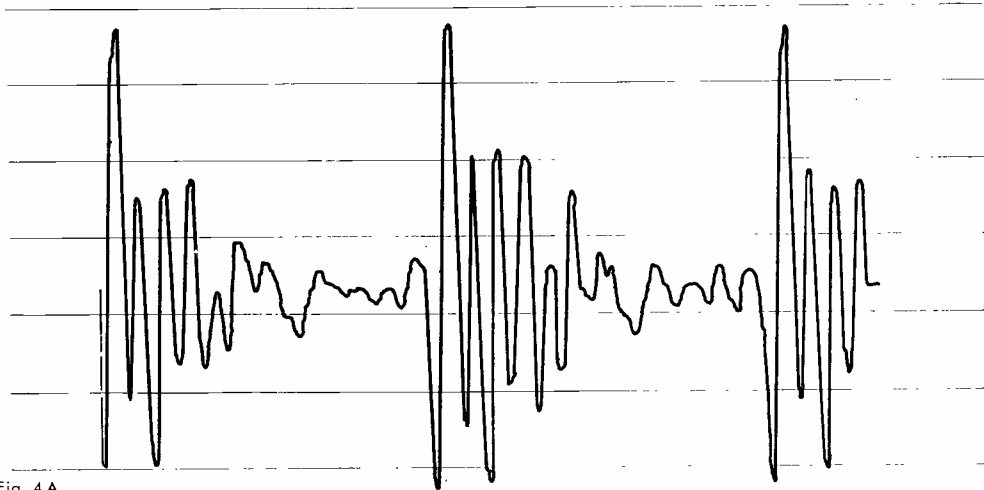


Fig. 4 A

Fig. 4(A). The increase in talk-power obtained by RF clipping, showing the output of a Datong RF clipper with the same input signal as in Fig. 1 but with no clipping. Fig. 4(B) below is the same but with 20 dB of clipping. Note the absence of harmonic distortion—see text.

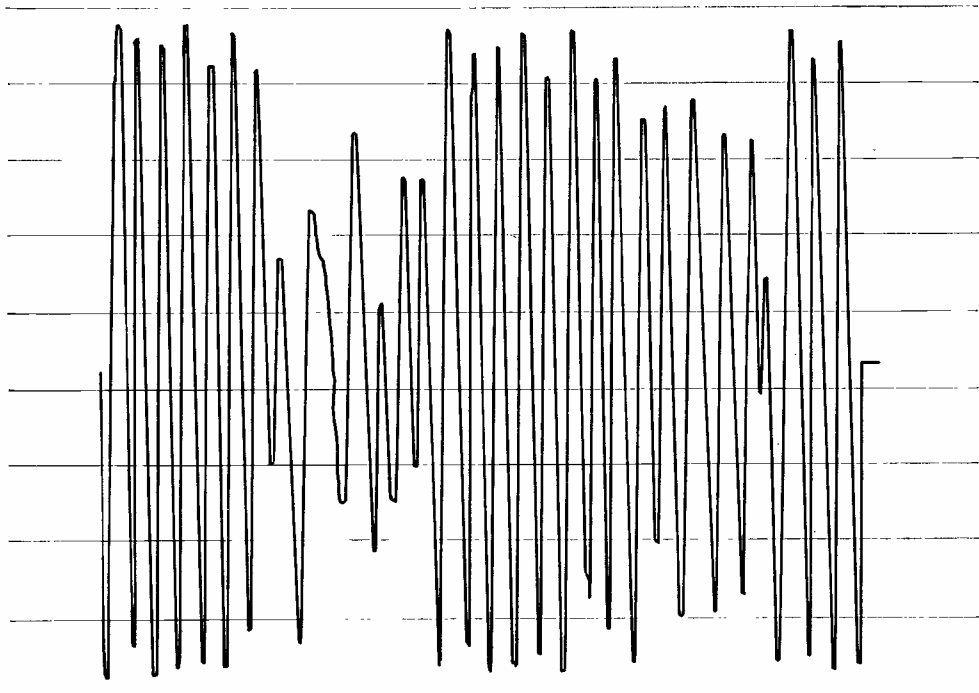


Fig. 4 B

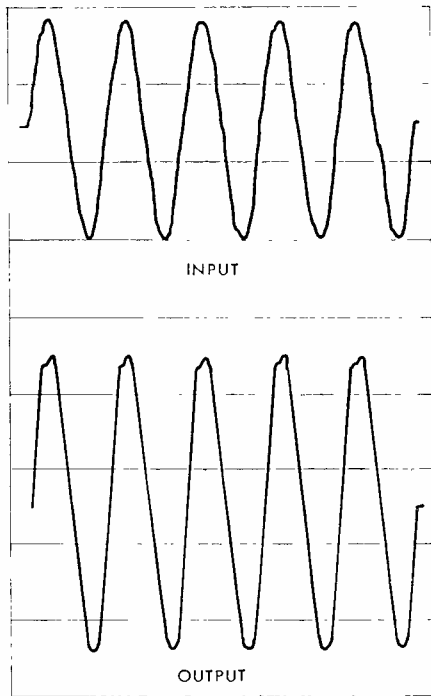


Fig. 5

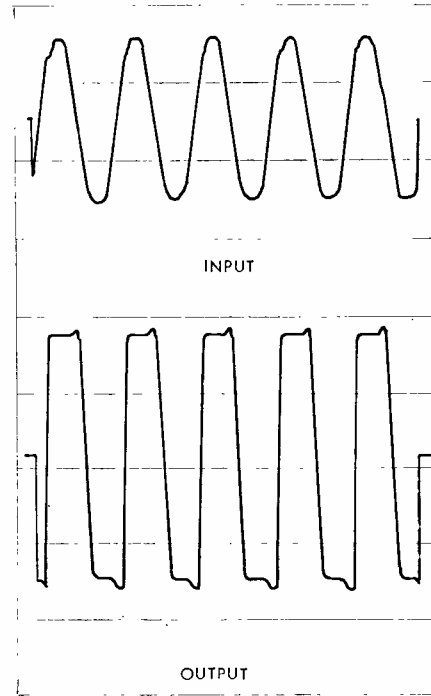


Fig. 6

Fig. 5. A sine-wave input, showing effect of 20 dB of clipping, with no distortion apparent. Fig. 6. Showing distortion when using 20 dB of audio frequency clipping—see text.

It will be observed that there is a filter after the clipping stage but this need no longer be of SSB standard because the internal clipped SSB signal is not radiated. The place of the second SSB-standard filter is taken by the audio low-pass filter at the output.

Benefits of RF Clipping

Fig. 4 demonstrates the striking increase in average-to-peak amplitude ratio which can be achieved by RF clipping. The upper trace shows an unclipped section of the same vowel sound as in Fig. 1. It was recorded from the output socket of a *Datong* RF clipper with its input sensitivity adjusted so that the peaks were just below the threshold of clipping. In contrast, Fig. 4B trace shows the same signal but with 20 dB of clipping. That is, the input sensitivity control was readjusted to increase the input voltage to the clipper by a factor of ten. The originally weak sections of the speech sample are now nearly as big as the peaks, yet the absence of peak flattening shows that no harmonic distortion has been introduced. To show this even more directly the observations were repeated using a single sine wave input signal at 500 Hz (Fig. 5). Even with 20 dB of clipping the output signal remains quite undistorted. This is certainly not the case with an audio frequency clipper, as indicated in Fig. 6. In order to keep all other parameters

constant the AF clipper was simulated merely by disconnecting the output from one of the balanced modulators in a standard *Datong* RF clipper. This meant that although the clipping was still carried out at RF, it was a double-sideband suppressed carrier signal which was clipped, rather than a single-sideband signal. Because the envelope of a DSB signal is directly related to that of the modulating signal the result is just the same as if the modulating signal itself is clipped.

The large gain in average-to-peak amplitude ratio shown in Fig. 4 makes the output signal from the clipper very much louder yet there is remarkably little audible distortion. For example, full speaker recognition is retained (in contrast with AF clipping).

Indeed most listeners to radio signals subjected to RF clipping, when given a choice between "clipper in" and "clipper out," prefer the clipper to be "in." This applies even when signals are strong enough for increased average radiated power not to be the reason. This is probably because the weak speech sounds such as "th" which are important for intelligibility are transmitted at a relatively increased level. RF clipping thus gives an unexpected bonus in that there is no trade-off between unwanted distortion and talk-power.

It seems to be generally agreed that a real gain in talk-power of up to two S-points (about 10 dB) is obtained

when 15-20 dB of clipping is used. In other words, it is as good as if you increased your peak radiated power by ten with a large linear amplifier. If one already runs the full U.K. legal power, RF clipping provides a way of getting the equivalent of a "4 kilowatt signal."

Furthermore, if a clipper of the *Datong Electronics* type is used it doesn't matter what the operating frequency of the transmitter is, as the one clipper can replace or augment separate 10 dB linear amplifiers for all bands from Top Band to microwaves. As a final bonus, once

any RF clipper is installed you cannot "flat-top" no matter how enthusiastically you shout.

Conclusion

Of the three speech processing techniques considered—AF clipping, AF compression, RF clipping—the latter gives by far the greatest increase in "talk-power." It does this with hardly any undesirable side effects. So much so that one can foresee a time when an amateur SSB transmitter without RF clipping will appear antique.

LINEAR AMPLIFIER FOR THE HF BANDS

DESIGN USING 6KD6's—CIRCUITRY AND CONSTRUCTION

Part I

E. P. ESSERY (G3KFE)

QUITE a lot of odd thoughts went into the genesis of this Linear Amplifier and its associated power supplies; the 1973 *ARRL Handbook* started the train of ideas, further stimulated by the acquisition of a set of four 6KD6 valves.

Now, to the circuitry; basically it is a lift from the *ARRL Handbook* of 1970 or later (in 1973's edition, the

same basic arrangement is repackaged and made to cover an extra band.) The coil data for the various bands are as given in the *Handbook*, as is the RF choke for the HT feed, the heater and feed chokes in the cathode circuit. A gram. motor is pressed into service to provide blower-power to keep the valves cool, with a home-made set of fan blades (which took quite a while to balance accurately for silent running). Each valve is given its own bias potentiometer, so that there is no need to search for a matched set of four valves—all that is required is to adjust for the same standing current in the undriven state, when it can be expected that all four valves will "track" to within 10% or so across the full drive range from zero to full signal input, and so prevent over-powering of any one valve.

Perhaps the best way to tackle a project such as this is to get all the parts together first, before ever you start to design, let alone cut metal. A photograph of the

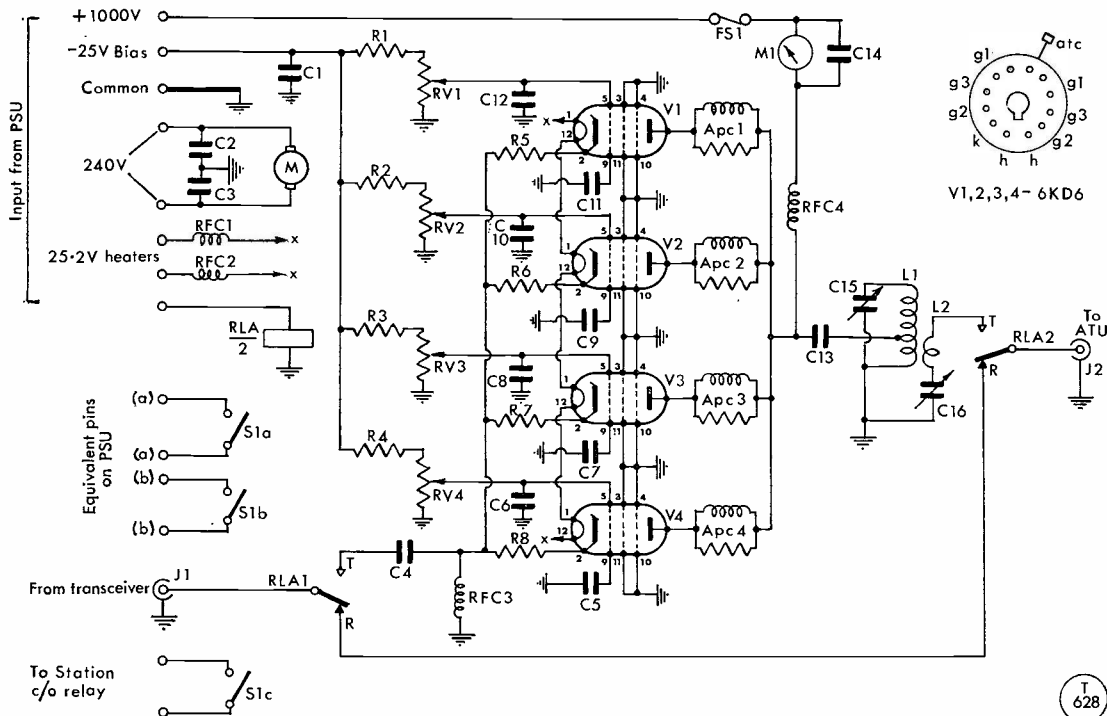
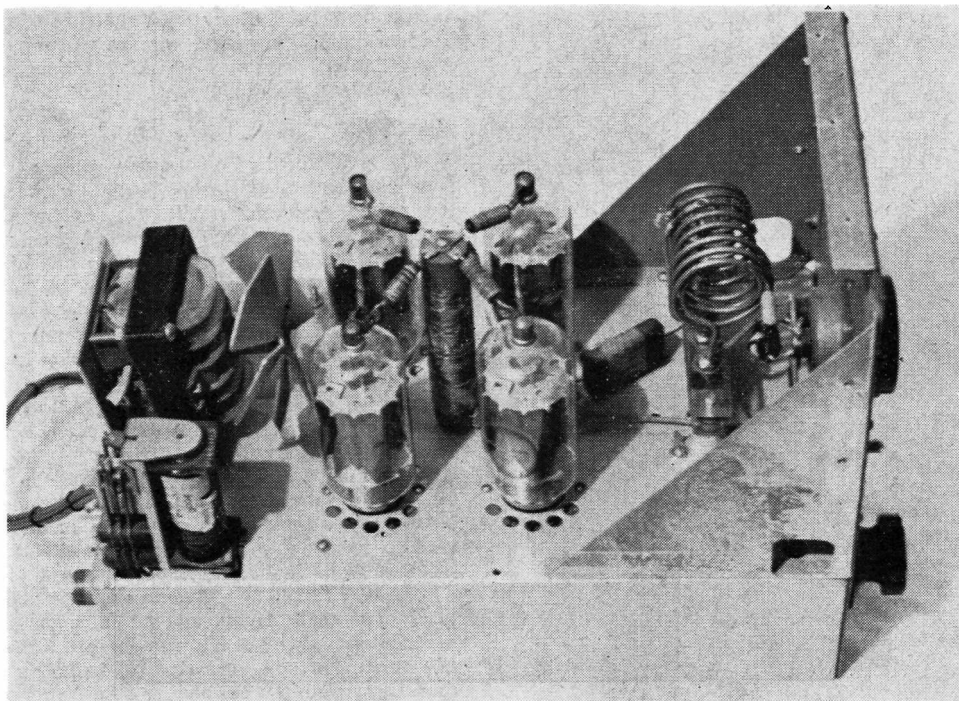


Fig. 1 CIRCUIT OF LINEAR



General upper-chassis view of the 6KD6 Linear

chassis layout shows that the four valves sit around the plate RF choke, so that the layout is symmetrical, with short leads from the valve anodes to the choke. Each anode is endowed with a parasitic stopper, APC, a few turns of wire on a 10-ohm resistor. Underneath, again

the aim was for a symmetrical layout, although more liberties were taken—for instance, the four “balancing” resistors in the valve cathodes are made screwdriver-operated and mounted in a neat bunch on the back drop of the chassis.

Constructionally, the chokes for the heaters are wound on bits of ferrite rod out of transistor sets, broken down to size, wound up with scrap wire of adequate gauge to avoid losing those vital heater volts any more than need be. The relay used came out of the junk box. For the DC supplies, a *Painton* connector out of the junk box, an SO-239 for the RF output, and (faintly ridiculous, considering the SO239 connector on the other end of its mating lead) a Belling-Lee TV type connector to bring the drive into the box.

TVI Point

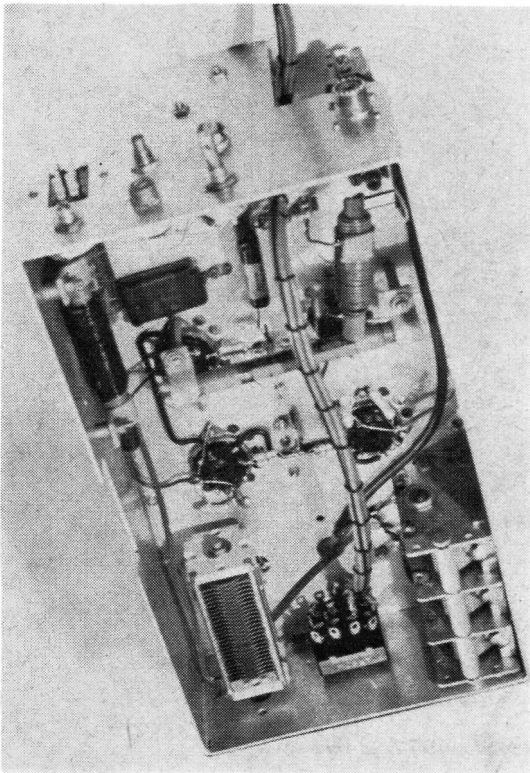
This linear amplifier, as built by the writer, has virtually *no* incorporated TVI precautions—beyond the care taken to ensure that it is an electrically stable and sensibly grounded assembly, it not being part of the plan to use it during TV hours, for which a TVI-proof 150 watts of CW is available anyway. However, it has been used on occasion on Twenty during TV hours and has neither had a response from the station monitor TV set, the domestic TV/Rx nor any neighbouring TV's—one hastens to add that this is probably as much due to the swing to colour as to the excellent layout, as the only Ch. 1 TV in range (other than the one in the shack) is well kitted out with mains, high-pass filter and braid-breaker,

Table of Values

Fig. 1. Circuit of the Linear

C1, C5,	RV4 = 10,000-ohm linear
C6, C7,	taper, 20%
C8, C9,	S1 = 4-pole c/o toggle
C10, C11,	APC1,
C12 = .005 μ F, disc cer.	APC2,
C2, C3 = .01 μ F, disc cer.	APC3,
C4 = .005 μ F, mica,	APC4 = see Notes
1 kV	RLA = Type 3000 GPO
C13, C14 = .01 μ F, mica,	relay, 200-ohm,
2 kV	12v. coil, heavy
C15 = 200 μ F var., wide	duty DPCO
spaced Tx type	contacts
C16 = 3-gang 443 μ F	RFC1,
var, BC type	RFC2,
R1, R2,	RFC3 = 200 μ H, 65 turns
R3, R4 = 10,000 ohms, $\frac{1}{2}$ w.	20g. enam. on
R5, R6,	ferrite rod
R7, R8 = 10 ohms, 1w. (or	RFC4 = see Notes
2/22 ohms, $\frac{1}{2}$ w.)	L1, L2 = see text
RV1,	VI, V2,
RV2,	V3, V4 = 6KD6 (Lowe)
RV3,	

Notes: Anti-parasitic chokes APC consist of 8 turns 22g. enam. on 56-ohm 1-watt resistor bodies. RFC4 is on 4in. x $\frac{3}{8}$ in. Tufnol former, wound in four sections from anode end of 16 turns, 25t, 30t, then 42 turns of 24g. enam. in one length, coated with insulating adhesive. Meter, 0-1 amp., using low-current type shunted. Blower motor M can be contrived—see text. J1 is TV-type coax socket, and J2 SO239 coax. F1 should be one amp slow-blow type.



Underneath the Linear Amplifier

all according to the book and with a bit of attenuation to spare.

The photographs will show that the layout, both top and below, is far from being the sort of thing which will win prizes at the local Club construction

contest—but it is the sort of job that more or less any amateur could reproduce on the kitchen-table—and when it is all boxed up, with the PSU under the table, it doesn't look too bad, at that!

The Coils

The layout of the PA tank may seem unusual but it is used on account of the low output impedance for the four valves in parallel—a switched *pi*-network could be used, but would come out with some rather odd values. L2 should be located over the *earthy* end of L1. The socket into which the coils plug in can be made from a piece of perspex, say $\frac{1}{4}$ in. thick by 5 in. long by $\frac{1}{2}$ in. wide, mounted on stand-off pillars made of studding about 4BA size. The sockets are as for Belling-Lee wander-plugs. The coils are mounted on a similar piece of perspex, with mating plugs to suit the socket spacing.

Starting points for the coils for each band are as follows: For *Eighty*, wind 18 turns of 14g. to 2 $\frac{1}{2}$ in. dia. spaced to 3 in. long for L1, while L2 can be five turns, 3 in. dia., over the earthy end of L1. As 14 gauge wire is a bit stiff to wind into a coil, a wooden mandrel could be used to form the winding. The tap should be made six turns from the hot, *not* the earthy, end. For *Forty*, L1 can be 12 turns of the same diameter, tapped three turns from the hot end, and L2 three turns 3 in. dia. over the earthed end of L1. For *Twenty*, we come down to 8 turns, 1 $\frac{1}{4}$ in. dia. spaced to three inches, tapped at three turns from the hot end, and L2 comes out at two turns, 2 in. dia., over the earthed end of L1. It will be noted that all these L1 coils are spaced to be three inches long.

For 21 and 28 MHz, one can expect the output from the Linear to drop off a bit, but coils can be wound for these bands by taking proportional considerations into account, plus a little juggling with the exact point for the tap on L1, which indeed may be found to be useful on the other coil sets.

(Continuation in Pt. II will cover PSU circuitry, testing and setting up)

COURSES FOR THE R.A.E.

Supplementary List

FOLLOWING is the last list of centres for R.A.E. instruction that we shall be publishing this year. They were received too late for appearance on pp.382-383, September. The first listing was in the August issue of *SHORT WAVE MAGAZINE* and together with last month's showing, it makes a total of nearly 60 centres at which R.A.E. instruction will be available for the winter session.

The courses now listed will, in most cases, already have started but no doubt late-comers can be accommodated if enrolment is made immediately.

Birkenhead: At the Technical College, Borough Road, on Thursday evenings. The lecturer is L. Roberts, G3EGX, *QTHR*, as in previous years.

Bridgnorth (Salop): At the College of Further Education, Stourbridge Road, with P. Edwards, G3DKJ in charge of the course, offering R.A.E. Theory on Mondays and Morse/Practical on Thursdays, evenings 7.0-9.0 p.m.

Colchester: At the North-East Essex Technical College, Sheepen Road, on Thursday evenings. Apply to the Dept. of Electrical Engineering.

Ilkley: At the Grammar School, on Tuesdays 7.30-9.30 p.m., with D. B. Appleby, G8FUW, *QTHR*, as lecturer.

London (Beckenham): At the Art Institute, 28 Beckenham Road, on Wednesdays, 7.30-9.30 p.m. Tutor J. M. Tripp, G3YWO, *QTHR*, or apply to the Principal.

London (Egham & Chertsey): Arranged by the College of Further Education, at St. Paul's Centre, Addlestone, on Tuesday evenings, and at the Magna Carta Centre, Egham on Mondays, 7.0-9.0 p.m. The course instructor is C. Duckling, G3SVL. Ring the College, *Chertsey 64157*, for details.

London (Islington): At the De Beauvoir Evening Institute, Tottenham Road, Balls Pond Road, a booster course for the R.A.E. under the direction of F. Barns, G3AGP.

London (West Croydon): At the Tamworth Road Annexe, with P. L. A. Burton, G3ZPB, in charge. Apply to the Further Education Centre, at the Annexe.

Those unable to find a convenient centre from the lists now published should apply at the local office of the Education Authority for their area, asking if they know of a course for the "Radio Amateur's Examination, Subject No. 765, City & Guilds of London Institute." It could well be that there are other courses available of which we have not been notified.

TRANSISTOR BC/Rx CONVERSIONS FOR DIRECTION- FINDING

SUITABLE FOR TOP BAND
OPERATION

E. W. HOLT (G3MHQ)

A RECENT Club activity, "fox-hunting," has resulted in a considerable demand for inexpensive Top Band direction-finding equipment. It was decided to try modifying the cheap Japanese and similar types of radio for this. It was found that these receivers could in fact be modified quite easily with a little care. The winner of our most recent (Ealing) Club event won the competition with a radio costing less than £2 to purchase.

The first item to tackle is the local oscillator, which must be tuned to the correct frequency. However, the coil slug could not be unscrewed sufficiently, without removing the screening can. To get the can off it is necessary to heat the underside of the printed circuit, where the lugs of the can are soldered, and then very gently easing it away from the board. A very small soldering iron should be used to unsolder the lugs, so as not to damage the printed circuit.

With some receivers it may be found necessary to unscrew the slug of the coil to the very last thread, and hold it in place with a blob of wax. With others, the slug may have to be removed completely. It was not found necessary to replace the coil can. The local oscillator coil is usually identified by red paint on the slug.

Next item to be modified is the ferrite aerial coil. This winding has to be reduced to 35 turns, from approximately 60 turns. The aerial coil usually consists of two Sections, the main winding of approximately 60 turns and the coupling winding of about 4 turns. The coupling winding is not touched. (Fig. 1). A word of warning about this aerial coil: If the wire is Litz, it requires some practise in cleaning all the fine hair-like wires, for soldering back to the printed circuit. One way to do this is to hold the end of the wire over a match flame for a few seconds. This burns the varnish off the wires and they can be scraped clean, the bare ends then being twisted together. The end should be tinned with solder ready to be resoldered to the printed circuit. It is best to practice on the piece of wire removed from the coil, as too much heat when burning off the varnish will melt the wires. With some receivers ordinary single-stranded copper wire is used and this caused no problems.

Alignment

Lining up the receiver should be quite easy if a signal generator is available. This should be loosely link-coupled to the aerial rod. First, set the signal generator to mid Top Band and the receiver tuning condenser to mid-position. Adjust the local oscillator for maximum signal, then the aerial trimmer to maximum, and the job is done, as there is no tracking condenser provided on these small receivers.

For those without a signal generator, they could try

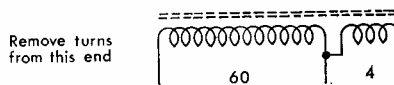


Fig. 1 MODIFICATION

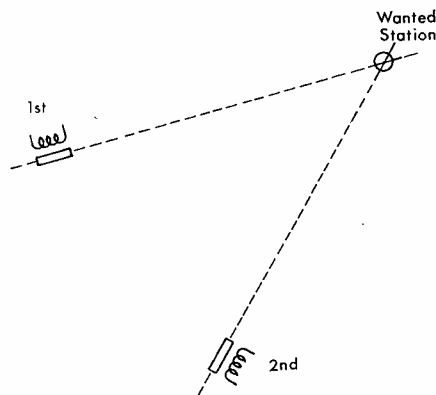


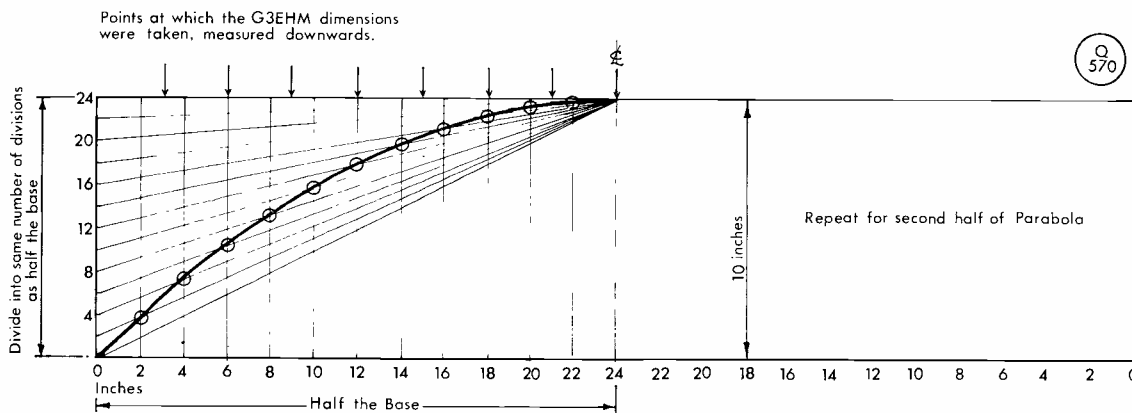
Fig. 2 GETTING A FIX

peaking the receiver on *Loran* at night-time, when the signal is loud, or perhaps some local amateur would oblige with a strong signal.

Operation

To use the receiver for direction finding it is essential that the lie of the ferrite aerial rod be known. The receiver is tuned to the station required and the receiver rotated to the minimum (*null*) signal. The receiver ferrite rod is now pointing towards (or away from) the station. To find the station one must move a distance at right angles to the first reading and take a second fix on the station (Fig. 2). Where the two lines cross lies the wanted station. To complete the direction finding equipment a scale map and a small compass are required.

Editorial Note: In fact, it will be found in practice that three direction-lines should be plotted—they are not likely to cross exactly, but will form a small "cocked hat" within which the Tx must lie. Even on a simple BC-type receiver modified as described, the *null* given by the ferrite-rod aerial will be quite sharp. Refinements for a D/F receiver are a sensitive signal-strength indicator, to give a well-defined *null* more accurate than can be obtained by ear, and a dead-beat compass fitted to the top of the Rx and corrected for deflection error caused by the Rx itself. Bearings should *not* be taken near wire fences, telephone lines, etc. Best type of map to use is the new Ordnance Survey 1/50,000 Series in kilometre squares, costing 65p and available from good bookshops. There is no need to mark the map itself when taking bearings—pin it to a board under a sheet of tracing paper and make your marks on that.



PARABOLOID CALCULATIONS

R. G. MARDEN (G3MWF)

IN the article by G3EHM in the June issue of *SHORT WAVE MAGAZINE*—"Paraboloid for Twenty-Three"—he suggests a calculation for each ordinate, when designing the template for the dish.

Referring to the diagram here and taking only half the dish: Draw a rectangle 10 ins. high by 24 ins. wide. Divide the longest side into equal parts, as many as you like, and erect ordinates from these points.

Now divide one of the short sides into the same number of points. From these points take converging lines to one of the opposite corners. Number the long and short sides in the sequence indicated on the diagram. Then put a dot where 2-crosses-2 and where 3-crosses-3, and so on.

If a line is then drawn through the points a perfect half-parabola is the result. Repeat an equal and opposite shape, and a complete parabola is formed.

It will be found that if the sketch is measured (allowing for scale) at the points suggested by G3EHM, it will agree with his calculations.

DSB ON TOP BAND

LOW-POWER DOUBLE-SIDEBAND EXCITER AS BASIC SSB UNIT

B. J. ARMSTRONG (G4BJA)

Though widely used commercially, in amateur circles not much is heard nowadays of DSB—the radiation of both sidebands with carrier suppressed, a receiver with USB/LSB switchable then taking either side. While not likely to be popular on our HF ranges, DSB is of great interest for experimental work on Top Band. The unit discussed here could be further modified for SSB working.—Editor.

THIS circuit is a useful building block for homebrew sideband transmitters, and can be altered to suit individual needs. The PA is shown separate. The results using the combined DSB generator and PA as a portable rig on Top Band showed that the QRP signal was only three S-points weaker than the 25-watt output SSB Tx at a range of three miles. Using a 10ft. whip (base loaded) the signal was S2 three miles away. Thus it can be seen that low-power DSB can be surprisingly efficient. One-sixty is the only band operated at G4BJA, but the circuit could be modified to work on any of the HF bands. The versatility of the unit could be increased by using a VFO instead of crystal control.

The circuit described here (Fig. 1) is a basic double sideband generator for use on any frequency up to about 3 MHz with the values given. It can be used with a carrier crystal and a filter to form an SSB generator, e.g. on 455 kHz. It can also be used with a Top Band crystal and a small PA as a lower DSB transmitter for 160m. Both these applications have been tried successfully by the author.

Description

The circuit centres around the Plessey SL641 balanced mixer IC. The carrier drive is provided by a Pierce crystal oscillator, the output being taken from the emitter of Tr3 to give a low-impedance source. This oscillator was found to start easily with most crystals. If crystals of frequencies greater than 3 MHz are to be used, the capacitors C1 and C2 must be reduced proportionally. The audio drive is produced by Tr1 and Tr2. Tr1 is a preamplifier for use with low-impedance microphones. Tr2 is an emitter-follower giving a low-impedance output for the IC. The balanced mixer IC requires a 6v. supply and is obtained by dropping the 12v. through a zener diode. VR1 and R7 may be required to balance out any residual carrier on the output, as is often necessary with unmarked devices.

Tr4 is an untuned common emitter buffer amplifier stage.

Construction

This is of course entirely up to the constructor, but

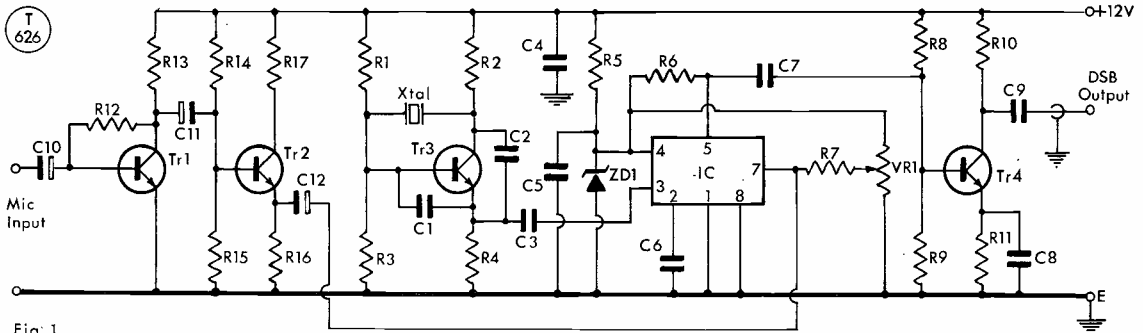


Fig. 1

Fig. 1. Circuit of the Double-Sideband Generator.

Table of Values

Fig. 1. The DSB Generator

C1, C2, C6, C8, C9 = .001 μ F, disc, 30v.	R5, R16 = 220 ohms
C3, C4, C5, C7 = .01 μ F, 30v.	R6 = 2,200 ohms
C10, C11, C12 = 1 μ F, 15v. elect.	R7 = 220,000 ohms
R1, R8, R14 = 33,000 ohms	R12 = 1.8 megohms
R2, R10, R11, R17 = 100 Ω ohms	R13 = 6,800 ohms
R3, R9, R15 = 15,000 ohms	VR1 = 10K pre-set
R4 = 82 ohms	ZD1 = 6.8v. 400 mW zener
	Tr1, Tr2, Tr3, Tr4 = BC108
	IC = SL641, Plessey (J. Birkett, Lincoln)

All resistors $\frac{1}{4}$ watt, 5% carbon

Table of Values

Fig. 2. Suitable PA Stage

C13 = 220 μ F	R18, R19 = 4.7K, $\frac{1}{4}$ w. carbon
C14, C17 = .01 μ F, disc, 30v.	VR2 = 10K pre-set
C15, C16 = 30 μ F, disc, 30v.	RFC1 = 2.5 mH
VC1 = 500 μ F, BC tuning	Tr5 = BFY51
	L1 = see text

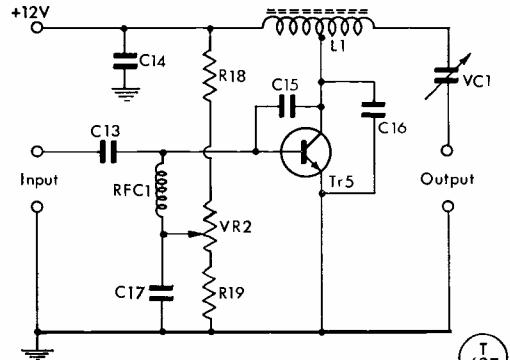


Fig. 2

Fig. 2. PA Stage for the Top Band DSB Generator.

the author used a printed circuit board to give a compact arrangement. The only points to keep in mind are the placing of the oscillator as far as possible from the output circuitry of the IC to prevent carrier leakage, and the adequate screening of the unit from later amplification stages.

Linear Power Amplifier

A low-power Class-AB power amplifier takes a BFY51 in the common-emitter configuration. VR2 is the bias voltage control and is set at the position giving the lowest standing current with good linearity, best found by monitoring the output signal on a receiver. VC1 is adjusted for maximum RF output. C15 and C16 are to help prevent instability. L1 acts as both RF choke and loading coil, and is of 50 turns 38g. closewound centre tapped on a $\frac{1}{2}$ in. diameter ferrite rod 2in. long. The physical layout of the amplifier can be critical; the input components must be mounted away from the output elements. This circuit has been found to be very reliable and robust, and when used in conjunction with the DSB generator will give around 250 mW p.e.p. of power output.

JAMBOREE-ON-THE-AIR—1974

This annual Scout QSO Party will this year take place over the week-end October 19-20, covering all amateur bands. As is customary, the form is for active amateur operators to entertain local Scout groups at their stations to give them some idea of what Amateur Radio is all about. It is not necessarily a matter of working DX, nor of making snappy contest-style QSO's. Since the event is *not* a contest, the idea is to have chatty contacts with other J-O-T-A stations—and if they happen to be DX, so much the better.

U.K. operators interested in participating and able to have small parties of Scouts/Cubs/Guides into the station at some time during the week-end should get in touch with their local District Commissioner for Scouts—either the telephone directory or the local newspaper can give the information.

For J-O-T-A, any band can be used, Top to two metres. The identifying call is simply "CQ Jamboree." The most populated bands for J-O-T-A stations will be found to be 20 and 80m.

WALKIE-TALKIE CONVERSIONS FOR TEN METRES

R. P. Morris (G4CTR)

EVERY now and again one encounters the odd occasion when some sort of walkie-talkie is required but the construction of one is not justified.

There are many cheap walkie-talkies available in the U.K.—these would be ideal except that they operate outside any amateur band, e.g. 27 MHz. The answer is to convert these devices so that they can be used in an amateur band. The closest to 27 MHz is our 10-metre band, only a few kHz away.

The device discussed here operated on 27.125 MHz and was capable of up to 30mW input power on AM. The oscillator consisted of a crystal and a variable inductor, the crystal frequency being 27.125 MHz.

To convert for operation in the 10-metre band a suitable crystal must be obtained—the closer its frequency is to 28 MHz the greater is the chance of being able to get it to oscillate, although take into account the bandwidth of the AM signal when deciding on a suitable channel.

Convert the device as follows: Locate the original crystal (See diagram), remove it and replace with the 28 MHz crystal. Then, using a receiver tuned to the crystal frequency, switch on the walkie-talkie and peak L1. The device should now be ready for operation.

When the conversion is successfully completed the Tx/Rx may be used in conjunction with the base station

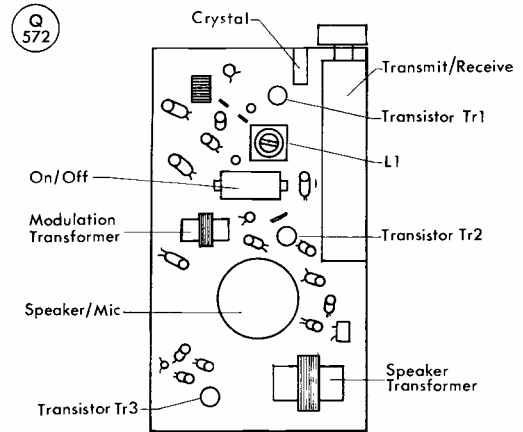


Diagram showing location of major components.

Converting the 27 MHz "Citizens Band" type walkie-talkies for operation on ten metres. Though illegal in the U.K. for transmission on 27 MHz (unless specially licensed) the simpler types are easily convertible for use by licensed amateurs in our 28 MHz band.

or another suitably converted device. Provided the 28 MHz crystal frequency is not too far up the band, it should be possible to peak L1 without having to trim the coil.

NEW QSL CARD SOURCE

We are informed by our well-known regular advertisers *Derwent Radio* (Scarborough) that they can now offer a QSL-print service for readers, in quantities at competitive prices, plain or coloured, printed one side or both. They are able to do this by reason of having taken over the stock and equipment of Harold Beaumont, G5YV (Leeds), himself for many years in the QSL-print business.

VALUE OF SMALL ADVERTISING

We have from time to time drawn attention to the buoyancy of the Amateur Radio market as typified by our Readers' Small Advertisement columns. For the September issue the total value of the priced readers' "for sale" offers amounted to about £6,000. This of course takes no account of the "wanted" items nor those for which offers were invited.

For many years now, the *SHORT WAVE MAGAZINE* Reader Advertising has established the second-hand or re-sale value of a very wide variety of amateur equipment. Indeed, taking any three months together almost anything you can think of has been on offer.

Cost of Reader Small Advertisements is 3p a word, with a *minimum* charge (irrespective of the number

of words up to 17, including address, etc.) of 50p. Insertions required in bold face, like this, are charged 15% extra on the total, and Box No. addresses are an additional 15p. Because we always have a carry-over from issue to issue, Small Advs. should be sent in as early in the month as possible for the issue following. Though we cannot invoice for the small amounts involved in Reader advertising, if there is doubt about cost, we can fill in the correct amount on a signed blank cheque, protected by an initialled endorsement "not over £3," or whatever seems reasonable, and the sum for which the cheque is filled in will be notified. (And you can be sure you will *not* be over-charged!).

Please draft your notice clearly using the accepted radio abbreviations and send, with remittance, to: Small Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H 0HF.

ABOUT 20,000 NOW IN ISSUE

Latest available official returns show that there are now 15,100+ Class-A and over 4,500 Class-B licences in issue, of which the /M permits total some 4,560. As these figures are always at least a month in arrears, the probability is that we are now over the 20,000-mark—about six times the number of U.K. amateur licences in issue just before Hitler's War.

Impressions of VHF/NFD

IN part of the country will readers be unaware of the frightful weather which we had for VHF/NFD, and this led to a great reduction in the number of portables who were able to operate effectively. Comments from those who did get out included stories of flooding and ruined gear, antennae blown down and damaged, or just not erected (particularly some of the solid dishes for 23 cm.), inability to reach sites and general disorganisation. As one weary operator was heard to remark—"It was just rough, rough, rough!" It was not only the portables who suffered, of course—several instances have been reported of damage to beams at the home QTH—your scribe lost his 23 cm. radiator on the Saturday morning, but was able to get it back into service in time for the event—so, all-in-all, it was perhaps encouraging to find as much activity as there was. The early start (1600z) seems to have caught some people by surprise, as did the early finish—several QSO's were heard going on after 1600z on the Sunday.

With the barometer under 1,000 mb for much of the time, propagation was below average on all the bands and DX paths very unstable, additional built-in QSB being engendered by the mechanical instability of high gain, narrow bandwidth antennae in the high winds. Although there was a concurrent Region I contest, very few Continental DX stations were being worked, even in the East and South-East, although F, ON and PA could be heard weakly for part of the time.

Heard on Two during the contest. "QRZ the two stations calling. Will one please call again while the other keeps quiet?"! One hears of two stations who refused to enter the IARU fixed station event since the results of last year's contest are not yet out! No less than five groups signified their intention of operating from Meriton Low in Staffs—G3JQA/P, G3FEC/P and the Leicester, Stockport and Eccles VHF Groups. That must have checked out the cross-mod. problems and one hopes did not lead to a punch-up in the "Mermaid!" In the event, G3JQA/P lost all their tents at 2 p.m. on the Saturday and called the whole thing off—and who can blame them with the 100 m.p.h. winds and the pressure down to 972 mb on the Saturday!

Four Metres: There was a useful amount of activity on this band, with a high proportion of stations using SSB. AM and CW brought their share of the points, but no NBFM was heard. Best DX logged at G3DAH was GM3AOR in Roxburgh (it is believed that there were three GM stations heard, if not worked, in the South) and the highest score noted was that of G3LCH/P from near Epsom, Surrey, who had over the 100 mark. Operating was good, and from the excellence of some of the CW transmissions, one could surmise that there were a few fugitives from the MCC contest crew who had been roped in for this event.

Two Metres: This band was quite often a shambles with just about every malpractice in the book being perpetrated. Callsigns were gabbed without any attempt to use phonetics or give the location or beam heading on a CQ call; little care seemed to be given to checking a frequency for occupancy before calling on it; breaking into a contact while the exchange of information was still going on was commonplace; and several stations were heard operating on phone in the CW segment of the band or using AM/

VHF BANDS

A. H. DORMER—G3DAH

FM on the SSB calling channel. One hears frequently enough about poor operating on some of the HF bands, but it was certainly equalled by the performance on VHF over this weekend. Add to all that, the truly appalling quality of some transmissions, and one has a fair idea of what two metres sounded like at times. These comments apply particularly to SSB operation—there was little AM/FM and, by and large, they are not applicable to CW transmissions—and one can only hope that the contest monitoring stations have duly noted the offenders and that the organisers will apply strictly Rules 15 and 16 and disqualify the culprits.

Having got that snarl out of the way, let us proceed to:—

Seventy Centimetres: Not a great deal of activity on this band in spite of the band multiplier of six and the additional use of it as a talk-back band for setting-up 23 cm., and higher, contacts. A noticeable increase in SSB signals compared with last year, but very little CW. One might have expected more in view of the unfavourable propagation conditions. Not unique to this occasion, but highlighted by it, was the number of undermodulated, S5 carriers.

Twenty-Three Centimetres: Understandable difficulties in erecting, and keeping on the correct heading, dishes for this band may have accounted for the low activity—a score of 20 contacts must be considered exceptional. In several instances noted, operators appeared to be unfamiliar with the equipment (where it was not operated by the owners) and contacts were not established where other considerations lead one to suppose that they would be. However, the use, and therefore training, of such operators is a necessary prelude for UHF/NFD in October and may be explained on those grounds.

Linear Amplifiers

Prompted by the foregoing comments on the poor quality of some signals during VHF/NFD, the following notes on the setting up of linear amplifiers may not be inappropriate.

To operate without distortion, a linear amplifier should draw no grid current. All mixer and post-mixer stages in transverters should, therefore, be monitored to ensure that this condition is satisfied. The most prevalent cause of poor quality signals, as far as could be judged from listening and monitoring them on an oscilloscope, was

over-driving. The anode, or collector, current in a mixer should rise very little (in the case of the popular QV03-10 about 2-3 mA) with SSB input, and the relationship of 10:1 oscillator injection voltage to speech input should be observed. Where a number of different operators are using the equipment, it is advisable to have either some form of monitor on the output or to have a good speech compression circuit or ALC, or both. In spite of extravagant claims to the contrary, the *distortionless* output from a linear amplifier will rarely exceed some 30% of the DC input.

Consider the QV06-40A: With 100 watts DC input (say 500v. and 200 mA) and an anode dissipation of 40 watts, this means that 60 watts must be radiated, and this is just not on. Looked at another way, if the anode dissipation is 40 watts and the efficiency is 30%, then the input should be limited to 60 watts with 20 watts being useful output. The lower duty cycle when such a valve is used in SSB service may tempt some to ignore these figures, but, unless manufacturers' ratings are exceeded, distortion of the output waveform is inevitable.

Distortion, from whatever cause, is a dead loss as far as we are concerned, and "loss" is the operative word. In the case of severe distortion, the signal at the far end becomes unreadable and the contact is lost. Power output on the desired frequency is lost since that available must be shared between the main and spurious in-and-out-of-band radiation. Goodwill is lost if the distorted signal occupies, as it must, a wide spectrum and if, as is likely, it interferes with other operators or services. Efficiency is lost if over-driving results in flat-topping and drooping power supplies and, finally, respect must be lost for the chap who cannot even operate commercial gear without mis-using it.

A good home-built set-up will have:—

- (a) A microphone which does not cut-off below 500 Hz or have a (untailored) significant output at 10 kHz,
- (b) A speech processor,
- (c) A low-level mixer,
- (d) Adequate filtering before the mixer to ensure a pure injection waveform free from harmonics,
- (e) Adequate post-mixer stages and filters to ensure that injection frequencies and mixer products are not obtrusive. They should be at least 60 dB down at the antenna. It also means that the final oscillator injection frequency should not approach too closely the radiated frequency, or filtering will become a problem. (404/28 MHz would be OK but 425/7 MHz would be impracticable),
- (f) Stabilised, low impedance grid and screen supplies with adequate metering,
- (g) A PA capable of handling without distortion the power output required.
- (h) Some method of output monitoring.

These notes are intended to be helpful and not an education in egg-sucking.

Contests

Results: The May two-metre Open, Fixed Station section, was won by G8FUF (Essex) followed by G4CXL (Surrey), and the portable section by GW3UCB with GW3WAS as runner-up. Over 100 logs were submitted, and this is some indication of the increased activity on the band these days. The leading stations in both sections made well over 300 contacts, which is another pointer to the popularity of this event.

The June Microwave contest produced a

record of 30 entries, the overall winner being G3WDG/P (Wiltshire), with G3JVL (Haying Island) as the runner-up and leader in the 23 cm. section. Conditions were very good for this event. G3BNL/P and G3EEZ/P shared first place on 13 cm. and 6 cm., G3KSU/P leading on 3 cm. and G8AGN/P and G8DMW/P sharing the honours on 9 cm. With this sort of entry, there is obviously a case for more contests to maintain and stimulate UHF interest still further. The WAB VHF contest on June 30 attracted only three entrants and one SWL log.

Reports: The 2m. QRP jolly on September 18 did not produce any startling DX. It was surprising (once again) that more use was not made of CW in view of the prevailing propagation conditions and the power limitations. It was fairly obvious that the latter was being exceeded in some instances.

In the South-East, and from comments received it seems to be the general view that conditions were little better than average for the two 70 cm. Cumulatives in August and the first one in September. CW helped out a bit, for those who can use it, but even in that mode, there is a general moan about propagation during these events. Having said all that, the last of the Cumulatives produced some excellent propagation—PA, ON, DC and, surprise, surprise, LX1DT were all worked from Herne Bay.

Forthcoming Events: This copy should be in your hands just in time to catch the last of the 1296 MHz Cumulatives on September 29, the first two having been on September 15 and 22nd. The next 432 MHz Cumulatives are dated *October 31, November 8, 16, 24 and December 2, 10 and 18.* Times 2000—2230z in each case. The 70 MHz Cumulatives are *October 13 and 27th, November 10, 17, 24 and December 1 and 8.* All are on Sunday mornings between 1000 and 1230 local time. Jolly good! The 432 MHz SSB event is on October 20, 1000—1400z. Although entrants may only transmit A3j, don't let that stop you coming on if you are not so equipped as cross-mode contacts score, and we can all do with the activity.

TWENTY-THREE CENTIMETRES

ALL-TIME TABLE

Station	Counties	Countries	Total
G4BEL	24	7	31
G8ARM	20	2	22
G3JVL	18	4	22
G3DAH	18	3	21
G4BYV	15	5	20
G3COJ	15	3	18
G3JXN	17	1	18
G4ALN	14	3	17
G3EHM	14	2	16
G8AOD	11	1	12
G5DF	11	1	12
G8FMK	9	1	10
G8FJG	7	1	8
G8EOP	1	1	2

The UHF/NFD and Listener event is on October 5/6.

Scottish Scene

There were sighs of relief in Edinburgh when it was learned that GM8BJF will not now be leaving that City. He is to be congratulated on the award of a two-year research contract at Edinburgh University which will ensure that his UHF/VHF expertise is still available to his many friends there. GM3WOJ, having recently obtained his B.Sc. from Glasgow, is now resident in Edinburgh, again much to the delight of the locals and to his friends in the South, who will be looking out for potent signals on 4m. from Chris in the Lothians.

Portable operation is still in the news. GM3BOC/P has been radiating a fine signal from Golspie, Sutherland, on 2m. SSB and this would be a welcome addition to the counties list for many. The 3 cm. wizards, GM3OXX/P, GM3DXJ/P and GM8BKE/P, who recently set up all those new records for the band, have become the first group to qualify for the newly created award for 20 counties and three countries worked on that band—and that is going to take some beating! GM4DGC in Perthshire gave that county to many for the first time and GM4BVD is now resident in Perth and putting a hefty signal into the Borders. G8FQE and G3NAS made good their getaway from GM after flattening a few of the front-ends in mid-Scotland. Their operations in Moray and Banff were particularly appreciated, and even a few of us down here were able to contact them.

The Glenrothes and Lothians Radio Societies have come to a working arrangement which should operate to the advantage of members on both sides of the Forth. It is a great help when the two secretaries, GM3YOR and GM8GEC, are as energetic and friendly as these two are. This idea could well be the model for other Clubs and Groups.

The patience, so long exhibited by GM8DIJ, has finally been rewarded with the appearance on 70 cm. of GM6XI and GM8BJF. He has been on his own for a long time now, and they would all welcome more activity on this band.

The Mid-Lanark Radio Society operate from Wrangholm Hall, Motherwell, which stately home has been converted into a Community Centre, and a very fine building it is. The Society now has an 8/8 for 2m. and a transverter is on the stocks to work with the FT-250 to give them full SSB capability on the band. The secretary, who is GM3KMG, has arranged an interesting series of talks to complete the Autumn programme, two highlights being the presentation by GM3OXX on November 22 of gear for 3 cm. (and he should know!) and by GM3SAN on December 6, who will be talking about the new repeater which should be well under way by then.

VHFCC Awards

Martin North, G8HKK of Bath, gains Award No. 225 for two metres and is the third G8H— to do so, the first being G8HSX and the second G8HPD. The gear consists of a H-B Tx with a QV03-10 in the final running about 8 watts of AM/phase mod. to the 8-ele. at 20ft. The Rx is a Codar CR.70 with pre-selector and Q-multiplier, and this is fed from a H-B fet converter with an MPF102 RF stage and a BF180 pre-amp, which sound a pretty hot set-up. At 525ft. a.s.l. the QTH is good in all directions

except to the North where rising ground goes up to 600ft. plus. Martin was surprised the other day to get a listener report from Spain, so the take-off in that direction must be pretty good! He finds that British stations QSO much more promptly than do Continental operators, and his 100 cards came in from the 150 which he had sent out since May, 1973. He has a 150-watt rig just completed, so will be making an even greater impression on the band!

In Loughborough, Leicestershire, Nigel Hoult, G4CIK, got his 100 QSL cards for contacts made on 2m. and gains thereby Award No. 226. He started up on the band as G8GXX with a Pye Ranger and a 2-ele. indoor Quad. The receive set-up was a H-B fet converter and the FR-50B. The Ranger was swapped for a Vanguard for a period, but Nigel now runs the Limer with H-B mosfet pre-amp and H-B QV06-40A linear. The 6-ele. Yagi is at 40ft. and the QTH at 160ft. a.s.l. with a good take-off in most directions, with the exception of the South-West where higher ground obstructs the view. He has worked about 400 stations in 7 countries and 55 counties with the best DX at 340 miles. Like so many others, he finds the DX much easier to work on SSB than with his old AM gear.

Seventy Cms

Playing around with the design of pre-amps and transverters for this band recently, a couple of points came to light which might merit emphasis.

Consider the BFR90: This will give a gain of about 18 dB with a noise figure of 3 dB at 432 MHz. V_{ceo} can be 12v., but V_{be} is 2.5v. max. $R_s = R_L = 50$ ohms. If we assume an antenna change-over relay with an isolation at these frequencies of 30 dB, a typical figure in some amateur installations, and if we apply the formula

$$W = \frac{E^2}{R} \quad \text{or, } E = \sqrt{WR}, \text{ we find that a high}$$

power Tx with 200 watts p.e.p. output would produce over 3v. across 50 ohms and, therefore, across the base/emitter junction. Transposing a bit, we find the formula yields a maximum permissible p.e.p. output of 125 watts to give a V_{be} of 2.5v. So a point to watch is that either the relay must give better than 30 dB cross-talk, or the power output must be held to a lower figure for safety. A 35 dB relay attenuation will handle 400 watts.

Another popular device is the BFR91, although these are expensive and difficult to obtain in singles. Here the V_{ceo} must be held to 5v. and the V_{be} to 2v. The gain is about the same as for the BFR90, but the noise figure comes down to below 2 dB. $R_s = R_L = 75$ ohms. Applying the calculation above to this case we find that 200 watts p.e.p. will generate nearly 4v. across 75 ohms and that 53 watts is the maximum permissible power under the conditions stated. Isolation of 35 dB will cope with an output of 170 watts.

The other point concerns the reduction of the output from a prime mover to feed a balanced mixer. The output required is very small and *should not* be adjusted by reducing the mic. gain control on the transceiver, which will only degrade the sideband/cARRIER ratio. The correct answer is to insert a pad between transceiver and transverter. The simple pi-type filter will do the trick. If R1 is the series element, and R2

the two, equal, parallel elements then:

$$R_1 = \frac{R_o(N^2 - 1)}{2N} \quad R_2 = \frac{R_o(N + 1)}{(N - 1)}$$

where R_o = input and output impedances and N = Voltage ratio.

For a 10:1 (20 dB) ratio, with R_o = 50 ohms, R_1 = 250 ohms and R_2 = 61 ohms.

News Items

Four Metres: G3TMG (Gosport, Hants.) has been interested in observing propagation on the VHF bands for some ten years, but came across a strange one on July 30. Listening on 70-80 MHz at around 1800z, he found a broadcast station which opened its programme with the sound of Big Ben striking two. Now, if that was accurate, and not part of a recording for example, the time difference would put the transmitter somewhere in Thailand, and that would suggest some sort of multi-hop propagation, although this seems altogether very mysterious. Any observations or suggestions?

G4BYP (Liverpool) is now QRV on Four with a Europa-4 and G3XBY (Warwick) has an 8-ele. beam up at 65ft. for this band. There's two to look out for! It is reported that G3SXX (Cambridge) is also putting up an 8-ele. G4AIR (Macclesfield), and what an appropriate callsign for a pilot, monitors 70.26 MHz during daylight hours and reports reception of a Cornish net at 1100 BST daily on 70.375 MHz.

Two Metres: GB3VHF is a better signal into the Midlands now that the new Tx is in position. G3OHH (Mow Cop) receives it at 5 & 8 for much of the time. The new frequency is 144.15 MHz. G8HKN (Stoke) reports hearing F1CCP on 2m. SSB on the first day that he got his Multi-2000 on the air. He is up at 650ft. a.s.l. of course! GB3WSF, at the Walsall Show & Fête, was operated by G2FPR and G3UBX, of the Wolverhampton Radio Society, on August 26. Conditions were poorish though, and they were only able to work the semi-locals on SSB.

G8DJZ (Stoke-on-Trent) does not qualify for the record TVI award, but got pretty near it the other day when his 2m. transmissions blotted out reception on I, II and III in 27 adjacent homes! They were all served by one masthead amplifier covering all those channels, and 144 MHz! This story was overheard on the North Staffs. net which meets every Wednesday evening, 9-10.30 p.m. Callers-in are welcome.

G3CHN operates from the Decca Navigator site at Bolberry Down, Devon, and now has 100 watts of SSB available on Two. He reports that some of the locals, and he, heard nothing of the Sporadic-E opening in July, and indeed no reports have come in from that area. Looks as if the QRB was just that bit too great.

GD2HDZ was pleased to complete a contact with GM8FQE/P in Moray the other night. Having listened on and off for the GM for most of the evening, with only just an occasional word audible above the noise, he took the '6-40A linear out of its case to do some work on it and, whilst he had it open on the bench, the Rx suddenly emitted "CQ from GM8FQE/P." Hastily replacing the linear, he was able to reply to the second "CQ" and the contact was no sooner completed than the frequency went dead again. Curious propagation! G8HHI in Hants. was also pleased to get the contact with 'FQE from Kinross. GW8HVP

THREE BAND ANNUAL VHF TABLE

January to December 1974

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3NHE	51	6	73	17	52	11	210
G3DAH	48	8	62	19	33	8	178
G5DF	44	7	62	14	36	6	169
GD2HDZ	37	6	78	13	29	6	169
G4AGE	24	3	63	11	39	9	148
G3XDY	22	4	70	12	18	8	134
G8EOP	—	—	55	10	35	10	110
G3FIJ	30	4	43	13	15	4	109
G4CZP	—	—	79	14	—	—	93
G3OHH	39	7	27	6	11	2	92
GW8FKB	—	—	75	8	1	1	85
GW8FOL	—	—	67	16	—	—	83
G4AEZ	11	2	46	11	11	2	83
G8GHZ	—	—	61	10	8	1	80
G3SHY	15	3	27	6	23	5	79
G8GNE	—	—	40	10	23	3	76
G2AXI	21	3	32	8	9	1	74
GW3KDG	—	—	57	15	—	—	72
G8ECO	—	—	49	9	12	2	27
G3BW	—	—	43	5	19	4	71
G3AHB	—	—	51	10	7	1	69
GM4CXP	—	—	57	11	—	—	68
GW8BXQ	—	—	52	12	1	1	66
G4DHF	—	—	54	9	—	—	63
G8DGR	—	—	50	10	2	1	63
G8FMK	—	—	25	2	33	3	63
GM3ZBE	—	—	44	8	4	6	62
G8FWB	—	—	51	10	—	—	61
G8GGP	—	—	50	9	—	—	59
G8HHI	—	—	47	10	—	—	57
GW8HVP	—	—	46	7	—	—	53
G8EKP	21	7	15	4	2	2	51
G8FUI	—	—	35	8	5	2	50
G8CBU	—	—	42	5	—	—	47
GW4BXE	12	2	20	11	—	—	45
G18EWM	—	—	35	9	—	—	44
G8HQA	—	—	37	7	—	—	44
G8GLS	—	—	36	6	—	—	42
G8BBP	—	—	37	5	—	—	42
G8GQQ	—	—	31	4	5	1	41
G8GXE	—	—	29	5	1	1	36
G3FKP	—	—	29	2	—	—	31
G8HYH	—	—	27	4	—	—	31
G8BPJ	—	—	23	2	1	2	28
G3SXX	—	—	21	6	—	—	27
GW3XJQ	—	—	16	7	—	—	23

Notes:

1. Claims should be on the basis of the OLD county boundaries until January 1, 1975.
2. The Table shows claims to date from January 1, 1974 and will close on December 31, 1974.
3. Claims should be sent to "VHF Bands," SHORT WAVE MAGAZINE BUCKINGHAM, MK18 1RQ at monthly intervals.

(Haverfordwest), found his best DX of the month with F1CMB/P and F1VA/P, both on the Massif Central, and that with a Liner, too.

Seventy Centimetres: G18EWM now has gear going on this band, but so far has not had a single QSO. The BAY96 tripler runs about 10 watts and the antenna is a 5 ele. Yagi. The 4CX250B linear for 2m. is also nearly complete. G3DAH (Herne Bay) now has 200 watts of SSB available and would like to run skeds with GW and GM stations using comparable power. GB3SC is now back on full power after running for some time on the driver stage only. No, it wasn't your converter!

Twenty-Three Cms: F8OD in Nantes (QRA ZH63) is on 1296-330 MHz and is looking for British contacts. He also has high power, 70 cm. SSB and would like operators to keep an ear open for him during "lift conditions" with the prospect of a QSY to the higher frequency band.

G3NHE (Sheffield) is pressing on with equipment for this band. He has the *Micro-wave Modules* converter and a corner reflector with a BFR90 pre-amp under construction, as is the varactor tripler, but hopes it will not now be too long before he is fully QRV.

G3KMS (Bolton) and G3JVL (Hayling

Island) are still keeping up their skeds on 23 cm. with intermittent operation from G8BGQ (Rickmansworth). 'JVL has added two good ones to his Table score with Devon (G3KDG) and Lancs. (G3KMS) safely in the log. He is operating with reduced e.r.p. at the time of writing because three of his four, 25-ele. Yagis suffered during the recent gales, but by the time this appears he should be back to normal operation.

G5DF (Reading) has added G3ZEZ (Clacton-on-Sea) to his 23 cm. total and G3DAH has notched up four new ones in G3PMH/P in Hunts., G3REH in Lincs., G3HBR/P in Sussex and G4FGU in Berks. The 'DAH/'JVL sked is still being maintained at 2245 BST daily and both stations tune the band for any calls thereafter.

General: We have, from time to time, mentioned the advanced years of some amateurs who have but recently passed their R.A.E. The record must now be held by Bill Peakin of Yeovil who, after becoming interested in radio at the tender age of 13, finally took, and passed, the examination to get the callign G8JFQ in his *seventy-fifth* year. Congratulations, Bill, and let the welcome to VHF be none the less sincere because of the time interval.

Aeronautical Spot Frequencies: Just as this was going down we were informed by the

Radio Regulatory Division that the reserved frequencies on two metres have been reduced to: 144.0, 144.54 and 144.90 MHz—these must continue to be avoided. The 145-146 MHz segment is clear of reserved frequencies. It is not known when it will be possible, says the Ministry, to release the three frequencies in the 144-145 MHz area.

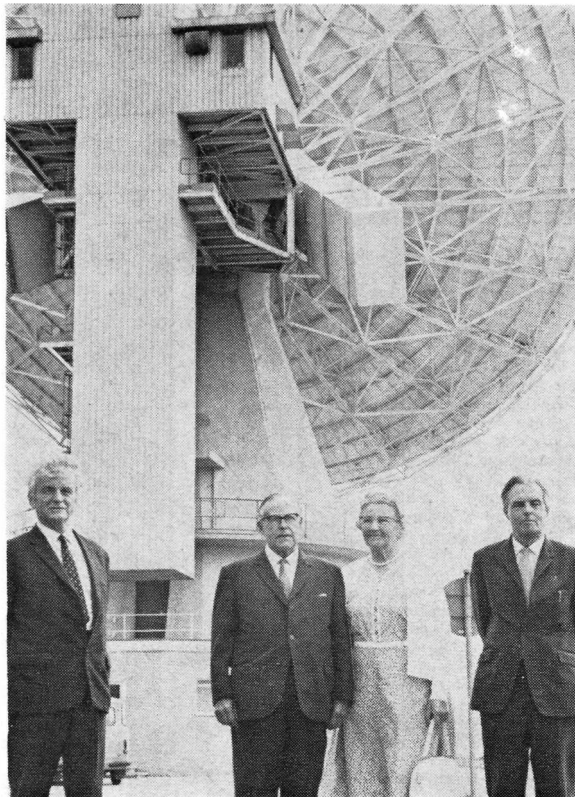
J-Beam is a name known to just about every amateur in this country. From September 1st, 1974, the various subsidiaries of this Company join the parent organisation and a new entity, known as Jaybeam Limited, has been formed. This has entailed a move to new premises and the address is now: Moulton Park Industrial Estate, Northampton, NN3 1QQ. Telephone: 0604 46611.

Texas have introduced a new range of UHF, dual-gate mosfets which includes the 3N225 and 3N225A in standard TO72 packages. These devices have typical noise figures of 4.5 dB at 900 MHz with gains of 15 dB, and this makes them very suitable for front-ends on 432 MHz.

Deadline

That wraps it up for this month. Deadline for the next issue: Friday, October 4. Please send your news, views, claims and comments to: "VHF Bands," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18 1RQ. Cheers for now and *vy 73 de G3DAH.*

Under the great dish of the No. 3 satellite-working aerial at Goonhilly Down, Cornwall. Left to right G3AHX, of the Station staff, G2KZ and XYL, and P. Johnston, Goonhilly operations. The occasion was the recent visit of Benjamin Clapp, G2KZ, to the Station to see how world-wide TV is handled by satellite—the point being that G2KZ, now 80 years of age, was in his earlier days John Baird's right arm in the pioneering work on television, in 1928.



THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for November issue: October 3)

ONCE again, the season for MCC is upon us, and the rules for the 29th Magazine Club Contest are given herewith. Please read them carefully and may your committee decide that again this year your Club should be represented in this annual Contest.

After due consideration and with particular reference to last year's actual results, the rules are being kept virtually as for the 1973 event—with the exception that Rule 4 has been clarified.

Since MCC has always been a contest for communicators using the art of CW, as distinct from rubber-stamp working simply to score, it is (a) For Clubs to identify themselves as Clubs and be able to recognise others as Clubs, and (b) To identify their counties. Hence, the re-wording of Rule 4.

The rules make it clear that both these conditions must be fulfilled for proper log-keeping and full point scoring. This also means that the log for the entry should be a fair copy—without the crossings-out, tea stains, cigarette burns and ambiguous callsigns that we sometimes get! In fact Rule 7 must be strictly observed. Any logs not set out in accordance with this Rule will be discarded.

Usually, we give the inside of a fortnight from the Contest till the closing date for entries to be received. On this occasion, because the Contest is rather later in November than we would like, the results will appear in the February issue of *SHORT WAVE MAGAZINE*, publishing on January 31, 1975. This allows more time for the work of checking logs and preparing the Report, and so makes the closing date for the 1974 MCC Monday, December 9.

From time to time your scribe's sense of geography has been questioned, as represented by the heading under which a particular Club has appeared. Last month, even the Editor expressed mild surprise, and this last clearly could not be allowed to continue. Thus, this time, we have allocated Club locations strictly on the basis of their areas as indicated in the 1974/75 AA Members Handbook.

South-East

Here, perhaps our first call should be with Barking, who will have started their winter session by the time this appears. During the summer recess, efforts have been made to get a trap dipole up over the roof of the Hq., using the leaded roof to establish the earth reference point, and to also add a two-metre beam and rotator. The programme shows Monday evenings as a Constructors evening, Tuesday for Morse classes, Wednesday the Club station is operated, and on Thursdays they have a combined informal and constructor session. All this is at Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex.

Not so far away is the Hq. of the East London Group, located at Wanstead House, The Green, Wanstead; somewhat unusually, but very successfully over the years, they get together on a Sunday—the third in each month, to be exact. For anyone coming from a distance it is perhaps handy to be aware that the venue is not more than a couple of hundred yards from the Wanstead Tube station on the Central Line. October 20, we notice, is down for G6NR, who will be talking about Transmission Lines, starting at 3 p.m.

Over now to Maidenhead, who have a place at the Red Cross Hall, The Crescent, where they start at 7.30 p.m. hours on October 3 and October 15; for the first session of the month, G3VXZ will be talking about and demonstrating slow-scan TV, while on October 15, G3OHX and G3VUQ combine forces to deal with "Interference—Prevention or Cure?"

If you want to join the growing numbers able to operate on 23 centimetres, why not take a trip to Milton Keynes on October 14, when the subject will be the question of Getting Going on this band. It will be at Lovat Hall, Silver Street, Newport Pagnell.

It looks like the first and third Thursdays in the month for Cray Valley, at Eltham United Reformed Church Hall, 1 Court Road, London S.E.9.; the start is at 8.00 p.m. but doors open half-an-hour before to give the early birds the chance to have a ragchew. We do not at the time of writing have details of the formal meeting, but we do know that the mid-monthly session is, if all goes well, going to be one of those celebrated Cray Valley Surplus Sales.

For Acton, Brentford & Chiswick the venue is the Chiswick Trades and Social Club, 66 High Road, Chiswick. The date to watch out for is Tuesday, October 15, when G4DLK will expound on his Experiments with Random Aerials in Restricted Surroundings.

The Dartford Heath D/F Club nights are October 4 and 18, although they also have, during the month, an invitation trip to a D/F Hunt in Essex, and a JOTA station to be operated. This crowd, as their title implies, are mainly D/F hunters, but they also manage to set up stations for such contests as NFD, and to have talks and such-like events at the Hq., which is the Scout House, Broomhill Road, Dartford.

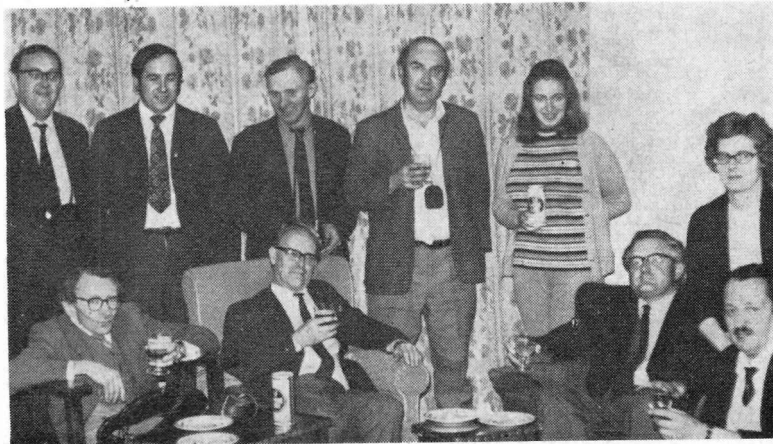
Perhaps the most nicely produced of all the Club newsletters we see, at least recently, is that from Farnborough which tells us they have a home at the 8th Air Scouts Hut, Rectory Road, on the second and fourth Wednesdays in each month; however, we do not know just what is the nature of the activity to be carried on during October; doubtless G8ECO (see Panel) would be pleased to tell you.

At Silverthorn we notice that Friday, October 18, is down for the Annual General Meeting, at Friday Hill House, Simmons Lane, Chingford, where the Club has its Hq. It is believed that the normal form is to have meetings each week, although the *Newsletter* does not say so specifically. Thus if you intend joining or visiting it would be a good thing to get in touch with the Secretary, as Panel, p.438.

A change of date is to be noted at Crystal Palace, doubtless to clear VHF-NFD; the new date is Saturday, October 12, and the talk will be by G6OPB/T—G8AAI. Start time is 8.00, and the venue Emmanuel Church Hall, Barry Road, London, S.E.22.

Although we note that provisionally, the date for Chiltern is the second Tuesday, November 12, for the informal, we understand that there may be changes due to problems with the Hq. bookings, these

You would hardly think it, but this is a picture of the aerial-rigging group for GB2TS, mounted specially by York Amateur Radio Society. The party was being entertained, at the conclusion of their labours, by the Club president G3TMN (right). Others in the group are G3XFM, G4DBB, G3WVO, G8BOK, G3WHH and G3WQM. The ladies are Mrs. G3TMN and their daughter.



being at Ernest Turner's works, Totteridge Avenue, High Wycombe. However, to be on the safe side, it is suggested you contact G2DR2—see Panel below.

Clearly the Secretary at Maidstone YMCA Club was in mortal combat with his typewriter when he wrote to us! However, he survived substantially undamaged to say that they get together on every Friday evening at the "Y" Sportscentre, Melrose Close. October 4 is a Beginners' Class and Morse Practice session, while on the 11th the Dolby technique will be explained to the Hi-Fi fans. Beginners and Morse come again on October 18, and on the 25th G3ORP will be talking about his coax-fed five-band Windom aerial.

At the Holloway Institute, Highgate Hill, the well known and old established London Club Grafton run weekly meetings on Fridays, covering a variety of topics of radio amateur interest. They also have the always-popular Junk Sales (October 18) and visits to such places as the I.B.A. Transmitting Station, Croydon (November 15). On Monday nights, there is the local R.A.E. class, and before the Friday meeting there is tuition in Morse.

Although we do not have, at the time of writing, the latest Verulam Newsletter—it usually manages just to miss the boat!—we can tell you that, all being well the October events will be dated for the first and third Wednesdays of the month, as usual; the place for the later meeting, the formal one, will be at the Market Hall, St. Albans, but we suggest that for the informal first meeting of the month, contact be made with the hon. secretary for the latest details.

The Stevenage membership get together at Hawker Siddeley Dynamics, Gunnels Wood Road, their next meetings being on October 3 and 17th at the Works, the intervening Thursday 10th being their visit to the I.B.A. Tx Station at Sandy, Beds.

Up North

Sunderland seem to operate on a fortnightly basis, at the Polytechnic. October 1 is basically a committee meeting, but at the same time G3YJG will chat about SWL aeriels, and there will be some Morse practice keyed by G3XID. As for the other two dates, October 15 and 29, at the time of their letter, they had not made any firm decision. On a different tack, the intention is to run a mini-bus to the Leicester Exhibition on the Saturday—anyone wishing to go to contact their hon. Secretary, address in the Panel.

High-pressure operation continues to be to the liking of the

South Manchester chaps; on Mondays the VHF and D/F addicts foregather at "Greba," Shady Lane, Manchester 23, where they are in the Club shack, while on Fridays they all move over to Sale Moor Community Centre, Norris Road, Sale. The arrangement of things in October shows them operating the Club FT-200 on 14 MHz on the 4th, with G3SMT talking about an Integrated-Circuit Transceiver on October 11. On October 18 there is a talk, with slides, by G4BJT about "Hydrogen and Hot Air"—sound like a session on ballooning. Then on October 25, there will be a discussion on the Club Project, and the Annual Dinner is down for November 1.

October 1 sees the broom cupboard at the University of Manchester back in action—this was the original function, they claim, of the room now used as a shack! Every lunchtime the cupboard will be open, and by the time of the start of term it is hoped to have the big beam and the VHF array all fixed up again after the battering they got from winds during the recess.

Bury and Rossendale are next in the pile, and the letter indicates a get-together every month on the second Tuesday of the month as the "big show" but informals at the same Hq. on every other Tuesday. The big show for October is to be a home-construction contest, followed, a bit ominously, by a Junk Sale in November. Hq. is at the Mosses Community Centre, Cecil Street, Bury, from where they hope soon to be on the air, having managed to raise the funds to buy a transceiver for Club use.

Nearby Bolton have in the past joined with the Bury gang for their VHF-NFD entry, but this year, as a sign of progress, are going it alone; this being so, the October session will be a recap on this contest, with some slides to show of the highlights, if all goes as planned. To find them, find the Clarence Hotel, Bradshawgate, where they have a private room, on the third Wednesday of each month.

On every Thursday evening, at the British Legion Club, 61 Micklegate, you can find the York chaps in a huddle; and in addition this month there is the annual dinner, booked for October 25. Visitors are welcome here, and indeed they seem to have had quite a few such during the summer months.

The routine of getting together every week but keeping one week in each month as the formal meeting with lecture, film show or whatever seems to be a popular arrangement; it is in use by the Star lads at their place in the New Inn Hotel, Bramley Town Street, Leeds 13, and results in October 16 being given over to G3TDZ to

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W3-8LB.
A.R.M.S.: N. A. S. Fitch, G3FFK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.
B.A.T.C.: J. J. Rose, G6STO/T, Pinchbeck Farmhouse, Mill Lane, Sturton-by-Stow, Lincs. (Stow 356).
BARKING: R. E. Clark, G8BXC, 62 Waltham Road, Woodford Bridge, Woodford Green, Essex, IG8-8DN.
BOLTON: S. Macdonald, G4AQB, 8 Archer Avenue, Bolton (20668), BL2-2SJ.
BURY & ROSSENDALE: C. Kirby, G8HQW, 2 St. Peters Place, Haslingden, Rossendale (4915), Lancs.
CHELTENHAM (RSGB): G. D. Lively, G3KII, 131 Mandaring Way, Wymans Brook, Cheltenham (34785), Glos.
CHILTERN: F. Rose, G2DR2, 84 Cuff Lane, High Wycombe, Bucks. (Penn 4240).
CITY OF BELFAST YMCA: S. Ruff, G1EWM, Braemar, Lynda Park, Jordanstown, Co. Antrim, N. Ireland.
CORNISH: H. Webster, G3XTE, Crandale, Gillyfields, Redruth (6905), Cornwall.
CRAY VALLEY: P. F. Vella, G3WVP, 78 Hurst Road, Sidcup, Kent.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, SE23-3BN. (01-699 6940).
DARTFORD HEATH D/F: A. R. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, DA4 9DQ.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3-7GE.
EAST LONDON (RSGB): P. D. Hull, G4DCP, 100 Prospect Road, Cheshunt, Waltham Cross (31889), Herts., EN8-9QL.
FARNBOROUGH: R. C. Bagwell, G8ECO, 33 Frimley Green Road, Frimley, Camberley, Surrey.
GRAFTON (London): H. Ashcroft, G4CCM, 86 Avondale Avenue, Finchley, London, N.12 8EN. (01-445 8477).
HEREFORD: S. Jesson, G4CNY, 101 Kings Acre Road, Hereford (3237).
HULL: F. Moss, G8GDD, 334 Ings Road, Hull, HU8-ONA, Humberside.

MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (20107), Berks., SL6-5LA.
MAIDSTONE YMCA: G. H. Taylor, G4BNI, 26 Valley Drive, Loose, Maidstone (43976), Kent.
MANCHESTER (University): G. T. Phelan, G8EPS, University Union, Oxford Road, Manchester 13.
MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (3369), Leics.
MIDLAND: A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingham, B29-54J.
MID-LANARKS: D. H. Plumridge, GM3KMG, 7 Waterside Gardens, Hamilton, Lanarkshire.
MILTON KEYNES: R. S. King, G8CHK, 7 Brackley Road, Towcester, Northants.
PLYMOUTH: S. E. Croft, 2 Crozier Road, Mutley, Plymouth.
SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road, South Chingford, London, E4-9EA. (01-529 2282).
SOLIHULL: L. G. Boswell, G4AEJ, 170 Kestral Avenue, Yardley, Birmingham, B25-8QX.
SOUTH BIRMINGHAM: R. J. Thompson, 23 Fox Hill, Selly Oak, Birmingham, B29-4AG. (021-477 0533).
SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.
SPALDING: R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs.
STAR: T. Leeman, G4BUU, 115 Asket Drive, Seacroft, Leeds, LS14-1HX.
STEVENAGE: C. P. Barber, G4BGP, 473 Canterbury Way, Stevenage, Herts., SG1 4EQ.
SUNDERLAND: P. Barker, 15 Buttermere Street, Grangetown, Sunderland SR2-9NJ.
VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford (25633), Herts., WD2-5JQ.
WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton, WV3-7LX.
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

discuss 144 MHz portable working, and doubtless some mention of the VHF transceivers he has evolved to cope with the requirement.

The Hull approach to publicity, by way of a large print of posters is of interest; the poster has all the essential details at the top, and then there is room lower down for the Secretary to type in the current month's programme, thus ensuring that his posters are always kept up to date. From one such we see a visit to the Laser Laboratory at Hull University on October 4, a Club open night on the 11th to which *everyone* is invited, to see members in action, then on October 18, instrumentation will be available for you to bring along receivers and compare them; finally on October 25, G8GLM will be talking about VHF and FM in the Amateur Radio context.

The Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motherwell is where the Mid-Lanarks Amateur Radio Society meets fortnightly on Fridays, next being October 11 and 25th (when GM8BBA will be showing some professional test gear). Subjects for future talks include SS/TV and getting going on three centimetres. The Club also runs an R.A.E. class on Wednesday evenings and on alternate Fridays they have the Club's FT-250 on the air—and for the satisfaction of the inner man, they put on what they call the Coffee Shop.

Midland Clip

It appears to be the first Thursday in the month for the Cheltenham RSGB group, at the Royal Crescent Hotel, Clarence Street, with the start timed for 8.00. However, at the time of writing we do not appear to have any details on the activity for that night.

One lecturer who is being given somewhat of a hammering by Midland programme compilers this month is G2RQ. His first engagement for the month to be mentioned in this piece is the talk he is giving to Solihull on October 8, an *extra* meeting, be it noted, over the usual ration. His subject will be the measurement of "Time and Frequency." The normal October event is down for October 15, again at Hq., and is the vital AGM. Hq., it should be noted, is at the Manor House, High Street, Solihull.

Our very next report, from South Birmingham, gives it that G2RQ is to give an "Historical Survey of the Measurement of Time and Frequency" to their chaps on October 2, at Hampstead House, Fairfax Road, West Heath. The hon. secretary apologises for the fact that although there is almost always something fixed up, it seldom is finalised until too late for publicity purpose, which may give the impression to his "potential" members among readers of the *Magazine* of an apathetic and/or dozing group. Not so, he says, and goes on to adduce adequate evidence to show them how active and expanding the club really is. Good!

One of these chaps who disagrees with "Club Secretary" about geography is the scribe writing in from Derby, who proved to your conductor that, since he was last in the vicinity, many many years ago, the city has slipped from its old place and ended up fifty miles to the south—must be these new-fangled motor cars! However, the main thing to record is the activity going on at 119 Green Lane, Derby, which is better-known maybe as Derby & District College of Art. October 2 is a Surplus Sale, followed by a Cheese-and-Wine party on the 9th and G3VGW on "Understanding SSB" on the 16th. A Film Show is down for October 23, and on the 30th they will be spending an evening getting ready for the Leicester Exhibition, to which members always give strong support.

At Spalding the venue is at the "Ship Albion" and the date appears to be set for the first Friday in the month, which would make it October 4; we do not, at the time of writing, have a copy of the *Newsletter* to hand, which would no doubt "fill us in"—sad to say it has been delayed in the printing.

Another Club to lean on G2RQ this time is Midland; on October 22, they have the AGM, and G2RQ will follow this up by a short talk on the life of Marconi, whom he actually knew. Their base is in the Birmingham & Midland Institute, Margaret Street.

For Wolverhampton the main event will be the Annual General Meeting, taken at Hq. on October 7. They can be located at Neachells Cottage, Stockwell End, on any Monday evening, save for Bank Holidays and the occasional evening outing. Our details as to programme unfortunately end at October 7, but one would assume from what is past that they would have something in the way of talk, film show, Junk Sale, or whatever on most evenings.

Melton Mowbray had their AGM on September 20, their meeting place being the St. John Ambulance Hall, Asfordby Hill. No doubt we shall have their forward programme in time for the next issue.

Westerlies

Our first port of call must be to GI-land, and in particular to the City of Belfast YMCA group. While their Club QTH is undergoing a complete rebuild, they have found a temporary home at Brunswick House, 7 Brunswick Street, where they will be foregathering every

MCC—THE TWENTY-NINTH TOP BAND CLUB TRANSMITTING CONTEST RULES

- Object:** Clubs to work one another and also geographical counties, U.K. and Eire.
- Dates:** Saturday-Sunday, November 16-17, 1700-2100z (eight hours in all).
- Band, Power and Mode:** Top Band, ten watts, CW only.
- Callsigns and Identification:** Clubs to use their own c/s (or that of a nominated member) and identify themselves as a Club, e.g., "G3ASR Clb", in all contacts. Counties may be indicated by abbreviations, e.g., "HMB" for Humberside, "WMid" for West Midlands, etc.
- Scoring:** Count 3 points for each Club worked once in each session. Score double points for contacts between Clubs G/EI, G/GC, G/GD, G/GI, G/GM, G/GW. Similarly, Clubs in EI, GC, GD, GI, GM and GW take double points for Club contacts between these prefixes. Take 2 points for each different county worked, but for once only over both sessions. Hence, Leicester Club would give five points to a G/Club in another English county worked once, and would take 6 + 2 for working a GM/Club once, or 12 + 2 if that Club was worked during both sessions. Non-Club stations make one point, score for their county multiplier and may be worked once each session. EU contact also count one point only.
- Multiplier:** Is the total number of different U.K./Eire geographical counties worked once each only. EU countries score once as additional multiplier.
- Logs:** To be legibly set out on one side only of quarto or foolscap sheets, with Club callsign used and name on each sheet, under the following heads: (A) Date: (B) Time: (C) Station worked: (D) RST given: (E) RST received: (F) QTH/Name Club worked; enter "non-C" for non-Club: (G) QTH non-Club: (H) County, or EU country: (I) Points claimed for QSO: (J) Tick opposite each QSO claimed for multiplier credit. At foot each page, total points claimed for that page. Column headings may, if desired, be (A), (B), (C), etc. as given above. Logs set out in any other form will not be accepted.
- Disqualification:** This will be at the discretion of the invigilators and could include a consistently bad note (rough or chirpy), signs of deliberate interference, use of excessive power, or over-driving a transceiver resulting in strong key-clicks or a spread of spurs.
- Contest Call:** Use "CQ MCC" only when calling up. Shortened callsigns used in course of QSO will disqualify.
- Final Tabulation:** The last log sheet to show the total of QSO points claimed, figure taken for Multiplier, and resulting grand total, e.g., 2384 points times 10 counties equals 23,840 points claimed. Give also details of equipment used, dimensions of aerial and callsigns of operators. Include a general statement on the Contest itself—experiences, comments, criticisms or suggestions.
- Entries:** Addressed "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ, must be posted to arrive not later than Monday, December 9. Results in full will appear in the February, 1975 issue of SHORT WAVE MAGAZINE, due out on January 31. The Editor's decision is final on all matter affecting the Contest.

Saturday afternoon at 2.30 by the time this is in print, and it is understood that the aerial farm covering 3.5 MHz to 144 MHz will also be erected by then, so they can put G16YM, the Club call, on the air again.

A change of venue is to be noted for the Cornish main meeting this month, to be, for this time only, the Cornwall Technical College, Pool, on October 3; G3XFL will discuss the ins-and-outs of QRA Locators. There is also a VHF group of the Club and an offshoot for West Cornwall who have a place at the Guildhall, Penzance.

For Plymouth we have no recent details, but we are told in the issue of the *Newsletter* to hand that they foregather on the first and third Tuesdays in each month, at the club Hq. in Virginia House Settlement—this venue is at the rear of the Breton Arms in Buckwell Street, near the St. Andrews roundabout.

The Hereford group keeps going strongly, producing a very readable newsletter for circulation to members. They run various activity tables, HF and VHF, which appear to be well supported by their membership, and also have a few paragraphs of members' news. Next meetings are on October 4 and 18th, the latter being a tape-and-slide lecture by Dud Charman, G6CJ, on his special subject of "Aerials"—and anything that G6CJ has to say about antennae is worth the closest attention.

The 'Home-'less

Into which category come all those groups who do not admit to any strictly local territorial connection.

Perhaps one of the most important of these is B.A.T.C., catering as it does for the interests of those radio amateurs who have an interest in the amateur transmission and reception of TV signals. They have a Convention each year, and a very good newsletter/magazine, containing technical articles of interest in the amateur TV context; and they are able to help in some areas with the acquisition of the specialised parts required for this field of activity.

A.R.M.S. is another such group, organised in the interest of the mobile radio amateur and SWL. Again, it is largely done through their *Mobile News*, which in this case is put out eight times a year. In addition, A.R.M.S. maintains a service of assistance to members in the taming of the QRM generated by their cars, an international relations adviser, and of course various operating awards.

For Next Time

Again we come to the end of the clip for this month. For next, the deadline is very tight indeed—sorry!—at October 3, latest, addressed as usual to "Club Secretary," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18-1RQ.



It will be 50 years on October 19 since Cecil Goyder, British 2SZ of Mill Hill School, London, worked New Zealand 4AA on a wavelength, as it would have been said then, of about 95 metres. This was not only one of the great landmarks of Amateur Radio but at the time aroused the greatest scientific interest and curiosity, being entirely contrary to the theories then held about radio-wave propagation. This memorial was designed and built by the Otago branch of the New Zealand Association of Radio Transmitters. Happily, the original participants in this great exploit—Frank Bell, ZL4AS and Cecil Goyder, living in retirement in Princeton, N.J.—are still with us.

NEW QTH's

This space is for the publication of the addresses of holders of new call signs, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section.

EI6CR, D. Doyle, College Street, Ballyshannon, Co. Donegal, Eire. (Tel: *Bundoran 65594.*)
 GM4COK, G. O. Szymanski, 7 Goldenacre Terrace, Edinburgh, Midlothian, EH3 5QP.
 G4CVL, I. T. Kirby, Gables, 244 Staines Road, Twickenham, TW2 5AR. (Tel: *01-894 3961.*)
 GI4CWZ, D. J. Lee (ex-GI8HIE), 33 Melrose Street, Belfast, BT9 7DL, Northern Ireland.
 GI4CYJ, G. Skeats. (ex-GI8IDM), 30 Melrose Street, Belfast, BT9 7DL, Northern Ireland.
 G4CZU, P. A. Hasler (ex-G8HZR), 30 Fletcher Road, Whitstable, Kent, CT5 3HB.
 G4DAF, G. Walker, 23 Richland Avenue, Coulsdon, Surrey, CR3 2QU. (Tel: *01-660 8085.*)
 G4DER, R. A. Parker, 21 Lundy Drive, Hayes, Middlesex, UB3 4ES.
 G4DET, R. E. Barrow, 22 Greenland Avenue, Leicester, LE5 1AA.
 G4DEW, J. J. Males (ex-G8HAC), 12 Wantage Close, Overstone Road, Moulton, Northampton, NN3 1UY.
 G4DGB, T. Crute, 85 Meadowbank Road, Fareham, Hants. (Tel: *Titchfield 42010.*)
 GM4DGE, F. R. Leslie, Windyridge, Kilbarchan Road, Bridge of Weir (2143), Renfrewshire, PA11 3EZ.
 GM4DGH, R. G. Card (ex-GM8HKR), 4 Hill Street, Tillicoultry, Clackmannanshire.
 G4DGM, J. G. Meddings (ex-G8DYY), 106 Goldthorn Hill, Wolverhampton, West Midlands, WV2 3HU.
 G4DGP, R. J. Campbell (ZL3FM), c/o S. Isles, 29 River Bank, Winchmore Hill, London, N.21.
 G4DHA, I. Forse (ex-G8HOX), Penlan, St. Stephens, Saltash, Cornwall.
 G4DHC, H. M. Smye, Windle Marsh, Manorial Road, Parkgate, Wirral, Cheshire, L64 6QW.
 G4DHG, R. J. Allen (ex-G8HTI), 5 Partridge Terrace, Wingate (425), Co. Durham, TS28 5BD.
 GM4DHH, J. M. Stewart, 8 Somerled Avenue, Paisley, Renfrewshire, PA3 4J1. (Tel: *041-889 9010.*)
 G4DHM, E. H. Cousins (ex-G8HPI), Holmforth, Hallfield Gate, Shirland, Derbys., DE5 6AG.
 G4DII, A. A. Excell (ex-G8EGX), 1 Fir Tree Close, Staplehurst, Kent, TN12 0AT. (Tel: *0580 891000.*)
 G4DIO, B. Waddell (ex-G8GLH), 10 Robin Grove, Wolverhampton, Staffs.

G4DJB, P. J. Roberts (ex-G8GJB), 269 Uxbridge Road, Hampton Hill, Middlesex.
 G8GXP, D. P. Storrs, 58 Hendl Lane, Kettlethorpe, Nr. Wakefield, Yorkshire, WF2 7NY.
 G8HIM, A. G. Falla, 3 Goldswong Terrace, Nottingham.
 G8IRJ, G. D. Martin, 38 Underhill Road, Upper Beeding, Steyning, Sussex, BN4 3JG.
 G8ISM, P. R. Goldsmith, 60 Hartnup Street, Maidstone, Kent.
 G8ITQ, E. A. M. Minton, 17 Owen Avenue, Long Eaton (3642), Nottingham, NG10 2FR.
 G8IXR, E. E. Cohen, 37 Rosslyn Avenue, Chingford, London, E.4. (Tel: *01-529 1893.*)
 G8IYA, C. Lorek, 93 Malvern Avenue, Frenchwood, Preston, Lancs., PR1 4PL. (Tel: *0772 25108.*)
 G8IZI, R. H. Benstead, 314 Eccleshall Road, Stafford, Staffs.
 G8JAH, K. Lewis, 9 Clarence Court, Rushden (4797), Northants., NN10 9HN.
 G8JAJ, G. J. George, 4 Bushcombe Close, Woodmancote, Cheltenham, Glos.
 G8JAZ, N. A. Marshall, 122 Goodenough Way, Old Coulsdon, Surrey, CR3 1DZ. (Tel: *Downland 51397.*)
 GM8JCR, R. A. Pontin, 24 Elm Lane, Perth (26657), PH1 1EL.
 G8JFQ, C. J. W. Peakin, Greenacres Meadow View, East Coker, Yeovil, Somerset, BA22 9LH. (Tel: *093-586 2818.*)
 G8JFS, C. A. McNeill, 40 Turnpike Road, Newbury, Berks., RG13 3AS.
 G8JGK, C. W. Baker, 65 Crompton Street, Chelmsford, Essex, CM1 3BW.

CHANGES OF ADDRESS

EI2BB, J. R. Bartlett, Deans Grange, Black Rock, Co. Dublin Eire.
 G3FN, Dr. A. H. B. Cross (ex-9G1DL), 48 Summerfield Road, Dronfield, Sheffield, S18 6GZ.
 G3HMO, J. M. Osborne, M.A., F.Inst.P., 141 Chadwick Road, London, SE15 4PY. (Tel: *01-639 5147.*)
 G3JFF, M. J. Matthews, 32 Briar Close, Portsmouth, Hants., PO8 9ED.
 GM3JFG, Rev. Canon I. W. T. D. McHardy, 1 Dean's Road, Fortrose, Ross-shire.
 G3OAZ, J. Randall (ex-DL2VM/5A4TZ/DL2BC), 243 Paddock Road, Basingstoke (65126), Hants.
 GM3ODM, W. McCrossan, 15 Muirdykes Avenue, Port Glasgow, Renfrewshire, PA14 5XY.

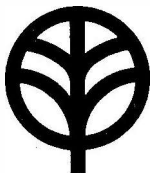
G3OHU, E. W. Dyer, 23 Asquith Avenue, Thundersley, Essex. (Tel. *Rayleigh 770018.*)
 GM3OOK, J. Plenderleith, 11 Broomlands Place, Irvine (71563), Ayrshire, KA12 0DU.
 G3TOW, A. D. Hirst (ex-GW3TOW), The Roosters, Herons Court, Parkgate, Wirral, Cheshire. (Tel: *051-336 4649.*)
 G3TPI, E. M. Wager, 29 York Road, Loughborough, Leics.
 G3VQC, D. R. Thomson (G6AEG/T), Rosegarth, Clerkenleap, Worcester (820374), Worcs.
 G3VGG, J. K. Harvey, o/b/o Bromsgrove & District Amateur Radio Society, 22 Elm Grove, Bromsgrove, Worcester, B61 0EH.
 G3WNC, R. K. Todd, 51 Blake Road, West Bridgford, Nottingham.
 GM3ZDH, R. A. Dixon, 34 North Murchison Street, Wick, Caithness.
 G3ZDJ, R. G. Judge, 22 Church Lane, Eaton Bray, Dunstable, Beds., LU6 2DJ.
 G3ZVD, W. K. Allen, 17 Aireton Close, Wickersley, Rotherham, Yorkshire, S66 0HP. (Tel. *070-984 3619.*)
 G4LJ, G. D. Brewer, D.Sc., 28 Hillcrest, Downham Market, Norfolk.
 GM4ABO, A. Stewart, 1A Waverley Court, Foxbar, Paisley, Strathclyde, PA2 0DR.
 G4ADT, A. Tibbett, 4 West Park View, Knaresborough (2486), Yorkshire.
 G4AEL, G. V. Prater, Weston, Basingstoke Road, Spencers Wood, Reading, Berks., RG7 1AA.
 G4AMF, J. Creswell, 16 Haddon Way, Aston, Sheffield (873221), South Yorkshire.
 G4AWL, C. R. de Combe, 27 Old Manor Way, Cosham, Hants.
 G4CDV, P. G. Harper-Roberts, 117 Chadacre Road, Stoneleigh, Epsom, Surrey. (Tel: *393 5673.*)
 GW4CWQ, D. R. J. Phillips, 127 Newton Road, Newton, Swansea, Glam.
 G5BY, H. L. O'Heffernan, c/o Woodend, Coombe Meadows, Chillington, Kingsbridge, South Devon.
 GI5DX, E. J. G. Tucker (ex-2AVQ), Greenleaning, Rockport Road, Craigavad, Holywood, Co. Down, BT18 0DE, Northern Ireland.
 GW8BPG, B. E. Viney, 10 Heol Merion, Barmouth, Gwynedd, LL42 1LA.
 G8DTS, B. Norcliffe, 7A Arrow Park Road, Upton, Wirral, Merseyside, L49 0UB.
 G8EUD, K. Fidler, 4 St. Catherines Court, Clarence Road, Windsor, Berks.
 G8FMT, P. L. E. March, Devon Holme, 2 Bedford Road, Holwell, Herts., SG5 3RX. (Tel: *Henlow Camp 350.*)
 G8GQY, D. Crompton, Hilltop, 131 North Road, Carnforth, Lancs.
 GM8HXM, R. Brown, 26 Northfield Gardens, Prestonpans, East Lothian, EH32 9LG.
 G8INQ, D. J. Spridgeon, 76 Church Street, Whittlesey, Peterborough.
 G8IUO, C. E. Wilson, 15 Barnsdale Road, Allerton Dywater, Castleford, Yorkshire.

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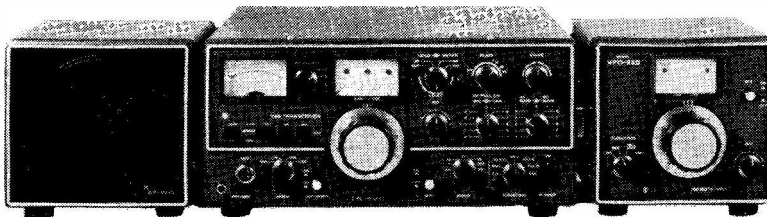
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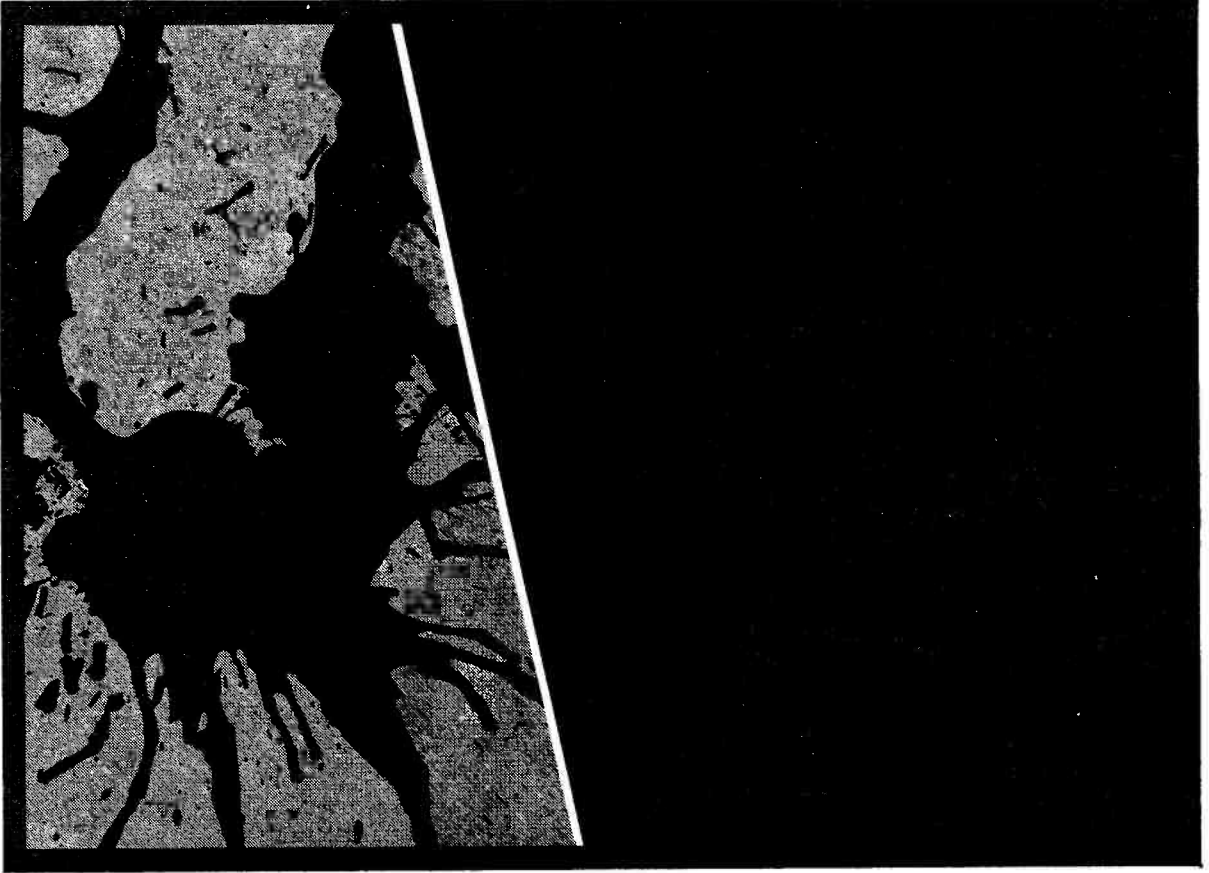
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SALE: AM.25B Vanguard with all controls, cabling etc., Tx working on two metres, Rx needs attention, complete with Tx/Rx crystals for 145.5 MHz, £18. Home-built 16 MHz VFO, well buffered. for Vanguard Rx, in case, £3. New HC6-U crystal. 38.66667 MHz, £2. Transceiver, primary 240v., output 1250.0-1250v. at 250 mA, £5. J-Beam halo, £1. — Thomas, GW4BCD, 13 Northways, Porthcawl, Glam., South Wales.

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WANTED: Morse keys, photographs, good details close-ups of old type GPO Morse keys showing top and bottom. Good price paid. (London).—Box No. 5358, Short Wave Magazine Ltd, 55 Victoria Street, London SW1H-0HF.

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SALE: Europa transverter, with all cables, RF and power terminated for Yaesu FT-2001 and FT-101 type, with aerial change-over relay, spare '6-40 and spare '3-10's, £60. FT-2F, with crystals for 144.48, 144.6 and 145 MHz, manual, mic., battery plug, lead and PL259 plug, £70. Heath RF-1U signal generator with manual, coverage 100 kHz to 200 MHz plus/minus 2% accuracy, £10. Cossor Type 339 double-beam 'scope, working but needs attention, with manual, £6.—Newman, GW4BCF, 138 Newton Nottage Road, Porthcawl, Glam. CF36 5EE. (Tel: Porthcawl 5173 after 6 pm.)

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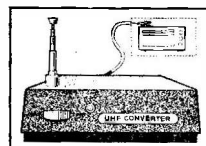
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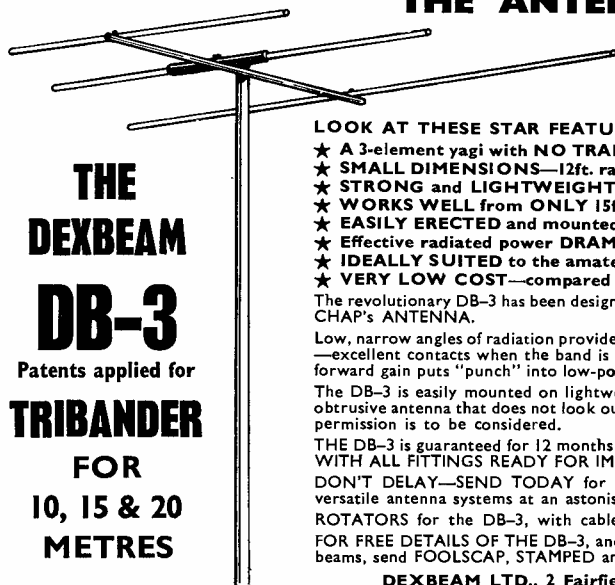
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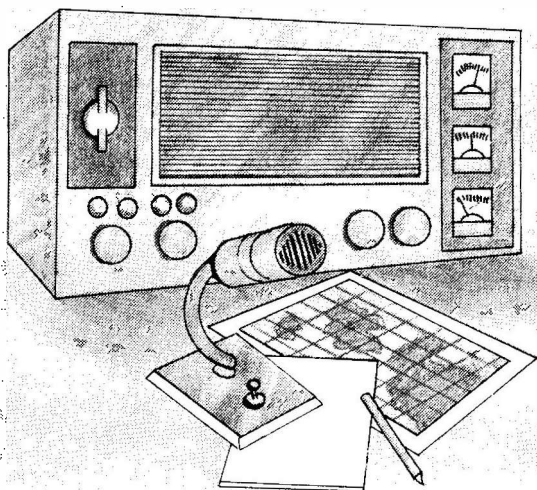
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