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*The*  
**SHORT WAVE**  
*Magazine*

VOL. XXIX

DECEMBER, 1971

NUMBER 10



**WORLD WIDE COMMUNICATION**

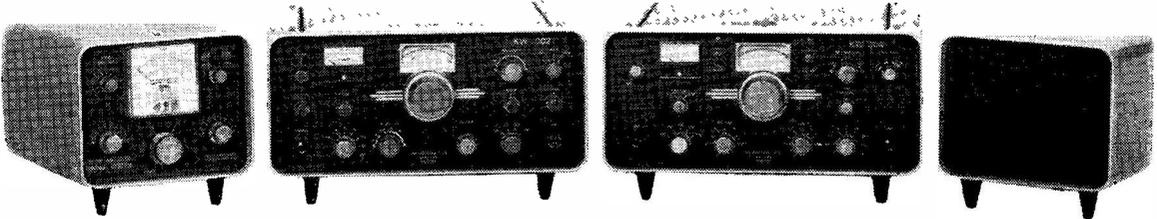


# World-wide leading manufacturer for the Radio Amateur

Long established to give you reliable service  
EXPERT FREE ADVICE DIRECT FROM THE MANUFACTURER

All Equipment Available  
through accredited agents

## An impressive new 'G'-line Series from KW — ex-stock



**KW 107 ANTENNA**  
Tuning SYSTEM

**KW 202 RECEIVER**, 10-160 metres  
SSB/AM/CW, with Mechanical  
Filter, built-in 'Q' Multiplier (Peak &  
Null), 500 kHz VFO covering all Bands.

**KW 204 TRANSMITTER**. 10-160  
metres SSB/AM/CW. Successor to  
the famous KW "Vespa"—Perfectly  
matches the KW202 Receiver and is

**KW 202  
SPEAKER**

Two Speed VFO Drive. Excellent Sig./Noise and sensitivity performance. Very attractive (similar in appearance to KW2000B). 100 kHz Crystal Calibrator price £140 carriage extra.

similar in appearance. 180 watts p.e.p. from trustworthy 6146's. Built-in Power Supply. Provides "side tone" CW monitoring. A beautiful compact efficient unit. Price £142 carriage extra.

### 2 Great Transceivers DELIVERY IMMEDIATELY, FROM STOCK

**KW2000B** 10-160 metres SSB  
TRANSCIVER: 180 watts PEP  
10-160 metres, complete with  
A.C. p.s.u., VOX P.T.T., I.R.T./  
I.T.T.

**£240** carriage extra.

- Two-speed VFO drive
- Improved VFO Read-out
- New, precise metering
- Attractive panel layout
- D.C. p.s.u. for mobile
- Break-in CW.

**KW ATLANTA** 10-80 metres.

**£200** carriage extra

KW Atlanta and A.C. p.s.u.

- Extremely good audio (crystal filters fitted)
- 500 watt PEP SSB Transceiver
- Operation on all amateur bands from 10 to 80 metres
- A.N.L. and A.L.C.
- 100 kHz Crystal Calibrator
- Two speed VFO drive
- Built-in speaker.

Both transceivers available with remote VFO unit

Matching **KW1000 LINEAR AMPLIFIER** for KW 204 and KW 2000B—also available. 1200 watt pep max. Pair T160L/572B tubes including 2.5kv Power Unit built-in to KW2000B style cabinet £135 carriage extra.

**KW 101** Standing-Wave-Ratio meter, £9-25.  
**KW 103** SWR/Power meter 0-100 & 0-1000 watts £12-50\*. **KW 103** with Dummy Load and Coax Lead, £20-50\*. **KW 105** Antenna Tuning System including E-Z Match, SWR Ind., Dummy Load, Antenna Switch, 5 position, £36-00\*. Also KW Trap Dipole with twin feeder and 4 other types (only the original Trap from KW is good enough for you). KW E-Z Match ATV, KW Low Pass Filters, KW & HZP Baluns, etc.

**KW for HY-GAIN, MOSLEY, G-WHIP, POLYQUAD, WEBSTER, HUSTLER ANTENNAS. SHURE Microphones, CDR Rotators. VIBROPLEX Keys, etc.**

We also offer a range of "Trade-in" equipment—Checked through our Service Department.

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**K. W. ELECTRONICS LIMITED:** 1 HEATH STREET, DARTFORD, KENT  
Tel.: Dartford 25574 Cables: Kaydublew Dartford

EASY TERMS ON EQUIPMENT AVAILABLE OVER 12, 18 OR 24 MONTHS

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119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE.

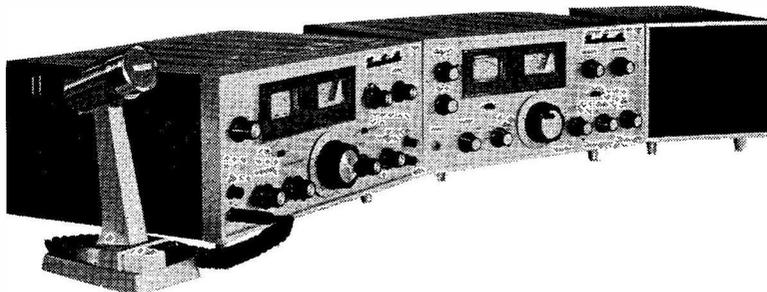
Matlock 2817 (2430 evenings) Bill G3UBO Alan G3MME

AGENTS (evenings and weekends only)

John 16 Harvard Road, Ringmer, Lewes, Sussex.  
G3JYG Ringmer 8071

Sim 19 Ellismuir Road, Baillieston, Nr. Glasgow.  
GM3SAN 041-771 0364

## A VERY MERRY CHRISTMAS TO YOU ALL



We are authorised distributors for Yaesu Musen equipment in the U.K. and stock the following :-

FRdx400 (illustrated) ...	£160	FLdx400 (illustrated) ...	£140
FL-2000B linear ...	£130	FTdx560 transceiver ...	£195
FTdx401 transceiver ...	£215	FT-200 transceiver (less p.s.u.)	£132
FT-101 transceiver ...	£230	FP-200 p.s.u. ...	£32
FT-2F transceiver ...	£80	Matching external VFO's	
Matching speakers ...	£10	for HF transceivers ...	£35
YD846 hand mike ...	£5	YD844 table mike ...	£10

We guarantee new Yaesu equipment purchased from us for a period of 12 months both labour and materials, but excluding valves and semi-conductors.

We deliver FREE via Securicor usually within 24 hours, but guaranteed to any part of the country within 48 hours. It is also nice to know that they handle your gear GENTLY.

### FRdx400 Super de luxe Receiver—£160

We supply these with all crystals top band to 2m. including WWV, CB and the whole of 10m. We supply them with no less than four TRUE mechanical filters (not ceramic transducers) CW, SSB, AM and FM.

We supply them with an FM discriminator. We supply them with two VHF converters for 2m. and 6m. Not that anyone goes wild over 6m., but it's easy enough to convert to 4m. and we supply full instructions. While on the subject of receivers, I wonder if it's generally known that at £75 the Inoue IC-700R is unbeatable. All solid state, 240v. A.C. or 12v. D.C., FET's widely used, 9 MHz IF with a top quality SSB crystal filter, audio-derived hang AGC, 80 to 10m. xtal controlled carrier oscillator. Any SSB signal heard on an expensive Rx you'll hear on the IC-700R. Today's crowded band conditions demand a high quality Rx, so either go for the FRdx400 if you want the best, or the IC-700R if you can't afford the best but still want top SSB performance.

### Other New Stuff

Inoue IC-20 2m. mobile FM transceiver. This and the Yaesu FT-2F are becoming more and more popular for mobile and fixed station, £80.

Other new stuff included the YD846 hand mike at £5, YD844 table mike at £10, keys £1, keyers £8-20, low impedance padded headsets £2-50 without plug, £2-60 with stereo plug, 12 hr. digital clocks £5-80, crystal filters KVG XF-9A, B, C, D and M, Kokusai IOAZ, Asahi dual meter SWR meters £6-80, 2m.  $\frac{3}{8}$  vertical whips £4-25.

### Power Meter/Dummy Loads

A decent power meter usually costs a bomb—one that is constant impedance over its range costs even more, and as for one extending to VHF—you could spend two or three hundred quid. We have imported a top quality Japanese product which we can retail direct at a ridiculous price. Look at these specs :-

Model 50 : Switchable full scale 20 or 120 watts. 50 ohms, V.S.W.R. better than 1 : 1.2, 3 to 500 MHz, £32.

Model 75 : Switchable full scale 20 or 120 watts. 75 ohms, V.S.W.R. better than 1 : 1.2, 3 to 150 MHz, £30.

### Special

Power supplies switchable 3, 6, 9 and 12v. D.C. fully smoothed and regulated to 500 mA, £3-50.

ALL PRICES POST FREE.

### Second-hand Gear

Trio 9R59D ...	£35	Cossor Ganging Oscillator	£3
AR88D, several ...	£30-£45	Trio 9R59DS ...	£37-50
Drake R4A ...	£160	AR88LF ...	£30
Codar ATS and 250/S mint	£20	Drake TR4 and p.s.u. mint	£225
Marconi CR150 ...	£16-50	Vanguard, late model ...	£20
Anglian 1000 ...	£160	KW1000 linear, mint ...	£90
Heathkit Q multiplier ...	£5	Heathkit RX1 ...	£25
Sommerkamp FR-100B ...	£70	Hammarlund HQ170A ...	£70
Sommerkamp FR-500 ...	£100	Somerkamp FL-200 ...	£80
KW2000 and p.s.u. ...	£120	Sommerkamp FL-500 ...	£110
Paros transceiver and p.s.u.	£80	LG300 + mod. and p.s.u. ...	£20
Jones ME-82/U wattmeter	£15	Siemens receiver ...	£45
Venner Digital Timer TSA 6614 ...	£30	Sansei D.V.M.'s brand new, list £120 our price ...	£65
Marconi TF1152 R.F. power meter ...	£20	M.L. Transistor Analyser ...	£35
Tester, Telegraph Distortion and Margin Portable No. 1 ...	£2	Bird ME-11/U wattmeter ...	£15
BC221, several from	£10-£20	CT212 sig. gens. (85 kHz to 32 MHz AM/FM) ...	£25
U.S. Signal Corps TS-39/TSM-1 osc. ...	£8	Rohde & Schwarz noise generator ...	£65
		Hickok scope with 5 $\frac{1}{2}$ MHz dual trace plug-in ...	£175

Carriage extra on the above by Securicor, usually 24 hours, £1-75.

### Service

In order to give an even better deal to our customers, we have appointed the following part-time (evenings and weekends) Regional Service Representatives :

Dave Dryden, G3BKQ 205 Main Street, Thornton, Leics.  
Alan Bartlett, GW3YSA 35 Pen-y-Waun, Efail Isaf, Nr. Pontypridd, Glam.  
Peter Ward, G3XWX 47 Radstock Avenue, Ward End, Birmingham B36 8HD.

Naturally, if you can get your gear to Matlock we would be delighted to see you and of course our Northern and Southern Agents, Sim and John are very adept at fixing gear in a hurry, but possibly there is an authorised Regional Service Rep. nearer to you who can sort out your problems in double-quick time. In which case, it may pay you to take your gear to him for prompt attention at low cost.

Hours : Tuesday to Saturday 9-5.30 (closed for lunch 1-2 and all day Monday).

73 de Bill and Alan

**CLOSED, XMAS WEEK!**

## TELECOMMS G3SED ELECTRONIC COMPONENTS

### MORSE KEYS

New ex-govt. morse keys with fully adjustable contact spacing and spring tension, complete with jack plug and lead.  
(P. & P. 15p) 65p

### SPECIAL OFFER SINGLE SIDED PRINTED CIRCUIT BOARD

S.R.B.P. Copper laminate board size 12" by 12" (P. & P. 8p) 20p  
Fibre glass Copper laminate board 12" by 12" (P. & P. 8p) 30p

### NEW BOXED SIFAM METERS (Special Price)

Type M25 0-250v. 2½" sq. ... (P. & P. 12p) £1-50  
Type M312 0-500v. 3½" sq. ... (P. & P. 12p) £1-20  
Type M303 0-300 m/A 3½" sq. ... (P. & P. 12p) £1-20  
Type M303 0-250 m/A 3½" sq. ... (P. & P. 12p) £1-20  
Type M303 0-50 m/A 3½" sq. ... (P. & P. 12p) £1-20

### NEW AEI TRANSFORMERS (Standard mains primary)

Type 1 0-310v. at 180 m/A., 170v. at 30 m/A., 6-3v. at 3-2A.  
(P. & P. 25p) 75p

Type 2 0-320v. at 60 m/A., 10-5-0-10-5v. at 3A., 6-3v. at 1A.  
(P. & P. 25p) 75p

Type 3 370-0-370v. at 80m/A., 3-15-0-3-15v. at 3A., 6-3v. at 1A.  
(P. & P. 25p) 95p

Type 6 WODEN : 0-20-22-5-25-27-5-30-32-5v. at 15A. 200v. at 50 m/A., 5v. at 2A., 6-3v. at 1A. ... (P. & P. 60p) £4-00

DUBLIER Nitrogen capacitors (Block paper) 8 mfd. at 800v. ... 45p

### WE ARE SOUTHERN STOCKISTS OF TRIO HI-FI AND TRIO COMMUNICATIONS EQUIPMENT

#### NEW AEI EQUIPMENT CABINETS

Size 16" by 10" with recess for front panel. A professional cabinet for a professional finish. Usually cost over £5 each!

OUR PRICE ... (P. & P. 50p) £2-20

CT54 VALVE VOLTMETERS. Measures A.C. volts up to 200 MHz. D.C./A.C. ranges : 2-4v., 4-8v., 24v., 48v., 240v., 480v.

Resistance ranges : 1K, 10K, 100K, 1M, 10M. Each unit has been individually re-calibrated and tested. Unit supplied with battery case, less batteries at ... (p. & P. 60p) £8-00

High impedance adaptor for above ... £2-50

### WRITE NOW FOR OUR LATEST COMPONENTS LISTS

For the caller we have a comprehensive range of components at competitive prices.

Shop Hours : Mon. to Sat. 10 a.m.-7 p.m. Half day closing Thursday.  
Terms : Cash with Order. Tel. : PORTSMOUTH (0705) 60036

73's From 73 TWYFORD AVENUE  
STAMSHAW, PORTSMOUTH, HANTS.

## G3EKX S.S.B. PRODUCTS G3EKX

SECOND HAND RX's/TX's  
IN STOCK—FOR SALE—NOVEMBER/DECEMBER.

### HALLICRAFTERS SX100 RX.

Most excellent condition.

CANADIAN '52' Set XTAL calibrator:—mains 1/p.

### HEATHKIT RAI RX.

With Manual/Speaker. New meter.

### VICEROY Mk. 2 S.S.B. TX.

Good condition. 80-10m. with pack.

### AJAX INTERNATIONAL Transistor/Mains.

108-146mc/s. 160-80m. M.V. F.M. Band. 1 month old.

### EX-RAF 1475

2-20 Mc/s. complete with Power Unit.  
£12 to clear (£2).

### MARCONI V.T.V.M.

As new (3 left)  
£5 each to clear (£1).

### CLASS "D" WAVEMETERS (EX-GOVT.)

(Each with New Dual Xtals), Manual and Phones.  
£5 each (£1).

WRITE IN FOR DETAILS—PRICES.

S.A.E. FOR REPLY BY RETURN!

PART EXCHANGES WELCOME

PYRAMID LINEAR KITS. 800W 1/P. 80-10M. Powered internally. SPECIAL !! £50 (less valves). Almost any colour T.V. L/O/P valves (4) will do. Carriage £2.

STILL THOUSANDS OF XTALS AT 50p. EA. (NEW)  
+ SAE. PLEASE

7 LITTLE CASTLE STREET, TRURO  
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## EHELDFORD COMMUNICATIONS

32, FELTHAM HILL ROAD,  
ASHFORD, MIDDLESEX.  
Ashford (London Code 69) 55265

and our new shop  
II, THE BROADWAY,  
KINGSTON ROAD,  
STAINES, MIDDLESEX.

We are due to open another, larger, shop about December 1, where amateur equipment can be better displayed. Our Ashford shop will be remaining open—but exact times may vary during the month. However our new shop will be open :—

Monday—Saturday 9.00—6.00 p.m.  
half-day closing Thursday

Mail order enquiries should be made to our Ashford shop for the time being.

S.A.E. will bring our Winter 1971/2 list.

Lastly, both I, Alan G. Wheeler, G3RHF and Maurice Stansfield (Shop Manager), G8DNM wish all our old customers and many friends  
A Merry Christmas and a  
Happy New Year

MULLARD BFW 10 F.E.T.'s for Two Metres, 25p each, 5 for £1.  
S.G.S. NPN 600 MHZ TRANSISTORS type BF 160 at 7½p each.  
TRANSISTOR DISC CERAMICS. 1-8pf 50v.w., 3-3pf 50v.w., 4-7pf 50v.w., 10pf 50v.w., 100uf 100v.w., .01uf 18v.w., .022uf 18v.w., .047uf 12v.w., .1uf 18v.w., .1uf 20v.w., 2.2uf 3v.w. All at 10 for 15p.

STUD MOUNTING SILICON RECTIFIERS. 100 P.I.V. 10 amps at 12½p each, 200 P.I.V. 10 amps at 15p, 400 P.I.V. 10 amps at 20p, 800 P.I.V. 10 amps at 25p, 1200 P.I.V. 10 amps at 30p.

SUB-MINIATURE ARDENTE SWITCH 2 pole 5 way 2 bank at 22½p each, 3 for 60p.

GENERAL PURPOSE P CHANNEL M.O.S. F.E.T. 10p each with application sheet.

GUNN DIODES X Band type at £1-50 or J. Band type at £1-50.

X Band Wave Guide Crystal Holders at £1 each.  
Surplus X Band Schottky Barrier Diodes at 30p each.

14 LEAD DUAL IN LINE NPN TRANSISTOR PACKAGE containing one Matched Pair plus 3 single Transistors. All 600 MHz untested with circuit 5 for 50p.

100 GERMANIUM DIODES like OA 70 unmarked all good at 50p.

SUB-MIN 5pf Air Spaced Trimmers at 8p each, 3 for 20p.

STC SILICON RECTIFIERS 30 P.I.V. 200 mA type XK 31. 100 for 50p.

### SPECIAL OFFER OF UNTESTED COMMUNICATION

I.C.'s consisting of 1 R.F., 3 I.F., 2 V.O.G.D., 2 A.G.C., 1 Mike Amp, 2 Double Balance Modulators, 1 Mixer. The 12 I.C.'s for £2-75. Separate I.C. at 25p each.

Untested Zero Voltage Switches with circuit 6 for 50p.

SUB-MIN TUNING CONDENSERS 6pf at 10p, 15+15+15+20pf at 30p.

D.C. to 15 MHz Integrated Circuit Amplifiers untested with circuit at 5 for 50p.

### GENERAL PURPOSE SILICON NPN TRANSISTORS

type 2N 706 unmarked 5p each 40p per doz.

1000uf 30v.w. Miniature Tag ended at 15p each.

Tantalums Sub-Miniature .07uf 20v.w., .5uf 25v.w., 47uf 6v.w at 5p each, 50p per doz.

### SPECIAL DOUBLE NPN 300 MHZ TRANSISTORS

with application data for using as Silicon Controlled Switch or Programmable unijunction Transistor, 12p each, 5 for 50p, 12 for 90p.

SUB-MIN 100 P.I.V. 5 amp. Silicon Bridges at 50p each.

J. BIRKETT (Radio Component Suppliers)

25 THE STRAIT, LINCOLN. Telephone: 20767

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London's Amateur Radio  
Stockists

Just around the corner from West Hampstead Underground Station

## R.L. DRAKE'S MAGNIFICENT R-4B RECEIVER

£240.00



Full Range of  
Matching  
Transmitters, Linears  
and  
Ancillary Accessories  
in Stock.

Send S.A.E. for  
Details.

### FEATURES

- **PASSBAND TUNING**
- **AVC WITH FAST ATTACK AND SLOW RELEASE** for SSB or fast release for high speed break-in CW. Also AVC may be switched off.
- **NOISE BLANKER** that works on CW, SSB, and AM and **NOTCH FILTER** are built in.
- **CRYSTAL LATTICE FILTER 1st IF** prevents cross-modulation due to strong adjacent channel signals.
- **PREMIXED INJECTION**—Crystal oscillator and low frequency VFO outputs premixed.
- **RECEIVES SSB, AM, CW, and RTTY** with full RF gain, complete AVC action and accurate S-meter indication.
- **PRODUCT DETECTOR** for SSB/CW—diode detector for AM.
- **EXCELLENT OVERLOAD AND CROSS MODULATION CHARACTERISTICS**; insensitive to operation of nearby transmitters.
- **TRANSCIVE CAPABILITY**; May be used to transceive with the T-4B or T-4XB Transmitters. Illuminated dial indicator shows which VFO is being used.
- **25 kHz CALIBRATOR** embodies sophisticated design, using integrated circuits and FET's, permits working closer to band edges.
- **NEW SCRATCH-PROOF EPOXY PAINT FINISH.**

### SPECIFICATIONS

**Frequency Coverage**: 3.5–4.0 MHz, 7.0–7.5 MHz, 14.0–14.5 MHz, 21.0–21.5 MHz and 28.5–2.90 MHz with crystals supplied. Ten accessory crystal sockets are provided for coverage of any 10 additional 500 kHz ranges between 1.5 and 30 MHz with the exception of 5.0–6.0 MHz.

**Selectivity**: Drake tunable passband filter provides:  
0.4 kHz at 6 dB down and 2.6 kHz at 60 dB down, 1.2 kHz at 6 dB down and 4.8 kHz at 60 dB down.  
2.4 kHz at 6 dB down and 8.2 kHz at 60 dB down, 4.8 kHz at 6 dB down and 25 kHz at 60 dB down.

Selectivity switching is independent of detector and AVC switching  
**I.F. Frequencies**: First I.F., 5645 kHz crystal lattice filter; second I.F., 50 kHz tunable L/C filter.

**Stability**: Less than 100 cycles after warm up. Less than 100 cycles for 10% line voltage change.

**Sensitivity**: Less than 0.25 uv for 10 dB signal plus noise to noise on all amateur bands.

**Modes of Operation**: SSB, CW, AM, RTTY

**Dial Calibration**: Main dial calibrated 0 to 500 kHz and 500 to 1000 kHz in 25 kHz divisions. Vernier dial calibrated 0 to 25 kHz in 1 kHz divisions. **Calibration Accuracy**: Better than 1 kHz when calibrated at nearest 100 kHz point.

**AVC**: Amplified delayed AVC having slow (.75 sec.) or fast (.025 sec.) discharge; less than 100 microsecond charge. AVC can also be switched off. 3 dB change in AF output with 60 dB change in RF input.

**Audio Output**: 1.5 watts max. and .5 watts at AVC threshold.  
**Audio Output Impedance**: 4 ohms and hi impedance for anti-vox.

**Antenna Input**: Nominal 52 ohms.

**Spurious Responses**: Image rejection more than 60 dB. I.F. rejection more than 60 dB on ham ranges. Internal spurious responses in ham ranges less than the equivalent 1 uv signal on the antenna.

**Controls and Jacks**:

**Front**: Main tuning, AF gain, RF gain, AM-SSB/CW with slow AVC, fast AVC, or AVC off, function switch, band switch, xtal switch, passband tuning and selectivity, preselector, and notch.

**Rear**: Antenna jack, speaker jack, mute jack, anti-vox jack, injection jack, accessory power socket, and fuse post.

**Side**: Notch adjust, S-meter zero, VFO-Xtal switch, and headphone jack.

**Power Consumption**: 60 watts. 120/240v. A.C., 50 to 400 cycles.

**Dimensions**: 5½" high, 10½" wide, cabinet depth 11⅝", overall length 12¼", weight 16 lbs.

# RADIO SHACK LTD.

182 BROADHURST GARDENS  
LONDON, NW6 3AY

Just around the corner from West Hampstead Underground Station

Telephone: 01-624 7174 Cables: Radio Shack, London, N.W.6.  
Giro Account No.: 588 7151

# PARTRIDGE EXPORT RANGE

— ALSO BARGAIN CLEARANCE OFFERS TO U.K. MAIL ORDER CUSTOMERS ONLY!

Size: 6" x 2½" x 4¾"  
Wt.: 2 lb.



Finish: (Metal Case)  
Gold stove enamel  
with fascia off white  
on maroon.

ILLUSTRATED: The new "JOYMATCH III" A.T.U. for RECEIVING ONLY tunes the "JOYSTICK" V.F.A. and many other antennae from 500 kHz through 30 MHz plus.

At the time of going to press the new Lo-z 500 should be coming off the production line—PLEASE WRITE FOR DETAILS (see November advert.)  
WHILE STOCK MATERIALS LAST—A SUPER BARGAIN SELECTION—CASH WITH ORDER TO AVOID DISAPPOINTMENT!

1. A TRIPLE PURPOSE L MATCH 6 BAND JOYMATCH A.T.U. in easily assembled KIT FORM.  
On RECEIVE continuous coverage 1.2 MHz to 32 MHz.  
On TRANSMIT handles 300 watts PEP PA input 160 thru 10m. with VFA. Tremendous SIGNAL BOOST when used with solid state radios.  
VERY ATTRACTIVE APPEARANCE.  
Price in kit form with step by step instructions £4-50 (plus 40p). Price ready wired £5-50 (plus 40p). Complete operating instructions.
2. Lo-z JOYMATCH A.T.U.s. (As used by G3DCS), £9-50 (plus 40p).
3. The new JOYSTICK VFA in WHITE STOVE ENAMEL plus a pair of snap-on insulators for external use £8-00 (plus 40p).  
ALSO: ● The new improved "JOYSTICK" V.F.A. in black, and gold stove enamel.  
● Rigid, tough and weatherproof when elements are screwed together in seconds.  
● Weighs 1 lb. 8 oz. Measures: 7' 6" (2.28 metres) in length.

The new "JOYSTICK" V.F.A. incorporates the advantages of standard types such as Marconi, Hertz, Zepp, Dipole, etc., but in greatly reduced physical size and with six band capability. A high radiation resistance in compact form—outperforms many beam antennae in practice because of its low reflected power factor and absence of harmonics.

G3VFA G3CED  
DETAILS—3p STAMP.  
Telephone: (Thanet) 0843 62535



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TRADE MARKS

## R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

HALLICRAFTERS SX 133	£110-00 (£1-50)
KW 202	£120-00 (£1-50)
KW 201	£90-00 (£1-50)
KW YESPA II c/w p.s.u.	£105-00 (£2-00)
LAFAYETTE HA 600	£37-00 (£1-00)
DRAKE 7A with speaker	£75-00 (£1-50)
TRIO JR 310	£65-00 (£1-25)
KW 77	£70-00 & £80-00 (£1-50)
HALLICRAFTERS S 240 as new	£35-00 (£1-00)
EDDYSTONE 940, as new	£135-00 (£1-50)
HAMMARLUND HQ170-A	£170-00 (£1-50)
HALLICRAFTERS HT 41, 1200 Watt Linear Amplifier	£85-00 (£4-00)
EDDYSTONE 8818	£85-00 (£1-50)
EDDYSTONE S640	£25-00 (£1-50)
LAFAYETTE KT320	£28-00 (£1-25)
HEATHKIT RG-1	£33-00 (£1-25)
LAFAYETTE HE-80	£48-00 (£1-25)
R.C.A. AR88LF	£50-00 (£2-00)
TRIO 9R-59-DE	£38-00 (£1-00)

WE CAN ALSO SUPPLY ANY MAKE OF NEW EQUIPMENT—and have pleasure in giving a few examples which are normally in stock:—

- ANGLIA, 2 metre converters (state I.F. required), £15-00 (30p).
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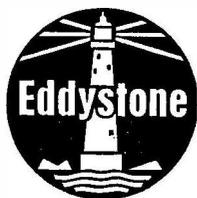
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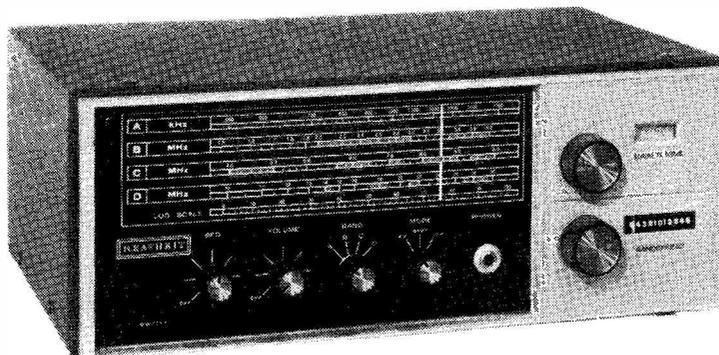
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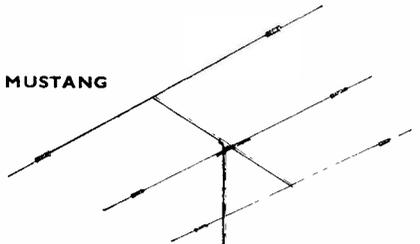
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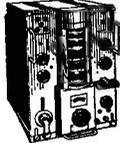


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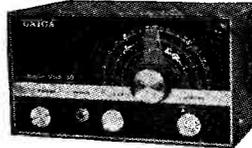
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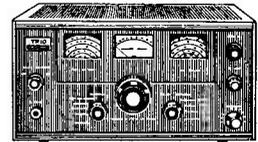
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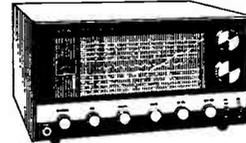
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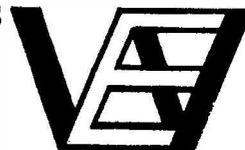
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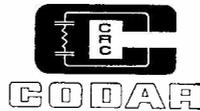
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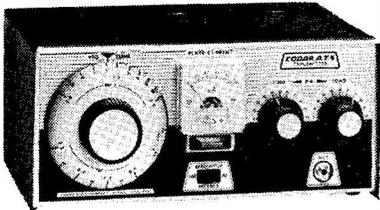
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# SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXIX

DECEMBER, 1971

No. 338

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*Advertising:* Maria Greenwood

*Published at 55 Victoria Street, London, SW1H-0HF, on the last Friday of the month, dated the month following. Telephone: 01-222 5341 & 5342*

**Annual Subscription:** Home: £2.50 (£2.75 first class) post paid  
Overseas: £2.50 (\$7.00 U.S.), post free surface mail

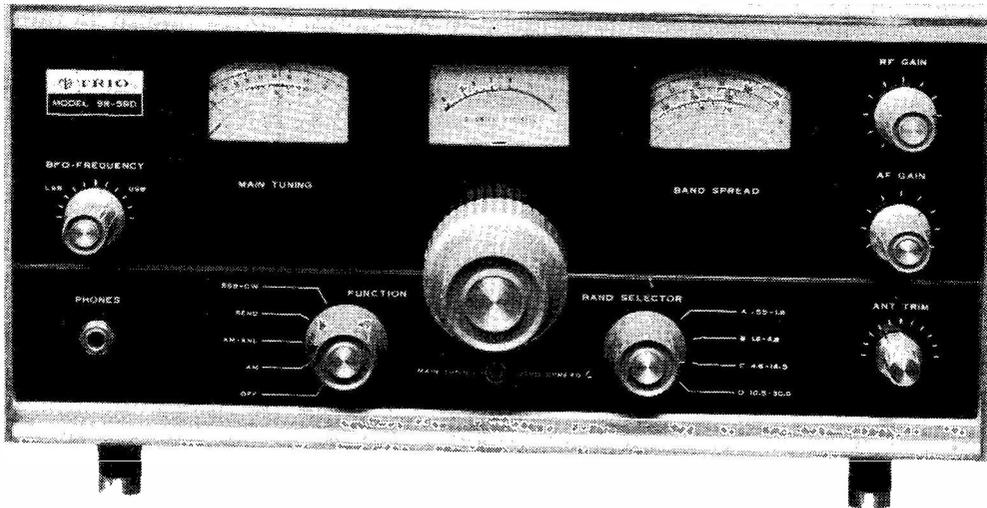
**Editorial Address:** Short Wave Magazine, BUCKINGHAM, England

## AUTHORS' MSS

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# The SHORT-WAVE Magazine

## EDITORIAL

**Pressure** *With steadily increasing production and distribution costs continuing to erode the narrow margins on which we operate, it has become necessary—much to our chagrin and regret—to say that with effect from the next issue (dated January, 1972) the cover price will become 25p.*

*This in turn involves an adjustment to the direct-subscriber rate—to £3 first-class posting, or £2.75 ordinary mail, for a year of twelve issues. Of course, subscribers on the existing rates will not be affected until their renewals fall due—nor do the revised rates for new subscribers become effective until January 1, 1972.*

\* \* \* \*

**Call Book** *The publishers of the “International Radio Amateur Call Book” have recently decided upon a new sales and distribution policy. With immediate effect—meaning the Winter editions of the U.S. and DX listings—the “Call Book” proper will be published only once a year, to be available over here in the Winter. Supplements to both editions will appear at quarterly intervals, obtainable by prior order direct from the publishers.*

*Hence, though we shall be able to supply the “Call Book” as an annual publication, as required at any time during the year, we shall not be handling the quarterly supplements. These will be available only direct from the publishers.*

*In any event, because of the continuing American dock strike affecting East and West Coast ports, it is going to be some time before we can expect to receive supplies of the new edition (U.S. and DX Listings) of the “Call Book”.*

\* \* \* \*

**Christmas** *In spite of what some readers may feel to be the rather dolorous announcements we have had to make, we hope that all who see this piece—and that includes our trade friends—will accept the sincere good wishes of the Editor, Management and Staff of SHORT WAVE MAGAZINE for this coming Christmas.*

*Austin Foster  
G6FO.*

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

**E**VEN when the bands are not as good as had been hoped—and after all, this is to be expected at a time of decreasing sunspot number—there is always *something* of interest on some band or other; and even if they're all dead at once, there is always some improvement to the station, by way of a constructional project, getting on with writing out the QSL's, catching up on the card-index of countries worked, dreaming up a new aerial, clearing up one's TVI complaints instead of not being on in TV hours, or in the last resort—the *very* last resort—VHF!

Talking of VHF, how about kicking off this month's review with a look at Ten?

## Ten Metres

It is interesting to notice that the few enthusiastic references to Ten of late have been from chaps who have never heard it at its best; and after all, to most of the old stagers, the sunspot maximum back in '47, and again in the latter fifties, were both much more interesting than the last few years. Possibly, we wear rose-tinted glasses, but for one thing there seemed to be more consistent activity, and for another there was the fact that the early post-War period was the first time that valves and receivers were advanced enough to make Ten a hunting-ground for the average amateur as against the adept constructor. And of course, of late years the era of commercial equipment for all has pushed the pendulum too far the other way.

Nice to hear from G3DO (Four Oaks) again after a longish silence; Doug has been busy, and so not very active, but he managed to hook A2CAB, CE6CA/Ø (Easter Is.), RF6FCS, VQ9R, XX6IK, XX7FM, 4M1A, 4M4CDK—the Easter Is. QSO being a new one for the band.

G2DC (Ringwood) is happy enough about conditions, but less so with the intruder situation on our bands. As for Ten, it opened up even during the week, when normally it is inhibited by lack of activity;

on two days WAC was achieved, the general pattern being European Russians about 0745z, followed by UA9's and Asiatic USSR, the VK's for a short time around 0930z, Africans (like VK's few in number) appearing from about 1100 to 1530, and then both North and South America. The CW signal went out to CE2CX, LU3EX, PJ2JW, PY5AQ, RL7PPA, UL7QR, UA9QB, UA9LAC, UA9UB, VK3AZY, VK3XB, VK6SA, VP2AAA, ZS2W, ZS5UB, 5Z4LW, 8R1J, all W call areas and VE1-3. In the SSB mode, which G2DC seems to be using more of late, he collected CE8AO, CX2CN, CR7TP, LU2DEK, PY2BCQ and ZP5AS.

Now we come to GM3OOK (Irvine) who is perhaps better known in his *alter ego* of ELØA/MM. Jake has been having a longish spell ashore, and so has been active on all bands 10-160m. with home-built CW-only transmitters, to a 41-foot vertical fed on 80-40-20-10 metres by separate ATU's at the base; a 150-foot end-fed for 160m. and for Fifteen either a dipole or another ground-plane aerial. Additionally, there is a G6LX-type vertical for Top Band coming along—clearly, Jake shares your conductor's opinion that you will have to go a long way to beat a vertical operated against a good ground system of radials or whatever, unless you can have a much more complex system. Contacts on Ten included 9H1BM, HPIE, KØZTV (S. Dakota), KV4CI, PY2DN, SVØWOØ, SZØCH, VK6SA and VP2AAA.

As for G3NOF (Yeovil), Don gives Ten rather grudging approval, although once the U.K. had put its clocks back to GMT, it started to go out as darkness fell, which meant no DX for the workers. SSB, as usual, was Don's favoured mode, and yielded CR7TJ, CT3AS, DU1FH, FL8MM, G3MUL/CE3, K3WEU /6Y5L, KP4DIW, KV4AD, KZ5BB, KZ5FA, KZ5JF, KZ5LS, W's, ZE1JL, ZE6JL and ZS3CCE.

Well, how about that! The old

reprobate, G3VPS (Hailsham) has returned to the fray, after a distressing bout of VHF'itus. He thinks his 180 watts and indoor dipole give him at least a sporting chance on Ten—and was rewarded by QSO's with FL8HM, VK9XK (Christmas Is.) and 7Q7BC for three new countries. Not quite so inspiring but nonetheless interesting were other contacts, like KV4AD, 9H1CE, 4Z4HF, TA1SK/4X, SV1SV, SVØWJJ, SZØDU, CR6II, XX7IK, 9E3USA, 4Z4HS, UF6CR, VU2CK, 5B4IS, 7Q7CY, a clutch of W's, with of course the usual Russians haunting the band to demonstrate its open-ness. All Peter's QSO's were SSB this time.

G3VBL (Wimborne) seems to have his rig in Lancashire, so a session in the CQ WW Contest involved a 500-mile drive to the shack—*blimey!* Christopher has a lot of interesting things to say about contests, of which more in another paragraph, but had among his pickings on this band such items as FL8HM, OB8V, TZ2AC, VK9XK, XX7, 3B8CZ and 4M1A.

From one or other of his DX-engines, G3DCS (Ipswich) has had a tickle on all six bands, with here and there the odd SSB contact. Enver has a clean bill of health at Ipswich for his FT-500 box, but still has TVI problems while his KW-2000 at the /A shack in North London is suffering from a dose of distortion on the mod., due apparently to RF from the aerial insinuating itself where it is not required. Thus, quite apart from the fact that he *likes* CW, it tends towards a peaceful existence for operation during TV hours. A fair-enough reason, and one feels many, many more U.K. amateurs particularly in Ch. I areas, could well persuade the majority of their neighbours to use the UHF, 625-line transmission for BBC-1, and clear the other few of TVI, before coming on the HF bands a bit more often. Reverting to the G3DCS collection, 28 MHz was not given

much of a pasting but CW reports were exchanged with W9UC, W1GBV and W2HI.

In amongst his beautiful collection of QSO's, W6AM (Long Beach) had just one on Ten, with XX6FL, SSB, at 1700z. On a different tack, Don is about to really thump Ten, among other bands, with the new W6AM 1 kW Linear *from the car*. With it, W6AM should be able to brew up a potent /M signal while driving the miles from home to Rhombic Farm.

The latest—nearly *too* late—letter from G3YDX shows Ron is now using a ZL Special for Ten, at 20 feet up. On SSB, the signal thus radiated found its way into receivers at EQ2BQ, CT3AS, CX3CN, G3MUL/CE3, FY7AE, KV4AD, OD5BA, OB8V, VS9MF, VQ9R, ZS3CJ, XE1IIJ, ZE6JL, ZP5AQ, 3B8CG, 4X4WP, 5B4IS, 7Q7AA, 7Q7LZ, 9G1DY, 9J2DT, 9J2JY and 9E3USA, while key-bashing gave EA8BK, VP9BK, 5Z4LW and 8R1J.

#### This, That and The Other

A *pot-pourri*, this, of points from various letters. G2DF (Warrington)

writes to make sure he is still in Top Band Counties, and in the course of his letter asks just where all the VK1 types have gone. A look at the *Call Book* shows that there are in fact not a great number of VK1's licensed, and some of those are of the VHF-only persuasion, all-same our G8/3 types. However, Fred needs a VK1 to complete the set for his WAVK. So, VK1 lads, if you hear the G2DF "pea-nut whistle"—Fred's description, not ours!—please put him out of his misery and give him a QSO.

G3UAN/4X (Arad, Israel), sent his letter just too late for his main objective, which was to mention the 4X field-day on November 13, in which Robert and some of the locals were going out /P to Beersheba. It is interesting to notice how much an enthusiasm is infectious—it seems that by the time we are in print there will be a radio club in existence in Arad, and there are hints of more 4X activities in the way of Top Band. Robert has been hoping for QSO's with the University of Sussex, and Exeter, but so far nothing has materialised. He is on the HF Bands, either CW or SSB, almost every day

and when not on the air seems to be enjoying his stay in Israel and making many friends.

No wonder G2HKU (Sheppey) is not so active as of yore; Ted is taking a Colour TV C. & G. course, which is keeping his nose firmly to books and grindstones.

From G2NJ (Peterborough) we have more news of his /MM collection; on October 30, at 2205 when the band was all but closed, OH2BD /MM came up from the Bay of Biscay, and on November 3 a rarity was hooked in the shape of LZ2OJ /MM, who was in the Sea of Azov.

G2BRR (Chippenham) writes to offer his DX gleanings, and also to mention the ISWL DX contest, open to both ISWL members and others. This one is over 0800-2000 *local time*, on 14 and 21 MHz, using SSB. The rules and ISWL list of rating countries can be obtained, for 5p or 2 IRCs, from Clifford Tooke, 6 Chelmer Avenue, Rayleigh, Essex, SS6-7TB, and your log should arrive not later than January 22, 1972. Full details may also be obtained from G2BRR, *QTHR*.

Have you ever been lost in Birmingham? At least two Brummies



The fine modern amateur-band station at the Science Museum, South Kensington, regularly active from the heart of London. As well as CW/SSB on all bands, GB2SM is equipped for RTTY operation, the radio-teletypewriter apparatus being at the left. All the gear is of the best, working into a system of antennae erected on the roof of the Museum. In charge of GB2SM is Geoff Voller, G3JUL, a member of the Museum staff and himself a highly competent and experienced operator. He is seen here at the main control position.

know how difficult it is to navigate in their city where things seem to change overnight, and they offer to be available to mobiles on any band to help out. Contact G3YZQ on 021-449-0309, or G3VPE on 021-777-1320, evenings or weekends, or better still drop them a line, *QTHR*. A good idea, this, which could be tried in other cities.

There are things and Things. One of the latter variety parked itself on about 7004 kHz, spread its tentacles right up the band and seems to have provoked G2DC into an "I Hate Things Week," meaning that he has various forms of violence predicted for the perpetrators.

W6AM, having shattered your conductor's idea with his revelations of a 1 kW linear in the car, proceeds to offer some soothing balm. It seems Don has actually clapped eyes on a specimen of the QSL blank being produced for the Annobon effort which recently stirred the bands up, said blank having been produced by the Signal-One people; and he adds that it is therefore reasonable to assume that the cards for this one, filled in, will soon be coming through.

The two U.K. winners of the Bermuda Contest were both from one of the nicest parts of England—Warwickshire. Both have now returned from their week in Bermuda, and one may reckon both will be putting in an entry for the 1972 event in the hopes of another equally enjoyable win; it seems the prize is no mere "get 'em there and back affair," but a week to be remembered for a lifetime. Lucky G3LNS and G3HCT.

G3FN (Sheffield) is 9G1DL most of the time, and at the moment is using up his home leave in catching up on the QSL cards, as he finds about half the chaps he works say "You are my first 9G1". Early January will see G3FN back at his 9G1DL post, and operational once again as soon as the problems of a burnt-out transformer have been resolved.

Advance warning is given of the Spring BARTG contest, over the weekend 25-27 March 1972, when the RTTY chaps are out in force against the world. With notification this early, there is time in plenty for intending competitors to drop a line to Ted Double, G8CDW,

Contest Manager, *QTHR*.

The Ballymena boys, GI3FFF, hope to be running GB3MNI in Co. Antrim during the period December 11-16, this being another of the Marconi 70th anniversary commemoration stations. Actually, the great man did in fact carry out some of his early 'cross-water tests in the neighbourhood, between Ballycastle and Rathlin Is., 7½ miles off shore, eventually establishing a Lloyd's signal station on the Island in 1898. The GB3MNI group plan to offer AM/CW/SSB on all bands from two metres to 160m.—a pretty tall order in terms of equipment and operators over a whole week.

#### Fifteen

Frequent openings around 0830 to JA and VS6, long-path, have been

noted by G3NOF, with the short-route opening coming around 1030; W's from 1100 to 2300, and the odd signal from S.E. Asia in the afternoon about indicates the picture. All in all, it came to mean SSB contacts with AP2KS, G3TBS/A (Scilly Is.), JA's, KY4CD, MP4MBB, MP4MBC, VS6BE, VS6DO, VS9MF, YA1CV, ZB2A and 5H3LV.

For GM3OOK the band yielded CW loggings with EP2DL, G3RSP/MM (bound for U.K. and home), VP9BK, KV4CI, VQ9SM, loads of WN's (right across to WN6JYT one time) and ZL3IS.

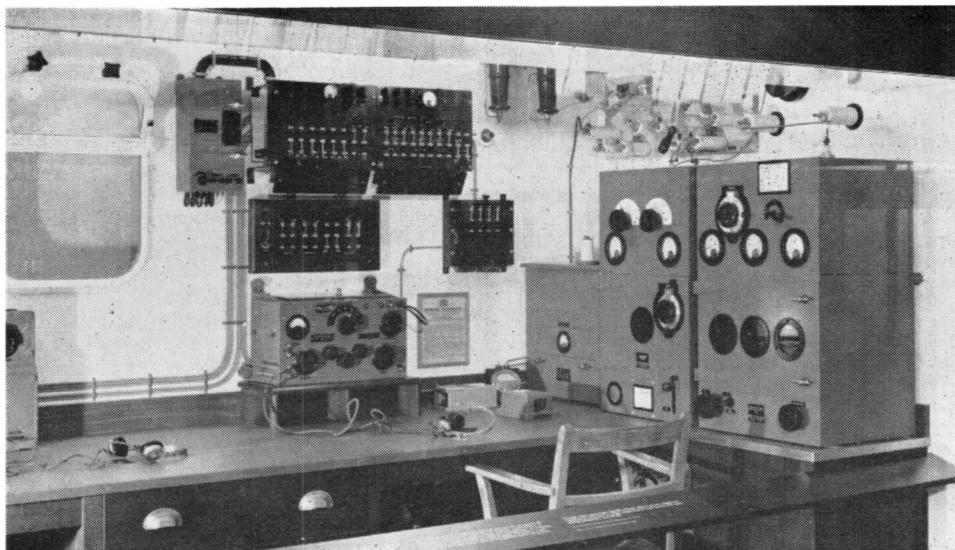
Sparing of any other band but Twenty has ever been the way of W6AM, and this month he only mentions one contact on 15m., with HK0AA on 21296 SSB, around 1426z. Somewhat similar situation

### SIX-BAND DX TABLE

(All-Time Post War)

Station	Countries	28 MHz	21 MHz	14 MHz	7 MHz	3.5 MHz	1.8 MHz
W6AM	350	151	163	350	146	120	7
G3DO	340	217	253	333	90	83	9
G2DC	339	181	312	330	170	116	20
G3NOF	322	207	234	313	38	68	4
ZL3GQ	285	146	164	245	178	127	5
G3KMA	266	210	217	210	152	67	11
G3LZQ	265	140	156	215	72	38	8
G3IGW	212	129	153	169	136	107	50
9H1BL	202	117	129	143	74	57	8
G3RJB	180	84	63	169	60	37	8
G3PQF	175	119	53	107	85	56	13
G3YDX	163	115	101	92	90	89	17
G3DNF	131	66	89	95	42	33	2
G3DCS	130	27	83	95	34	28	11
G3XAP	122	44	75	53	77	31	13
G3ZEM	110	—	—	108	28	32	13
GC3YIZ	87	52	17	40	18	5	1
G3VLX	67	7	14	34	20	33	19

(Failure to report for three months entails deletion from this Table. Six months of "Nil" reports will also result in deletion. Placings this month are based on "Countries" column.)



We have recently shown, in CDXN, some modern ship's radio installations—here is one of 30 years ago, typical of a deep-sea cargo vessel of the late 1930's. The HF/MF transmitters are on the right, with aerial control and isolating switchery above (mainly used for "earthing" during thunderstorms!). The general-coverage all-band receiver is at centre, with the separate emergency 600m. Tx/Rx, independent of the ship's supply (usually a wavering 110v. DC) at far left. The switch panels on the bulk-head above the Rx are for controlling battery charging and cutting power from various units. Operation from this ship would have been by hand-keyed CW only, there being no VHF nor long-wave ship-to-shore telephony (except in large passenger vessels) at that time. The interesting installation shown here can be seen in the new Telecommunications Gallery at the Science Museum, South Kensington, London—well worth a visit any time you are in Town.

applied at G3DCS, where Enver only worked his key with UWØUZ and a gaggle of W's this month.

G2DC feels *Fifteen* has been somewhat neglected of late, and also says hard words about the commercial RTTY stuff which infests the band and seems on the increase. However, CW did the trick to EA6AZ, ET3ZL, KR8AO, JA1-Ø, UD6AR, UJ8AW, UL7GW, ZE1JL, ZS1WQ, W1-Ø, VE1-4, VE7, VE8, VK2-4, VK6 and VK7.

Fifteen at G3VBL was a matter of contest pickings, with, other than W, such as EA9AQ, FL8HM, KG6ALV, KR6MM (over the long path), TR8MR, T2ZAC, XX7IZ, 4NØDX, 4C1QB and 6D1AA.

G4AMT (Penzance) is no pirate, being a refugee from Justin Cooper's world. Terry runs a K.W. Viceroy, and Trio 9R-59DE receiver to a young aerial farm, comprising dipoles for 80, 40, and 20, plus a Quad for Fifteen, with the ten-metre skywire yet to be invented—although this will be sorted out by the time we reach print. G4AMT has somewhat of a problem to the West, as his signals encounter a nearby hill-side with an almost audible clunk, and hence do not make the impression he could wish for over in the

States. Nice to hear that Terry uses his key, although at the moment the need for a Q-Multiplier on the receiver is making his CW QSL's mainly non-DX. SSB has made up for this, with 9E3USA, 4Z4IV, W3ASA, MP4MBL, EQ2TW, EQ2BQ, 9M2DQ, VS9MF, 5Z4MO, 5H3MV, 5B4IS, 9J2RA, VE3DDR, ZC4CB, and 4NØDX. All of which adds up to a Good Start!

#### On to Twenty

On most of the bands, G3YDX (Newquay) uses a KW-204, in conjunction with the W3DZZ-type trapped aerial and a Drake 2B, a rig which seems to do the trick quite well. On Twenty, it netted SSB contacts with MP4BJG, CN8BB, KL7HGR and 3AØGB, while the key gave OX3HV, FGØGD/FS7, KV4CI.

G3DO looks to have kept away from the rat-race on 14 MHz, although Doug did make one contact on the band, with VKØPF, on Casey Base, Antarctica.

Sked contacts with ZL1VN, ZL3RS and ZL3SE are mentioned by G2HKU (Sheppey) as usual, with KL7GQH as the only other contact Ted felt worth recording.

G3ZPF (Dudley) cares so little for

his call that he forgot to put it anywhere on his letter, which left G3KFE having to do some detective work to identify the writer—but more to the point, G3ZPF, who is still Twenty-only, seems to be pressing on happily, his score to the time of said letter being 98 countries, despite such as KV4, 4M2, 8P6, VO2, 4W1 and ZS all slipping through his fingers. However, since the 98 included, during the period in review, HZ1, HV3, 4C1, UM8, ZE2, CT3 and VP9, the tears are wiped away.

Most mornings have seen G3NOF on the receiver, around 0700 to 0800, but only a few VK's and little or nothing from the Pacific appeared, albeit it is fair to say this last may have been a function of the time of listening. In the early evenings quite good signals from Africa were heard, and several times VKØMX, Mawson, was coming over the South Pole, while W6 and W7 could be heard over the North Pole. DU1FH, K7NHG, KL7DHB, KL7HFQ, KR8EA, KZ5JF, MP4MBB, MP4MBC, VE4SD, VE6AKV, VK/ZL, 3AØGB, 3AØGC and 9V1QQ were booked in.

GM3OOK stuck to his key, and his persistence was rewarded by

contacts with HS4AFN, KL7HBK, KL7HCN, VK2AHK, YA1R, ZL1HY, ZL3BJ, ZL2AFZ, ZL4NH, and ZL3PO/C on Chatham Is.

For W6AM Twenty is the band, and his collection for this month includes such as UL7GW, UL7JE, KY6PUR, UK7GAB, OH2BEJ (who recalled the W6AM visit to OH-land for a hamfest) VU2IN and ZL3PO/C, with SSB chiming in to yield VR4CG, VK9CH, ET3ZA/A; another CW one was KQØNEB at the Nebraska State Fair.

Twenty for G3DCS seems to have been all-CW, with OMØCDP, JA3BDP, KL7MF, KY4CD, SVØWO, CN8CG, FM7WF and hordes of W and European signals to make up weight.

G2DC ruminates on the number of JA's now licensed; it is said to be as high as 20,000 fully licensed—there are another 80,000 or so in the class-B category!—and this could account for the fact that a DX call between say 0730-0830z will usually yield at least five of them on the trot, usually good signals and well-driven. The pity of it, though, is that they

submerge the VK and ZL signals, sometimes audible underneath but not workable. One interesting QSO was with VK1BE, ex-G3CXQ, who enquired where all the U.K. signals had gone as he rarely hears one, let alone has a G QSO. The CW G2DC list reads K4BHZ/VP9, KH6RS, KL7HIR, UAØLS, UAØZAI, UKØFAF, UWØFW, UVØBB, VK9LV, VR1AA, XX6HL, ZL3PO/C, VK1-8 and ZL1-4 areas.

G4AMT, obviously, finds *Twenty* a bit of a chore after the delights of Fifteen; Terry offers EQ2WB, JY8BI, EQ2DM, ZC4EJ and EA8HS.

The 14 MHz signal of G3VBL, during the CQ WW Contest, hooked loads of W's as we have already noted, but there were a few brighter moments, when, for example, FP8CS, HM1BK, KR6OC, VP2KF, XX7FR, 4W1AF and 6D1AA all fell to his charm.

#### Wise Words

It is strange how the truly thought-provoking letters seem to arrive in batches. This month we have a couple, one on Contests and the other taking us up on QSL'ing.

To look at the letter topic first, VR1AA (Gilbert Is.) has some very telling statistics to offer on the QSL manager situation. Dan says his QSL rate as VR1AA is about 16,000 contacts a year, all through a QSL manager, whereas as 9M2LO (with no QSL manager) the rate was about ten thousand—a high rate of QSO'ing, by any standard. Since his time spent on the air has remained about constant, the difference in number of QSO's is purely related to the time spent writing out QSL cards—VR1AA has a manager, 9M2LO did not. Now to the economics: For 16,000 QSO's a year, about 10,000 return cards come in. The cost of their distribution, plus the cost of printing, is a minimum of £420, and would rise to £1,435 if air-mail were used. Of those 10,000 incoming cards, at most 500 will be of interest to the DX operator for any awards or DX'chasing he himself may be doing—the rest are just waste paper. VR1AA points out that the majority of bureaux operate on a cost basis—REF, SRAL, WIA, for example, with fee stamps, and will not accept out-of-country members whose sole effect would be to

swamp their bureau. ARRL, for example, will not accept cards from VR1AA's QSL manager, even though Dan became a member of ARRL. However, assuming one can find a co-operative bureau, one is still out of pocket on QSL'ing to the tune of about £150 a year if one is an active and sought-after DX operator.

Now, Dan reckons—and this is not unreasonable—that QSL'ing should not cost him more than about £75 a year out of his own pocket—this being part of what one is prepared to pay for one's hobby. This means two solutions if one is still using the bureau approach: Either to limit one's QSO's, or to insist that anyone wanting a card must defray the cost. The first way would in practice hit the chaps in the populated areas, as the DX lad would stop working strings of W's, G's, JA's and EU's, and look for what are *to him* DX and worth a card *to him*. The second is the alternative most DX operators and their managers have to adopt, but then comes the rub—IRC's cost about three times the value of the stamps they represent! The answer to that one *can* be the local stamp shop, where stamps—mint, of course—for sea mail represent half an IRC, or for the impatient, air-mail stamps would equate to three IRC's.

For the really DX chap, what VR1AA says has a telling ring of truth and practicality—one wonders what the anti's have to say now? How much actual cash would they be prepared to spend in QSL'ing, VR1AA having said that £75 a year is about his limit?

Now to the argument about Contests and the number of G's in them. G3VBL comes in on this one. He operated in the CQ WW Contest, and now has about a month or six weeks off the air, while he does the paperwork. When you have been working W's at the rate of maybe 120 or so an hour for stretches of an hour or more at a session, one is bound to snag some duplicates—and only to get these out of the logs to meet the Contest requirements is a major task. But then the log has to be scored, the multiplier worked out, and so on, by which time the entry is about ready to be written up in proper form—a few hours of work. Add to that the fact that the 1,000 *plus* stations you have worked

#### TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2DF	98	98
G3ADH	98	98
G3VLX	98	98
G2NJ	98	98
G2HKU	98	98
G13WSS	97	98
G3XWZ	76	90
G3KFE	72	88
G3YMH	69	93
G3LXD	64	83
<i>Phone only</i>		
G2NJ	98	98
G3POF	98	98
G3XDY	72	89
G13WSS	67	83
G2HKU	55	58

(Failure to report for three months entails deletion from the Table. Claims may be made at any time. Six months of "Nil" reports will also result in deletion.)



Station of G6VQ, Tom Wilson, Helm View, Stalnton, near Kendal, Westmorland. Starting in the crystal-set days, he worked up to an AA ("artificial aerial") licence in 1935, becoming G6VQ—10 watts maximum in those days, by the way!—a year later. Though over the years much equipment has been built, the station is now all-commercial, with K.W. equipment and a Hy-Gain 3-element beam. As can be gathered from our picture, the main operating interest is in DX, CW/SSB, and the acquisition of the appropriate certificates. Still keenly interested in experimental work with antennae—the only way to work the DX, whatever gear you may have! —G6VQ is also fitted up for mobile.

will mostly be wanting a QSL card, and you have more time to put in writing out cards and checking the log to see the QSO was a good one. G3VBL spent an hour on Ten, and a long session on the other HF bands—but those twenty hours or so generated at least double that amount of paperwork. And, in addition, any U.K. operator knows he hasn't much of a chance of carting off the silverware, because of the DX-peditions (to places in the Caribbean and such) which are mounted for the sole purpose of winning. However, G3VBL had fun, even if he doesn't get his entry completed in time. And at least the W's can be happy that they are reckoned the world's best operators—as Chris says, you try working 130 Europeans in an hour! Organisers of the big Contests might mull over these interesting words.

### The LF Bands

As we go further into winter conditions, these bands will come more into their own. *Forty* already is a haven for use when *Twenty* has given up the ghost in the evening. *Eighty*—well, you either loathe it of love it, depending on the mood and personality of the individual. Oddly enough, almost the same could be said of *Top Band*, which is the dancing-ground for all those mediocre types who beef so hard about "excess power" when someone builds up a decent signal level—yet this band is the one on which the unarguably toughest feats of DX are achieved.

Let's take a look first at *Forty*, then. As always, the QRM is pretty terrific—this band is no place for the transceiver-user on CW unless he has a Q-Multiplier. QRN can often be quite bad, and the Thing

that starts up on 7004 in the mornings is calculated to damp enthusiasm. However, G2DC managed to rake in CW QSO's with KH6RS, VK3MR, VK3XB, ZL3AAD, all W call areas and VE1-3, pulled out of the murk.

The CW end was where on occasion G3DCS could be found, possibly working W2GGE or UK4PAA, or cursing his luck at missing VK3MR. Mid-afternoon our time saw W6AM in action on the CW end, his takings being VKØCC and UKØZAD.

GM300K tackled the QRM, again on CW, and pulled out some EU's. CW again for G2HKU, to make contact with HI3XAM and PY6AIQ, but an interesting SSB contact was EQ2DX.

For G4AMT SSB did the trick with XE11IJ, YV5BVG and VK3HW.

Apart from G2HKU, the only

chap who seems to have tried it both ways on *Forty* was G3YDX, who hooked 9H1BP and EQ2TW on SSB, but slid down to the LF end for contacts with JX2HK, VK2GRK, VK3MR, VK3XB, VK6HD, UAØPY, and ZL3GQ—all nice QSO's on what years ago was one of the best real-DX bands.

### Eighty Metres

Here we can kick off with G3YDX, having his last fling before turning into one of the frustrated, suburban TV-upsetters. His last fling has certainly been a good one, with SSB into EQ2WB, G3YBH/VP9, MP4MPA, TF5TP, WB4RJK/TF, WN6EGL/TF, lots of VE/VO, VP2GAL, VB1MSA, VS6DO, YV5BPG and 4Z4HF, while the CW turned up VK6HD, VP2AAA, UF6FAG, and JX2HK. Not so dusty!

G4ATM offers his little lot as being VO1FG, 5U7AR, CN8HD, VE3MR/P/4X and 4U1ITU. G2HKU succeeded with OHØMA on Market Reef, K1NOL and W2DBQ, changing over to SSB for his contact with MP4MPA, which constituted a new country for Ted.

GM300K must have laid out his ground-bait carefully, for he managed to get such big fish (for 80m.) as 9H1CG, VO1AW, VP2AAA, VP9BK, UL7GW and UM8AP on to his hook. For G3DCS there was HBØAFH to float over, plus a crop of interesting EU's.

As G2DC puts it, the commercial QRM and clutter at the DX end is bad enough, though the DX can sometimes still be heard—but if

you call, you are then bound to lose your man between the clutter and the QRM from lots of callers attracted on to the scene. Despite all this hard work he was still able to make contacts with W1-5, W8-Ø, VE1-3, UW9WS, UA9AHA, UAØBB, ZF1RH, ZL3FZ and ZL4IE—these latter being the ZL's who always appear on *Eighty* at the right time.

### Top Band

Perhaps the most interesting report this month is that from G3ZYY (BFPO, Ships) who was listening from Gibraltar recently, and heard G3XKV and G3ZDY, both at 59 on SSB, plus the CW signals of G3RKJ, G3ZDY and GW4AEC at 559, with G4ADP not far off at 589. This with a dilapidated and out-of-track B.40 and a 20ft. whip, on September 18. Then the ship moved off to St. Helena, where G3XHI was heard at 479 working a 599 ZD8AY. Followed a trip to ZS-land, where there seemed to have been no time for radio, then Singapore, *via* Gan after that, and enquiries being made about a ticket from there—but no news as yet.

G2HKU likes his bite at Top Band, and this time has a longer list than usual: HB9CM on CW, and with SSB PAØPN, PAØINA, PAØRTR, GM4ANR/P, G3LWS, DK2JX, DKØWA, DLØPG, DLØWU, OH1VR, and OH5SM were all done. Among those heard were OE8MI, W1HGT, K2ANR, K2GNC, W8ANO, VE3EK (all on CW), plus ZD8AY on both CW and SSB, the latter mode producing a better signal.

GM300K starts by mentioning GC3APA, OL5ANJ, OL6AOQ and OMØRTO, and then goes on to refer to *his* gotaways—W1BB/1, K1PBW, W3IN, W1HGT, K4IEX and K8IQQ. Nothing like that about G3DCS, who offers a worked-list on CW of HB9CM and OK1HBT, on SSB of PAØPN and DLØII, but *no* gotaways.

We also have a note about 160m. from G2DC, who chased some spiders out of his Top Band device and set it to work on October 29, raising lots of OK's but no real DX, albeit the band sounded so lively that a resolution was recorded to the effect that G2DC must take a listen once again during DX times.

Finally, don't forget the Top Band Tests and other 160m. DX activities—see pp.466-467, October issue, for the essential information. We shall be glad to hear of results from any participators, either as operators or listeners.

### Christmas Greetings

#### —And Sign-Off

By the time this is being read, we shall be getting closer to Christmas, and indeed the January issue is out just after the Holiday—thus now is the time for us to wish all readers of this piece a Merry Christmas, and a Happy and Prosperous New Year.

For the rest, there is the matter of the deadline which must be **Friday, December 3**, to CDXN, *SHORT WAVE MAGAZINE*, BUCKINGHAM—somewhat tight because of the inevitable disruption of the mails at this time of year. Till then, *adios amigos*.

### SPLURGE KEYING

#### THE MITTEL-EUROPA BUG

Careful monitoring of the CW areas of the HF bands has led experts to believe that an entirely new form of electronic keyer has been developed in eastern Europe. Known as "Splurge Keying", it has gained rapid popularity on the bands.

Although the details are still classified, industrial espionage and traffic analysis have enabled a rough picture to be built up of this new and exciting development in the field of electronic keyers.

The principle of the system would appear to be that by slight movements of the left or right foot (or both), various Morse character combinations can be formed with the minimum of effort. Without even

removing his boots, a skilled operator can produce at speeds varying between 4 and 100 w.p.m., groups such as: NAME VLAD, NAG VLAB, NAG 4LA6, XG VLA6. Other combinations include: DR OM DR OM DR OM DR DROM PSE QSL PHE QHL Q5LL 4IA BURUU, and CQ XU BX DE (or BE or 6E). Apparently, later models have, in addition, the facility to send "CQ" (or as an optional extra, "CMW") for anything up to ten minutes on end without once giving a call sign. The operator is able to maintain the suspense generated during such a marathon CQ by allowing the keyer to take complete control and at the end sign off with three entirely different call signs followed by, of course, KN.

G3MHF

## MORE MODIFICATIONS FOR THE TRIO JR-310

### FILTERING AND AUDIO SELECTIVITY UNIT — TOP BAND CONVERSION

G. J. BENNETT, B.Sc., Ph.D. (G3DNF)

IN the previous article on this receiver (SHORT WAVE MAGAZINE, January 1971) its performance, merits and shortcomings were reviewed and suggestions made for its improvement. Further experience has led to additional modifications being made which are worth putting on record for the benefit of other users of this equipment.

#### Selectivity—General Discussion

The use of a filter based on *Clevite* individual resonators as an alternative to a more expensive mechanical filter was shown earlier to be practicable with this receiver, a bandwidth of 2 kHz being readily obtained for "narrow" selectivity. In the writer's opinion this represents an acceptable compromise between efficient SSB reception under difficult conditions on the one hand and reasonable CW reception on the other. A narrower bandwidth for CW reception could be obtained by fitting instead a Trio CW filter. Data on this filter are not available at present, though a bandwidth of not better than 1 kHz might be expected.

The need for still narrower selectivity in CW reception is somewhat a matter for debate. Effective reception of CW depends as much upon the actual pitch of the audio signal in relation to background noises as upon the bandwidth (which determines the relative strength of unwanted adjacent signals). A very narrow bandwidth can, however, prove to be an embarrassment under certain circumstances. For example, it can make searching for signals more difficult; if the BFO of the receiver is crystal-controlled, the range of adjustment of the audio beat note may not be sufficient to permit resolution of the desired signal in the presence of severe

QRM. The advantages of a very narrow IF passband are therefore more easily realised in a receiver with variable BFO.

The JR-310 BFO is crystal controlled; in such cases it is common practice to sharpen up the IF selectivity for CW reception by the use of a Q-multiplier, some adjustment of peak frequency being usually attainable at the same time. For the record, it should be mentioned that the writer tried this method on the JR-310 without success. Stable operation of the IF stages proved impossible to achieve, this being one factor which led to the investigation of the *Clevite* resonators as a way to improve selectivity.

The 2 kHz "narrow" filter described earlier results in maximum audio output around 1500 Hz, this being the difference between either BFO frequency and the midpoint of the 2nd IF passband. Opinions differ as to the "best" pitch for receiving CW. It is entirely a matter of individual choice, modified by conditions obtaining at the time. For steady reception under good conditions the writer prefers a pitch of about 1000 Hz, though 1500 Hz is not found too objectionable. When severe QRM makes it desirable to tune the wanted CW signal to an audio pitch of 1000 Hz and below, it is desirable to switch the JR-310 selectivity to "wide", with the inevitable result of making the QRM even stronger. Under these circumstances the use of audio selectivity can provide welcome relief for deafened ears!

Audio selectivity is not a novel idea. It is incorporated, for example, in that old stalwart the CR-100 (the poor stability of which barely does it justice).

In recent years interest has been concentrated mainly upon IC active audio filters for this purpose, and many designs have appeared in the literature. Such a device has been tried out in conjunction with the JR-310 and was found very effective when placed between receiver and headphones. The main disadvantages of such active filters, briefly, are that input must be kept below saturation level, the output requires amplification, and a separate power supply is needed. With the JR-310, a more convenient approach was found to lie in the provision of a simple parallel-tuned circuit at the grid of the first AF amplifier. This enabled the full range of audio output to be retained without excessive modification of the receiver.

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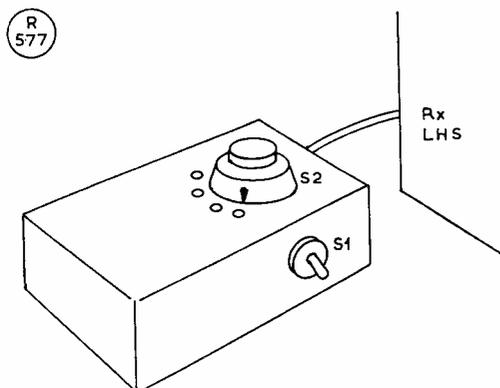


Fig. 1. General appearance of the Audio Selectivity Control as an add-on unit for the JR-310—see text.

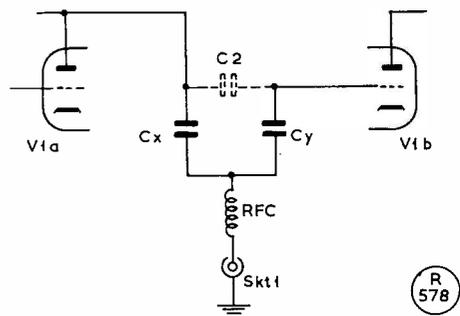


Fig. 2. Modification of AF sub-assembly in the JR-310 for provision of the external audio selectivity unit. Values are: Cx, Cy, .01  $\mu$ F, 400v.; RFC, 1.5 mH; Skt1, screen jack socket. Note that C2 is removed from the circuit board.

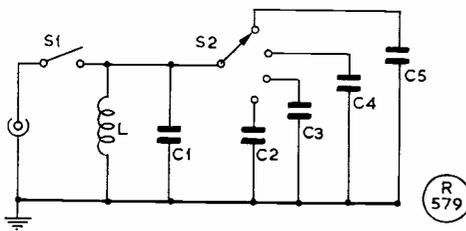


Fig. 3. Audio selectivity unit for JR-310, for which values can be: C1, C3, .047  $\mu\text{F}$ , 200v.; C2, .02  $\mu\text{F}$ , 200v.; C4, 0.1  $\mu\text{F}$ , 200v.; C5, 0.3  $\mu\text{F}$ , 200v.; and L, 120 mH.

### Audio Selectivity Unit—A Description

In this modification the essential components are contained in a small diecast box (*Eddystone* type 7134P,  $4\frac{3}{8} \times 2\frac{3}{8} \times 1\frac{1}{8}$  inches) which is connected to the receiver by a screened lead *via* a socket in the rear apron of the JR-310. A switch on the box enables the resonant frequency to be selected from four fixed values. The unit can be brought into action by means of a press-on press off switch (S1, Figs. 1 and 3). Incorporation of this unit entails some minor changes within the receiver itself (Fig. 2). The grid coupling capacitor C2 on the AF sub-assembly must be removed and its place taken by a pair of .01  $\mu\text{F}$  capacitors in series, the common connection of which is also a junction point for the additional AF tuned circuit (*via* an RF choke). The function of the RF choke is to prevent self-oscillation of the receiver when the selectivity unit is plugged in. On the rear apron of the receiver, close to the aerial connector, there is a hole which appears to have been made for a coax connection, *e.g.* the Amphenol type of socket. This spare hole can be blanked off with a small metal plate on which a socket (Sk1) can be mounted.

As for the selectivity unit itself, the diagram (Fig. 3) is self-explanatory. There is scope for adaptation to suit individual choice. The inductance L was made up by winding 250 turns of 32g. enamelled on a toroidal ferrite core (*Salford* Type MM475, rated nominally at 25.8 turns for 1 mH). Other ferrite cores (pot or toroid) having different ratings could be used if due regard is paid to the fact that inductance is proportional to the square of the number of turns.

The frequency selector switch (S2, Fig. 3) used was a single-pole multiway (break-before-make), but some economy in components might be achieved by redesigning the unit around a switch with a progressively shorting wiper.

The highest resonant frequency, 1500 Hz, corresponds to the optimum pitch obtained on "narrow" selectivity, whilst the lowest frequency is an octave lower at 750 Hz. Additional frequencies chosen were 1000 Hz and 1250 Hz, but these could be altered or omitted to suit the user. If the "narrow" filter has been fitted in the receiver, care should be taken to ensure that the resonant frequency of 1500 Hz actually corresponds to the optimum beat note obtained. Some trial and error may be necessary here in making up the correct value of parallel capacitance. In calculating the resonant frequency obtained, account should be taken of "stray" capacity amounting to about 0.2  $\mu\text{F}$ , due to the effect of the

coupling capacitors in the receiver.

With this unit in operation the measured 6 dB overall bandwidth of the receiver is 300-400 Hz with a very sharp "nose". Response falls off more rapidly on the LF side of peak (assuming a linear scale of frequency). In use, there is some "ringing" which can make high speed Morse difficult to read, but noise pulses are reduced to a mere "ping".

The value of the additional selectivity is most apparent when pulling weak signals out of bad QRM. With a little experience, one soon learns to select the most effective audio frequency for easy copy. In general the unit gives best results with selectivity at "wide," though "narrow" should be used, if available, when receiving at the 1500 Hz pitch.

### Construction of a Wide Filter

In the January article, the construction of a "narrow" (2 kHz) filter using *Clevite* resonators was described and reference was made to the eventual replacement of the "wide" filter which had been found to have an asymmetric response and a centre frequency which was outside tolerance.

Greatly improved results were obtained by replacing this unit with a 3.7 kHz filter made up in the same way as the narrow one. For convenience the circuit is shown again (Fig. 4) with a new table of values. Constructional details are the same as before, and the instructions for fitting are similar to those given in the *Trio* handbook for a mechanical filter. If the "wide" filter is replaced in this way, it is advisable to realign the IF transformers in order to obtain a well-shaped passband. Even if a wobulator and oscilloscope are not available for this purpose, a worthwhile assessment of the alignment can be made by injecting a fixed frequency (from a crystal calibrator) at the aerial, and observing variations in S-meter readings as the receiver is slowly tuned through the signal with function switch at "AM". Realignment can then begin by setting all IF transformers to the centre of the passband.

To do this, first tune the receiver so that the beat note is unchanged when the function switch is altered from LSB to USB. Each IF core is then trimmed to peak reading, the gain being adjusted so that S9 is not exceeded. Correction of "lopsidedness," etc., can then be done by adjustment of individual cores. This is a

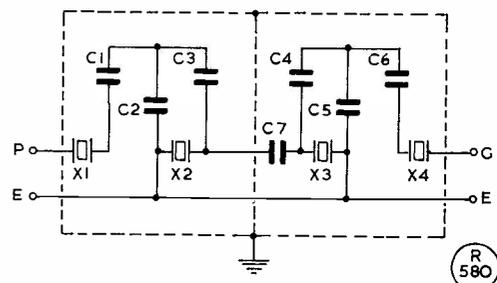


Fig. 4. Circuitry of a 3.7 kHz filter for the 455 kHz IF of the *Trio* JR-310. C1, C3, C4, C6, 270  $\mu\text{F}$ ; C2, C5, .001  $\mu\text{F}$ ; C7, 39  $\mu\text{F}$ ; X1, X2, X3, X4, *Clevite* identical resonators, Type TF04-442; all capacitors should be good quality silver-mica or polystyrene-foil.

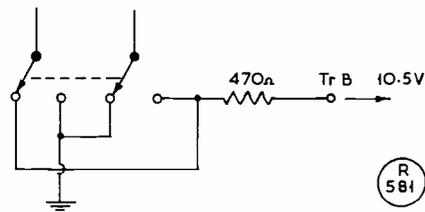


Fig. 5. Surge-limiting resistor modification for protection of the selectivity switch in the JR-310—see text.

rather tedious method, but it is infinitely preferable to the impossible task of doing the job by ear (not even worth attempting!). In practice, the new filter was found to result in the expected  $\epsilon$  dB bandwidth of 3.7 kHz, the shape of the passband being almost flat-topped with steep sides. A mechanical filter would undoubtedly do even better, because of the narrower bandwidth attainable at 60 dB, but the do-it-yourself filter is a worthwhile improvement on the filter originally fitted and is easy and cheap to construct.

**Selectivity Switch**

A note of warning must be sounded about this switch; it achieves its purpose by reversing the polarity of voltages applied to switching diodes which steer the 2nd IF signal to the appropriate filter. For reasons best known to *Trio*, a 4-pole 2-way make-before-break switch has been used. This means that the switching voltage is momentarily shorted to earth when the switch is operated. Rapid destruction of the switch results!

Replacement of the switch could prove difficult—it has a 6mm. spindle. To avoid its destruction a surge-limiting resistor of 470 ohms must be fitted in the supply line designated TrB, 10.5v. in the circuit diagram (Fig. 5). If the switch has already failed, all is not lost. Only two of its four poles are utilised, leaving two which can be used as spares. After carefully removing the twisted remnants of burn-out contacts, the switch can be rewired, and the additional resistor mounted on spare tags thereby made available.

**Top Band Conversion**

Though not an ardent devotee of Top Band, the writer decided to press the spare (“EXT”) band facility on the JR-310 into service for 160 metres, mainly out of curiosity. Results were so good that they will bear recording!

The “EXT” band was intended by the manufacturers to lie within the range 3.5-30 MHz. This is because the HF and 1st mixer coils will not tune outside this range. In covering Top Band it is necessary therefore to fit not only an additional crystal and coil in the first local oscillator section but also to add a set of HF and mixer coils. Space for this purpose is somewhat limited despite the generous amount of below-chassis “headroom”.

The approach adopted was to use miniature *Osmor* coils mounted horizontally below the coil pack (Fig. 6). As a result, Top Band core adjustment must be done with the base plate removed from the receiver, but in practice this had no detectable effect upon performance.

**The Local Oscillator**

An additional coil and crystal (7755 kHz, giving a tuning range of 1.8-2.4 MHz) can be fitted exactly as described in the *Trio* handbook. It is not essential to use a crystal with wire-ended encapsulation. There is sufficient room for an HC6/U can and holder to be wired in, an elastic band being fitted over the crystal to prevent coming loose in the socket. A suitable HC6/U type with a nominal frequency of 7754 kHz is available cheaply from advertisers in *SHORT WAVE MAGAZINE*. This can be adjusted to 7755 kHz by providing slightly less parallel capacitance (say 22 pF) than that specified (30 pF).

An anode tuning coil must also be fitted in accordance with the *Trio* instructions. The required inductance (30  $\mu$ H) is not available in the *Osmor* QO (oscillator) series of coils, but as only a single winding is needed, Type QHF-4 was chosen, its “grid” winding (pins 3 and 4) being utilised. This coil fits exactly into the hole provided in the chassis. (Press the coil firmly home until both sides of its spring clip snap into place.) Adjustment of this tuning coil should be left until the rest of the modifications have been attempted. Switching to “EXT” before the wiring is complete may damage the RF stage by open-circuiting the anode supply. The adjustment, which is not described in the *Trio* handbook, is quite simple. With a voltmeter between earth and the “B+” (HT) rail which links all of the oscillator coils, oscillation can be detected by a rise in voltage as the core of the coil is screwed in. Two positions will be found at which the voltage is at a maximum. Each maximum has a sharp-rise slow-fall characteristic. The core should be set so that the voltage is 90-100v. on the “slow-fall” side of the peak. If the core then projects from the end of the coil, it should be screwed further in so that the adjustment can be made on the other maximum. (Re-read the foregoing to make sure of the details.)

**Fitting The HF And Mixer Coils**

Before embarking on the following operations it is as well to do a “dummy run”, using one’s imagination instead of a soldering iron! Refer to Figs. 6 and 7:

- (1) Solder 1 inch of pvc-covered 22g. wire to

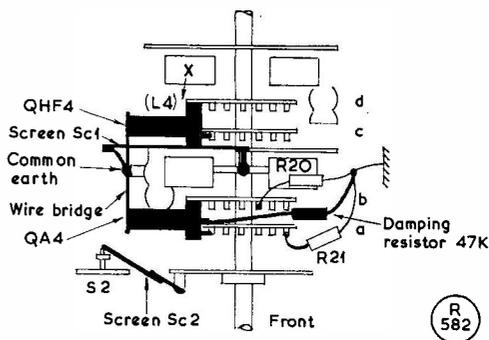


Fig. 6. General impression of the JR-310 coil pack showing, in heavy line, the position of the additional components for the Top Band modification.

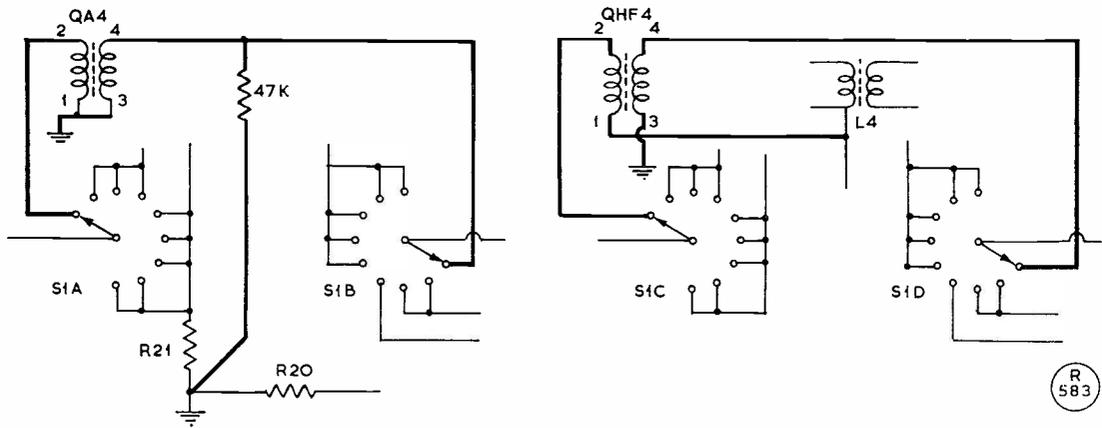
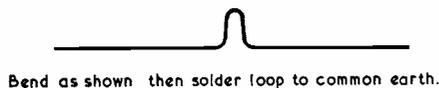


Fig. 7. Partial circuit of the JR-310 coil pack, with the Top Band modification in heavy line.

- each of the spare tags of wafers 'b' and 'd' (ready for instruction 7),
- (2) Solder 3 inches of pvc-covered wire to the tag on L4 at its junction with R7 and R6. Bring the free end up at "X" (Fig. 6),
- (3) Remove the metal mounting clips from the *Osmor* coils, noting the colour coding of the coils (QA4 blue, QHF4 green),
- (4) Gently twist tag 2 of each coil about 10 degrees anti-clockwise and shape the spare tags on wafers 'b' and 'd' (Fig. 6) to accept these tags, allowing the coils to lie in a horizontal position; solder them in,
- (5) Trim the wire at X to the required length and connect to tag 1 of QHF4,
- (6) Connect tag 3 of QHF 4 and tags 1 and 3 of QA4 to the common earth, taking care to make a sound joint,
- (7) Connect the wafers 'a' and 'c' to tags 4 on the corresponding coils (see instruction 1) and connect the damping resistor (47K) between tag 4 of QA4 and the common earth point of R21 (150 ohms) and R20 (33K),
- (8) Provide extra support for the coils by

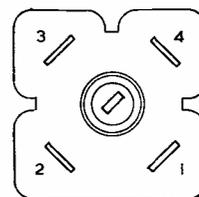
- means of a piece of 18g. tinned copper wire, 4 inches long, bent as shown (Fig. 8) and soldered to the common earth point. Bend the free ends of the wire carefully round the ends of the coils and trim off excess,
- (9) Fit additional interstage screening (Sc 1) consisting of a piece of copper-clad laminate (2 x 3/4 inches) between the coils, as shown in Fig. 6. The screen is attached by means of two "legs" made of 18g. trimmed copper wire, soldered to the common earth and to the earthing point for the coil pack trimmers,
- (10) Fit a similar screen (Sc 2, 2 x 1 inches) between coil pack and function switch, with copper-clad side facing the coil pack. The edge of the screen should lie snugly against the chassis and a short length of 16g. tinned copper wire can be used to earth the screen and support it by attachment to the spare earth tag at the front of the coil pack. The purpose of this screen is to prevent 4th harmonics of the BFO entering the front end of the receiver. Without it, these harmonics appear as S9 spurii at 1814 and 1826 kHz.



R 584

**Alignment**

This is quite a simple operation, more so because



R 585

Fig. 8. Wire bridge for the support of the Q-coils fitted as part of the JR-310 modification for 160 metres—see text.

Fig. 9. Connection plan for the Osmor Q-coil base.

trimming capacitors are not involved. It was found that they were an unnecessary refinement because the tuning range is so small and the tracking error between the two sections of the main tuning capacitors is minimal.

Proceed as follows: Switch to "EXT" and adjust the oscillator as already described. Set the main dial and IF tuning to zero. Set RF tuning to "WWV", with the white mark on the knob in line with the left-hand edge of the long white band. Adjust the cores of both Top Band coils so that their ends are flush with the "tag end" of the coil formers. Now peak both coils on an 1800 kHz signal or on "sharsh". Adjust IF tuning slightly if necessary. Check the core settings. Now reset the main tuning and IF tuning to "200." Retune the RF, using a

2 MHz signal or "sharsh". The correct setting should lie midway between the "WWV" and "3.5" points on the scale. Carefully check the core settings on both coils; they should be found not to require any alteration.

The base plate can now be replaced, and the receiver tested for any signs of instability on the new band (at all settings of RF gain control, with and without aerial). If the interstage screening and damping resistor have been properly fitted, no difficulty should arise in this respect.

In conclusion, the best testimonial that can be offered is that the receiver works so well on Top Band that the writer is now intent on building a *transmitter* with which to winkle out some of the DX already heard!

### TELECOMMUNICATIONS AND THE LONDON SCIENCE MUSEUM

Well worth a visit is the new Telecommunications Gallery at the London Science Museum in South Kensington. The Gallery was opened on Friday, October 29 by the Minister of Posts and Telecommunications, and includes examples of both historical and modern communications equipment. Nearly 10,000 square feet in area, it provides about twice the space previously available and new styles of exposition and display have been used to attract and stimulate the interest of visitors.

Broadly speaking, the gallery is divided into two sections, the first displaying models of line techniques and the second dealing with radio and television, both ancient and modern.

The lines section includes examples of early Trans-Atlantic cables and repeaters and progresses through to the modern telephone exchanges and the use of waveguides and optical fibres for long distance transmissions—and you can't get much more up-to-date than that!

In the radio section, examples of early domestic receivers for both radio and television are displayed side-by-side with the most modern sets. A comprehensive range of Military radio from the 1914 war up to the present time includes such well-known sets as the Marconi T.1154/R.1155 and some of the first airborne, VHF gear. Ship-borne equipment is not neglected, and



View of part of the new Telecommunications Gallery at the Science Museum, South Kensington, London, in which is displayed a great deal of apparatus of historic interest in the field of communications, right down to recent times. The section shown deals with Service equipment and in the near foreground can be seen specimens of the famous R.1155 receiver and T.1154 transmitter, which were the standard fit in aircraft of Bomber Command during Hitler's War. The R.1155 is, of course, well known and was the first Service receiver for airborne operation with anything like modern tunability and performance. The T.1154 was a very good CW Tx for HF-band working and was one of the first designs having a control layout with operator ease and convenience as an essential consideration.

full-size wireless cabins, dating from the early 1900's up to the present time, show strikingly the march of progress in this particular sphere.

The historical collection includes such prime exhibits as Cooke and Wheatstone's needle telegraph equipments—and here one must remark on the really beautiful wood and brass work of the cases—also examples of some of the early apparatus used by Marconi, and that for Watson-Watt's "Daventry" experiment to demonstrate the possibility of Radar. What is believed to be the only surviving example of the world's first centimetric radar, and a 20 kW short-wave radio transmitter dating from 1927 (in use at the Post Office Dorchester Wireless Station until only a few years ago) are also shown.

Working models illustrate both mechanically and

electronically various fundamental radio principles, and many of the display cabinets are equipped with handsets which, at the touch of a button, give the visitor a short explanation of the exhibit at which he is looking.

Of particular interest is the Science Museum Amateur Radio station GB2SM, which has Collins and K.W. equipment for all the HF bands, as well as RTTY facilities, and could arouse some envy in the breasts of those less fortunate people who are cramped for the sort of support and facilities they have at the Science Museum! In charge of GB2SM is G3JUL; a senior staff member, G5CS, has had much to do with the whole project.

A visit to this very fine addition to the Museum's collection should prove both entertaining and instructive.

A.H.D.

## DESIGN FOR A MULTI-MATCH COUPLER

VERSATILE UNIT COVERING  
ALL BANDS AND A VARIETY  
OF AERIAL FEEDER SYSTEMS

F. G. RAYER, A.I.E.R.E. (G3OGR)

WHEN using end-fed aerials, or a doublet or Zepp with open-wire feed line, the problem of a suitable aerial coupler arises. With such a coupler, suitable coil tapings can be found by trial and then soldered in place, but this is only suitable for *one* band and *one* aerial system, a soldering iron being needed to change tapings. A good method of changing tapings to suit other bands or aerials is to use multi-way RF type ceramic switches, but if the coupler is to be really versatile, and permit series or parallel tuning, as well as other configurations, the switching combinations and switches become quite numerous.

In the coupler described here tapings and other points are brought out to a terminal board. Flying leads can then be taken from various terminals, as required, to produce the circuit needed. (This is exactly as with certain commercial equipment which is set up for the required frequency and afterwards operated by unskilled personnel.)

By using numbered terminals, and noting connections for each band or aerial system, band-changing is accomplished in a few seconds. After one test on each band, the coupler can be set up immediately for the wanted band, to duplicate earlier results.

### Circuit

Fig. 1 is both the coupler circuit, and the panel terminal hole drilling guide, with dimensions.

Input to the coupler is by a co-axial socket, and a 75-ohm coax lead runs from the transmitter  $\pi$ -tank output to the coupler. It is helpful to put a 75-ohm SWR indicator in this co-axial lead, so that the coupler can be adjusted for minimum reflected power.

The coil for the HF bands has tapings numbered 8 to 16, 12 being the centre-tap. A central link winding has terminals 5 to 7. Using terminals 6 and 7 employs two turns; 5 and 6 provide three turns, while 5 and 7 give five turns here.

Tapings 20 to 28 are for the LF band coil, with 24 at the centre-tap. Three, five or eight turns may be selected on the link, by the use of terminals 17, 18 and 19.

In some cases it is of advantage to be able to place capacitance in series with the link. This is done by connecting 1 to 2, and connecting the link to 3 or 4 (or both).

For tuning, two separate variable capacitors are used, ganged with an insulated coupler, and isolated from the metalwork. These may be used singly, or together, for various forms of series or parallel tuning.

An end-fed aerial is connected to A1 or A2. Zepp or doublet twin feeders are taken to A1 and A2. Earth terminals are provided for an external earth, and for other connections where wanted.

The variable capacitors should have numbered dials, or scales which can be marked for each band, so that they can at once be set to the correct position.

It may clarify use of the coupler to note those circuits which are most likely to be necessary.

### Input

Input or link circuits are shown in Fig. 2. (1) employs the whole of a link winding—as example, connect terminal 1 to terminal 7 (1-7) and terminal 5 to terminal E (5-E) for the HF bands. If fewer turns are required, reduce the number to three or two, as at (2) by use of the appropriate terminals. Similar considerations apply to the LF band coil, using terminals 17, 18 and 19.

To obtain a very low SWR (3) may prove better. One section of the ganged capacitor is introduced by 1-2, and 3-7. This condenser may be placed at the earthed side of the link (4) by E-2, 3-5, etc. For the LF bands, if more capacitance is wanted, connect 1-2, 3-4-19, and 17-E, or as required (5).

### End-Fed Wires

For end-fed aerials, one of the circuits in Fig. 3 will usually suffice. In all cases the input of the coupler can be any of the circuits in Fig. 2.

In Fig. 3 (1) is one way of feeding an aerial which is a half-wave or multiple or half-waves. Typical connections

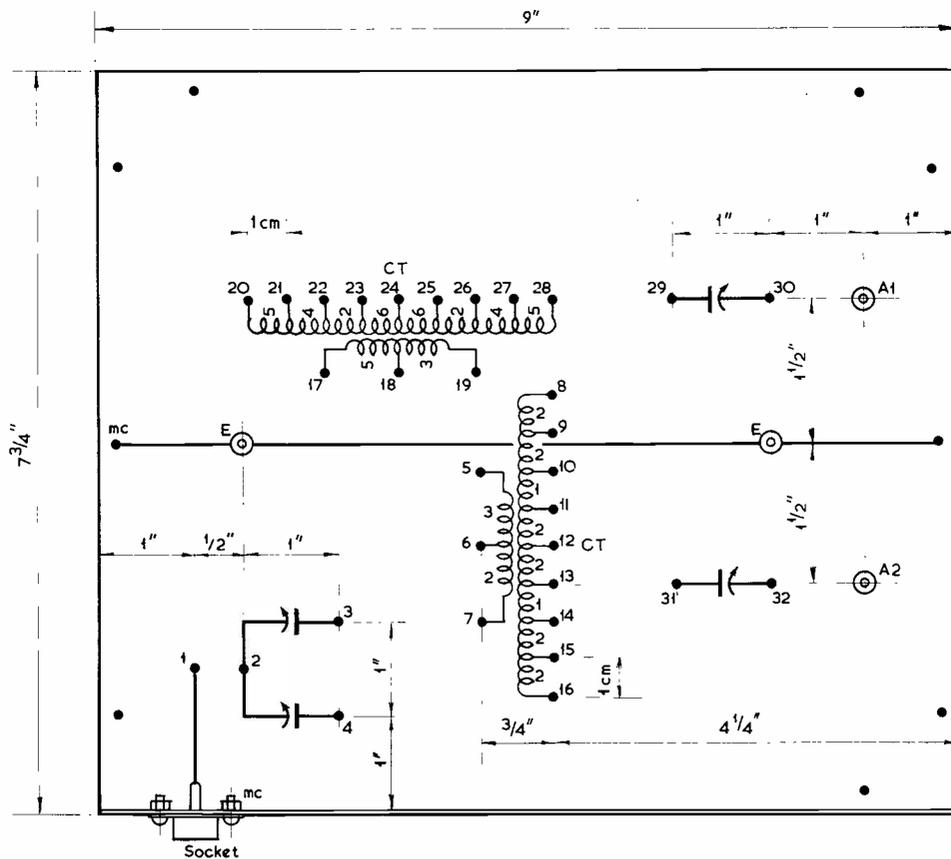


Fig.1 Circuit and Drilling plan

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*The Multi-Match Coupler described in the text.*

would be 8-29, 30-32, 16-31, 12-E and A1 to 29 for the aerial. The RF voltage is divided between the capacitors.

Circuit (2) earths the capacitors instead of the coil. Circuit (3) uses taps equal sides of the CT, such as 10 and 14, for a higher frequency band.

Circuit (4) involves one capacitor only, doubling the effective capacitance, compared with (1). Capacitance can be further increased by using both capacitors in parallel. This is not necessary on HF bands.

Circuits (1) to (4) are for high-impedance feed. For a somewhat lower impedance, tap the aerial down the coil as at (5). With both (3) and (5) the capacitors may of course be wired as for (4).

For a low impedance (quarter wave, or odd number of quarter waves) series tuning as at (6) is better, and one or both capacitors may be used. The earth connection can be to the centre-tap; the number of turns in circuit can be reduced as at (7) or the capacitor can be put at the earthed side of the coil, as at (8).

Other circuits will come to mind, such as using the whole coil for an end-fed half-wave in the manner shown at (9). With a little experiment it is usually possible to anticipate which method of feeding or tuning is likely to be most satisfactory.

**Open Line**

With open-wire feeders, similar considerations apply, but the coupler is always used in a balanced configuration. Fig. 4 shows some of the circuits most likely required.

(1) is for high impedance parallel tuning. For additional capacitance, one or both capacitors can be used as at (2) and the centre-tap of the coil is then earthed, if required. The circuit (3) is also for high impedance, but for a higher frequency band, such as 40m. Tuning may be on the lines of (2).

With a medium impedance (4) sometimes works, the feeders being equally tapped in on the tuned portion of the coil. But for low impedances, series tuning as in (5) will go better. For higher frequencies, where the whole coil is not wanted, the capacitors are tapped in equally, as at (6).

In some cases for the lowest frequencies, if more capacitance is required, use one or both capacitors as at (7). This is no longer strictly balanced, but usually proves satisfactory in practice.

The need for parallel or series tuning can often be anticipated by designing the aerial system and feeder length to suit, but on the HF bands a slight change in

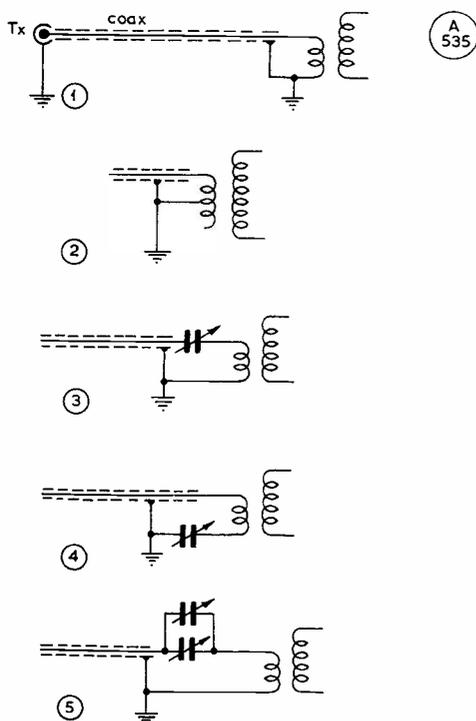


Fig.2 Circuits at the Link or Input side of Coupler

length, or other variables, can make considerable differences.

### Fly-Leads

These are of stout insulated flex or solid wire. Flexible leads can have soldering tags, or the ends can be twisted and looped. A 6 BA box spanner is handy so that nuts can be run on and off easily. Terminal heads could be used on the bolts instead.

The fly-leads should only be about as long as required, though an extra inch or two here is unlikely to have any effect, except on the highest frequencies.

### Construction

The use of two "universal chassis" flanged members 9 x 4in. and two 8 x 4in. makes a box 9 x 8 x 4 inches. The top was  $\frac{1}{8}$ in. thick Perspex, a little under-size (about 9 x 7 $\frac{1}{4}$ in.) and was chosen so that connections were visible inside. If the panel is opaque a diagram like Fig. 1 ought to be kept to hand, or the terminals marked for guidance.

Bolt the flanged members together, position the panel and drill for the fixing bolts, but leave the back and left side off until wiring is finished.

The box was made in this manner in order that it could stand upright on either end, or be placed flat, as circumstances require.

The 350 pF capacitors have three threaded bushes for 6 BA bolts, isolated from fixed and moving plates. One capacitor is bolted to the case front, and the other

to a bracket cut from a small flanged "universal chassis member" so that they are in line, and ganged with an insulated coupler. The 2-gang capacitor was bolted to a piece of paxolin about 2in. x 3in. which was in turn fixed to the case front, with spacers, so that its metal frame is isolated from the case. All capacitor spindles pass through  $\frac{1}{2}$ in. clearance holes.

For A1, A2 and the two E points, 4 BA terminals were used. All the other terminal points are 6 BA  $\frac{1}{2}$ in. bolts, with 6 BA tags under the panel, and washers and nuts on top.

All connections inside the coupler are of heavy-gauge wire, with insulated sleeving where required. A stout lead passes from the MC tags (case sides) to the two E terminals.

### LF Inductor

This was wound on a *Home Radio* CR.34 stealite former, 3 $\frac{1}{2}$ in. x 1 $\frac{1}{2}$ in.; using bare wire with slightly spaced turns, taps being soldered on as winding progresses. There are equal numbers of turns each side the centre-tap. Turns are cemented with a little clear *Bostik*. (The coil as a whole should *not* be varnished, or treated with any lossy paint or adhesive.) Probably the easiest method of making a neat winding is to anchor the wire firmly at one end, straighten it by pulling through the fingers or round a wooden toolhandle, then rotate the form in the hands, slowly moving forwards while keeping strong tension on the wire. Thin string can be wound on at the same time (to equalise spacing) and afterwards removed. The taps are about  $\frac{1}{2}$ in. long, and positioned and shaped to match the solder tags.

The link is well insulated wire, wound on a strip of tape afterwards turned over to hold the ends.

### HF Inductor

This is self-supporting, using 16g. or 14g. wire, of

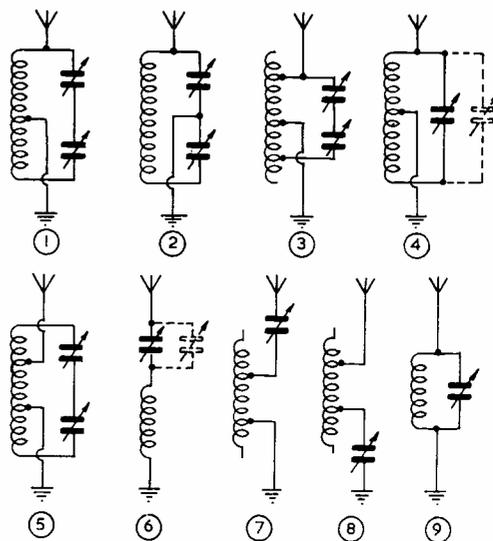
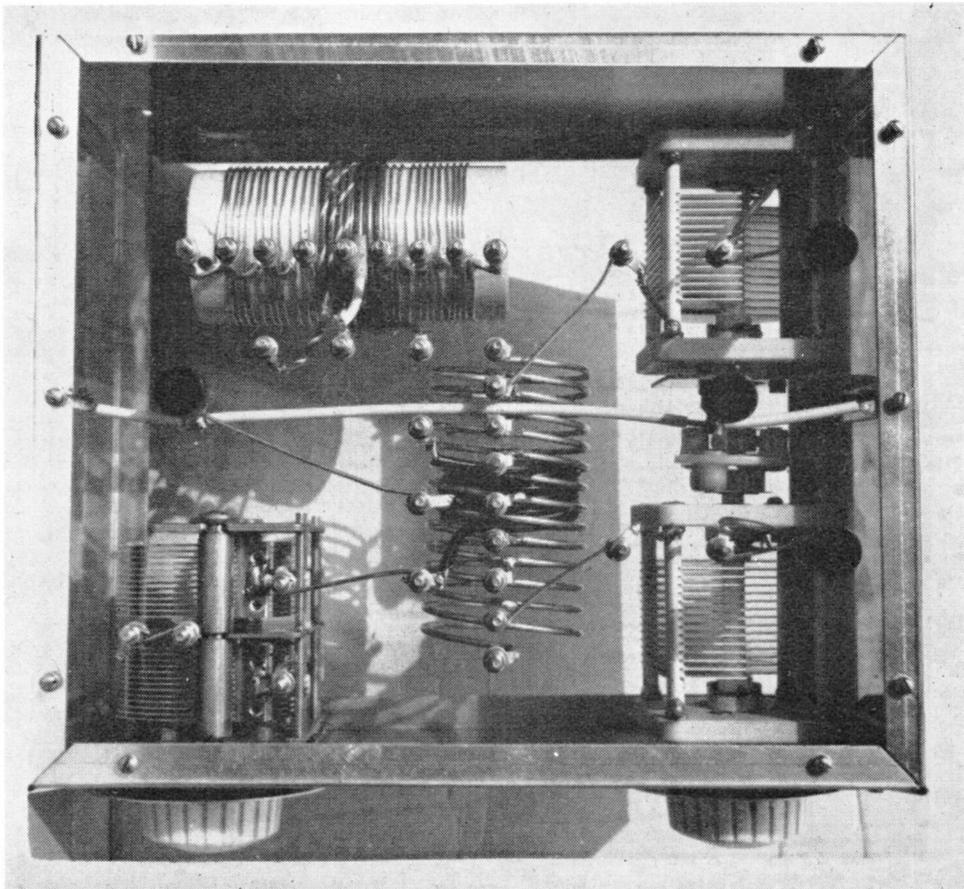


Fig.3 Methods of coupling Long wire and other End-fed aerials



*General construction of the Coupler — LF bands coil at upper left.*

14 turns 1½in. diameter by 3in. long. Anchor and straighten the wire as mentioned, and wind turns side by side in the manner described, on any convenient object of suitable diameter, as a mandrel. When this is removed, stretch the coil, or run a pencil or screwdriver round between turns, to obtain an evenly spaced winding.

Shape the ends and solder to 8 and 16. Short pieces of bare tinned-copper wire are then cut and shaped to go from the other terminal tags to the coil turns.

The link is made in a similar way, sleeving being put on the wire in advance. Its turns are inserted between those of the tuned winding, at the centre.

No doubt other coils could be equally suitable and it may be possible to adapt surplus or other inductors. There is no need for the exact number of turns indicated, provided there are enough tapings. The coils should be of stout wire, have low-loss construction, and be reasonably clear of metal parts.

#### **Power Capacity**

The 2-gang input capacitor is in a low-impedance circuit and will not normally spark over with any anticipated power.

The particular *Jackson C.12* 350 pF capacitors actually used have an air-gap of 0.024in. and are rated at 1 kV DC. Where they are in series (*e.g.*, (1) in Fig. 3, etc.) the pair would take 2 kV. In any series tuned application (such as (5) Fig. 4, etc.) the impedance is low and RF voltage relatively small. With parallel tuning of high impedance circuits, the RF voltage is large. The RF voltage developed across these capacitors naturally depends on the transmitter power, method of connecting, *e.g.*, (1) or (4) Fig. 3, and aerial loading. In some circumstances, as when feeding a very short wire, even more widely spaced capacitors will spark over at under the 150-watt level. On the other hand, where the impedance is not too high, 150w. can be greatly exceeded without sparking. For this reason, it is difficult to give a definite maximum rating. If sparking does occur on speech peaks, and the capacitors are used as at (1) Fig. 3, the only solution is to modify the aerial to reduce the RF voltage at the coupler end—or fit larger condensers having a wider air-gap.

The inductors should do for any U.K. amateur power rating, unless adjustments are made which result in much RF being dissipated in the windings! Normally,

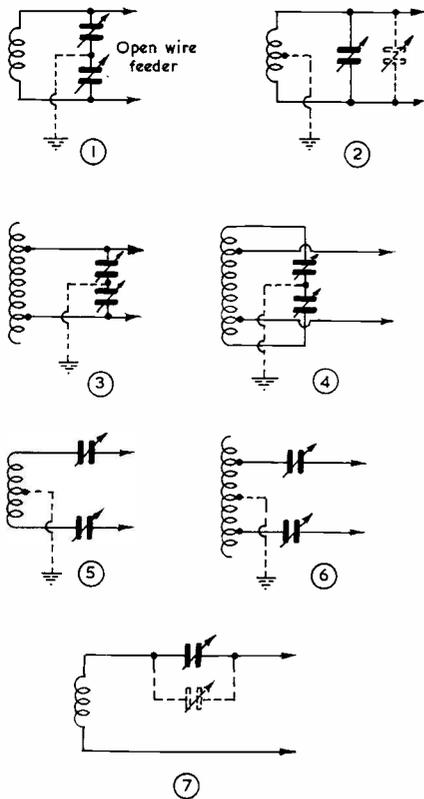


Fig. 4 Circuits for Zepp, Doublet or Double-Zepp, Two half-waves in phase, etc.

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the coils should feel cool after transmitting.

**Setting Up**

This has been described, but if a change is being made from the general use of a dipole fed with, say, 75 ohm coax from the Tx, some means of tuning up at reduced power is very wise, especially with an SSB transmitter capable of full power output. Adjust the coupler for minimum reflected indication on the SWR meter, or with small gear load the Tx into a 75-ohm or similar resistive load, and find coupler settings which result in similar loading.

The tapping points, adjustment of tuning, and adjustment of the ganged capacitor (if in circuit) all effect each other, and also the settings of the Tx PA tuning and loading or *pi*-tank output capacitors. This is the price which is paid for being able to work any band with almost any aerial, and a good reason for logging taps and dials.

**For Reception**

The coupler can of course, be built for reception only. Components should be low-loss, but no wide-spaced capacitors are necessary. Find those tapings which allow S-meter readings to be peaked on the receiver. In conditions of a bad mis-match between aerial and

Rx, a gain of about 2 or 3 S-points may be obtained—and even one S-point is worth having!

This Coupler can be fairly described as a pretty versatile unit for the amateur station, for both transmission and reception.

**POINTS OF INTEREST**

If you aspire to offering an article for possible paid publication in SHORT WAVE MAGAZINE, do please first read the directions under "Authors' MSS" on the Contents page of any issue of the Magazine—it gives you all the information you need for putting the material together, and the conditions under which we accept it for publication.

\* \* \*

Under the prevailing system of numbers for everybody and everything, our London post-code is now SW1H-OHF. But you can take it that you still have to address us as Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H-OHF—or, for the Editorial Dept., just SHORT WAVE MAGAZINE, BUCKINGHAM.

\* \* \*

Wessex Amateur Radio Group will be running GB3PMA on 15-20-80m., CW/SSB, from the Haven Hotel, Sandbanks, Poole, Dorset, during the period December 12-18. The significance of this operation is that it is to "mark the 70th anniversary of Marconi's original tests across the Atlantic." It was at the Haven Hotel that his spark Tx/Rx was set up in 1898 to communicate with the I.o.W. (For interesting details of Marconi's early life, look up a book called *My Father, Marconi*, which may be available at your local public library.)

\* \* \*

The total of VK amateurs licensed by the end of May was 6,359, including full AT and what we would call B-grade. By the end of August, the total of similar U.K. licences in issue was 16,800. About half of these would be members of the RSGB.

\* \* \*

For their financial year to end June, 1971, the RSGB announces a loss on operations of no less than £7,200, this being about *five times* the deficit for the previous year! No doubt the matter will be a subject for some serious discussion at their forthcoming AGM, on December 3.

**AMENDMENTS AND CORRECTIONS**

In the November issue, the following should be noted: In the Table of Values on p.540, R3 should read 5,600 ohms. Looking at the circuit Fig. 4 on p.546, there should be a capacitor C74 (560 µF) in the grid of V17, between the tops of C73 and R71—also, on p.547, the meter resistor marked "820" is R94 in the table of values. Thirdly, in the second formula on p.539, the expression should read.

$$P.e.p. = \frac{E_p^2}{E_{cw}^2} \times P_{cw}$$



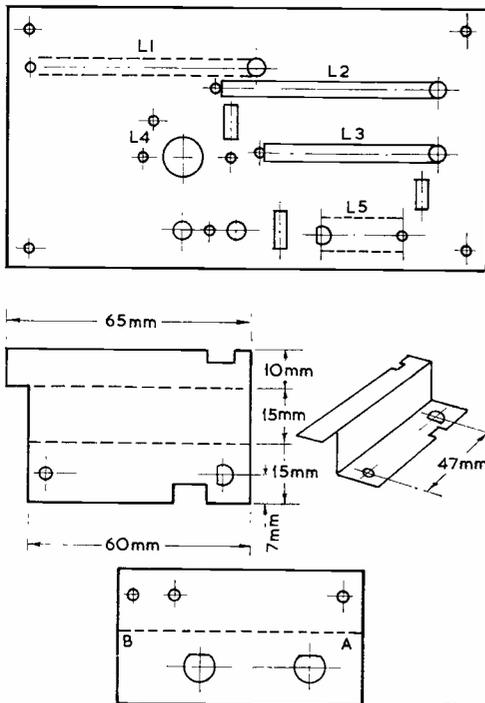


Fig. 2

Fig. 2. Above, drilling diagram for the copper-clad board. Centre, showing the folding and drilling for the screen between L1 and L2, using 22g. copper sheet. Below, mounting bracket for the BNC connectors.

of 50-60 dB depending upon the care with which the filter is constructed.

L2 is coupled directly to the emitter of the BF181, and the 288 MHz signal is injected into the base via the 0.047 μF capacitor C4 from L3. The 100K potentiometer RV1 enables the base current to be adjusted to give maximum conversion gain, and this setting will have a considerable effect on the overall sensitivity of the converter.

L4 is tuned to 144 MHz (since 432-288 = 144 MHz). The capacitive bridge across this coil tunes it to resonance and at the same time permits the extraction of the 144 MHz signal at an impedance of 75 ohms for connection to the receiver input.

The multiplier chain consists of a 96 MHz crystal controlled 2N706A oscillator and an MPS3640 tripler to 288 MHz.

The supply line is at 9 volts, either from batteries or from a 12-volt supply with a zener diode stabiliser, as shown in the diagram.

**Construction**

The converter is constructed on double-sided, copper clad board, and Fig. 2 shows the layout to scale. Brass may be used for the chassis, but the board is much easier to solder.

To facilitate test with other types, the transistors are mounted in holders. The screening between L1 and L2 is provided by the double-sided board, and that between L2 and L3, as shown in Fig. 2, is made from thin copper sheet, as is the mounting bracket for the BNC connectors. The construction and mounting of the tuned lines may be seen in Fig. 3. The drawings and photographs should be sufficiently explicit without going into greater detail.

**Setting-Up**

Before connecting up the supply voltage, check for short circuits, and do this before placing the transistors in position in their holders. Connect a meter in the supply line, and tune C7 for maximum indication.

With a GDO, check that L3 is tuning to 288 MHz and then increase the current through the BF181 by means of RV1 potentiometer, previously set at maximum resistance. Then with the GDO check that L4 resonates at 144 MHz, inject a signal at 432 MHz, and adjust the L1 and L2 tuning capacitors for maximum output. A wobulator would facilitate this operation, but is not essential for arriving at the correct settings—a beacon and some common sense will do just as well. The absence of a signal generator or wobulator need not be an excuse for not adjusting a converter on 432 MHz just as easily as one on 144 MHz.

**Performance**

The following small sum shows that an RF stage is not indispensable. The conversion gain of the BF181 is of the order of 10—that is to say that if the 144 MHz receiver has a sensitivity of 0.1 microvolt, as is not uncommon, then the overall sensitivity at 432 MHz will be at least 0.05 microvolts. Bearing in mind that the construction of a stable RF stage at 432 MHz is quite difficult, no further comment is required.

Although the converter had been tested in an area of high two-metre activity, no serious breakthrough was experienced—except from those two-metre stations radiating a considerable amount of third harmonic! Better rejection of the 144 MHz signals was obtained with this type of construction than could be achieved by placing a filter in the antenna lead. A signal giving an S9 reading on the meter of the main receiver showed only S6 when another converter with an IF of 28-30 MHz was used, even though this latter had 2N4416's or AF139's in the front end. By adjusting the gain of the receiver to give identical S-meter readings, it was possible to compare the signal-to-noise ratios of the two con-

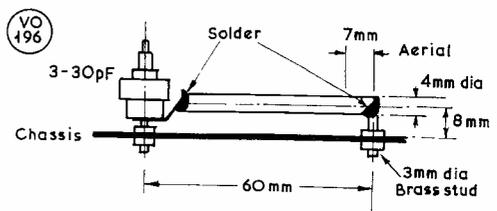
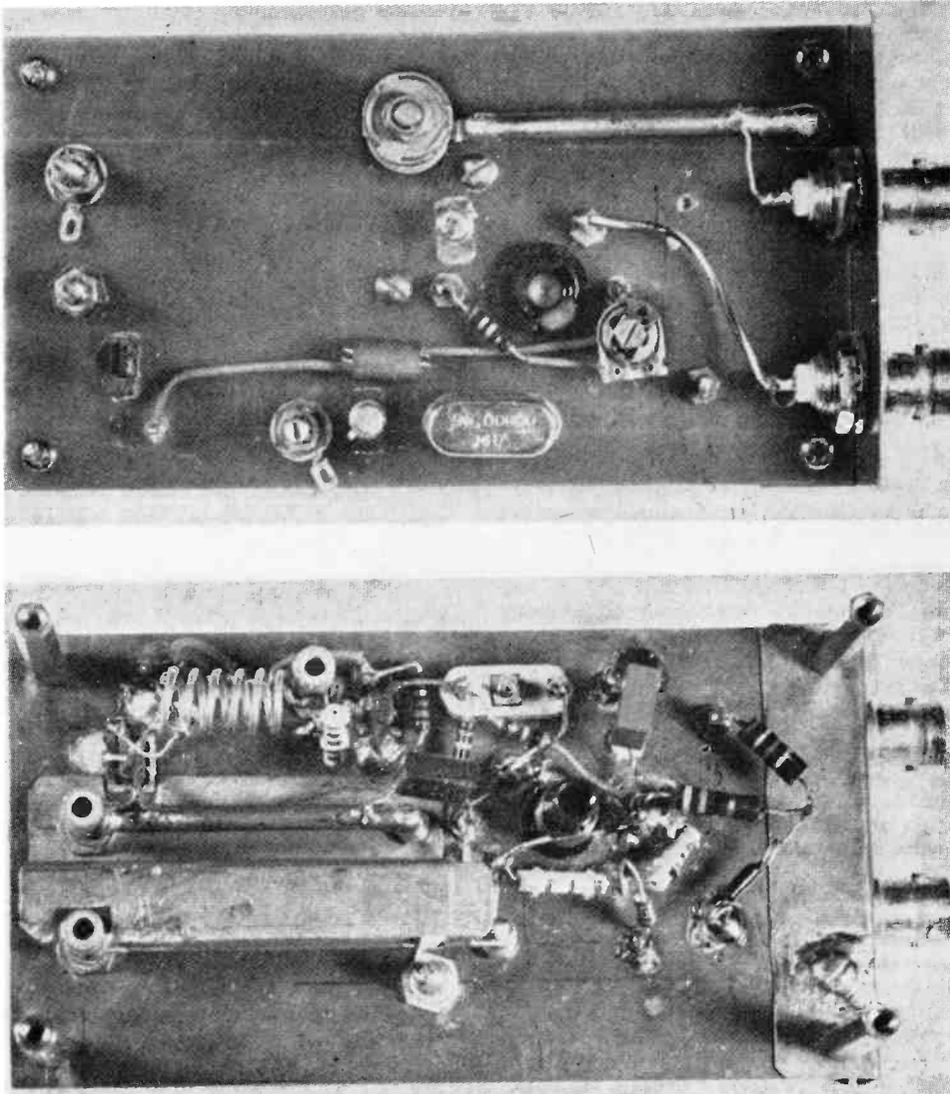


Fig. 3 Detail of L1

Fig. 3. The L1 configuration and mounting. L2 is identical except that the variable capacitor is tubular ceramic type. L3 is mounted in the same manner, but is 47 mm. long, with the Ae. tap at 7 mm., and the collector of the MPS3640 soldered directly to the capacitor.



*Construction above and below chassis for the Converter.*

verters, and the present design turned out to be marginally better, not by much, but nevertheless better. So one may well ask: Why go for more complicated and costly designs for essentially similar results?

#### Notes for General Guidance

- (1) If the input impedance of the 144 MHz converter is not constant then oscillation is possible. A resistor of 100-390 ohms, as shown at R5 in the circuit diagram, will effect a cure, but should be removed if *no* instability is observed.
- (2) Certain zener diodes produce appreciable noise if they are connected directly to capacitors, and the 27 ohm resistor shown as R2 suppresses this.

(3) In order not to degrade the performance (by increasing the chance of cross-modulation), protective diodes have not been incorporated in the design. It may be noted that the BF181 has a  $V_{eb}$  of 3v. compared with the AF239, which has a  $V_{eb}$  of only 0.3v. Obviously, the usual precautions must be taken when operating the transmitter. (Note:—Back to back 1N914's directly across the input socket should be acceptable in this design—*Editor.*)

(4) With some MPS3640's there may be a lack of 288 MHz output, and in these cases the capacitor of C8 and the parallel resistor R6 should be removed and a direct connection made between L5 and the emitter of the MPS3640.

## CONDITIONS CHECK FOR UHF/VHF

### USING TV TRANSMITTING STATIONS

C. MORTON (G8EMS)

To evaluate on conditions at VHF and UHF most people check the strength of the various beacons situated up and down the country. However, these beacons do not always give an accurate indication of conditions, e.g. PAØ's have been heard (in Leeds) when the Kent beacon was at its usual level. It can depend on the skip distance. During good conditions recently, stations in Sussex, Kent, Surrey and Hampshire were coming in at 5 & 9+, yet nothing was heard from north of London. The following afternoon the beacon was only slightly above its usual strength but GC2FZC was coming through at 5-9 with a number of French stations.

To be able to predict good conditions is a very valuable asset to the VHF enthusiast.

In the U.K. there are now many low-power television relay transmitters, in fact about one in every county. Surprisingly enough, quite a few of these can be received regularly. Although these stations will be too weak to be of entertainment value (unless high gain aerials and possibly pre-amps. are installed) they do, however, act as very reliable beacons. When conditions are good from their directions these stations will be well up, even as strong as the local.

From Leeds it is fairly easy to work into Manchester, but much more difficult to work into N. Lancs. As there are no amateur-band VHF beacons in Lancashire the only way to check conditions is to monitor the TV Channels or the local radio stations. For example, when Granada TV or Radio Blackburn is coming through better than usual (both of which can be received in Leeds at reasonable strength) then it is most likely that the N. Lancashire stations will be there on two metres.

Each of the VHF and UHF amateur bands is situated close to TV frequencies, i.e. 4 metres, Band I, 41-67 MHz; 2 metres, Band III, 175-215 MHz; 70 cms., Bands IV & V., 475-830 MHz.

Propagation affecting the VHF bands will similarly affect their corresponding TV bands.

#### Four Metres

Band I TV and 4m. signals are affected by tropospheric ducting but to a lesser extent than 2m. and 70 cm. signals. TV signals on Band I can be received from about 100 miles under normal conditions using simple aerials such as dipoles or 2-element Yagis. Above-normal signals from a certain transmitter will permit greater distances to be received (or worked) in that direction on 4 metres.

Another form of propagation which affects 4m. and all frequencies from about 30 MHz to 150 MHz is Sporadic-E. This is the ionisation of clouds at a height of about 50 to 70 miles causing signals, which would normally have been lost in space, to be reflected back to earth over distances of up to 2000 miles. During the

months of May, June, July and August Spor-E is quite common, with ionisation permitting signals on frequencies of up to 50 MHz to be reflected just about every day during these months. The frequencies of up to 70 MHz are reflected a little less often during May and the latter part of August but quite commonly during June and July. Since there are only a few countries with 4m. amateur stations the working of DX on this band is not usual—though Malta, Gibraltar and Iceland are within range.

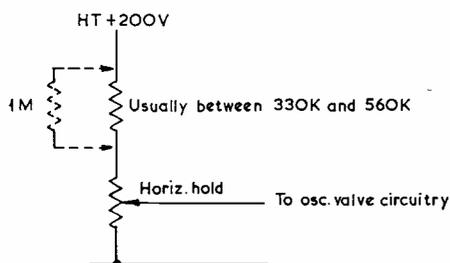
Sporadic-E also reflects TV signals from countries all over Europe. The Continental TV system differs from our own—625 lines instead of 405 lines on Bands I and III and negative modulation instead of the positive modulation used in this country. To increase the line-frequency it is necessary to reduce the value of the series resistor between the line hold control and the HT rail. The line frequency depends on the bias on the grid of the multivibrator valve, thus increasing the bias increases the frequency. (See diagram.) This is achieved by wiring in parallel with the series resistor (usually 330-560K) a resistor of about 1 megohm. Secondly, to permit the resolution of the negatively modulated picture, the video detector needs to be reversed. The aerial required for the reception of these signals is a horizontally polarised dipole cut for about 56 MHz preferably on a rotatable mast (otherwise fired N-S).

When the Spanish TV is coming through quite well on frequencies around 60 MHz it is well worth checking four metres to see if the Gibraltar beacon is there. If TV signals can be found on frequencies around 50 MHz but nothing above, then it is less likely that there will be any ionisation affecting 70 MHz but there is always the possibility that there is no TV transmitter on that frequency in that area, so it is still worth checking.

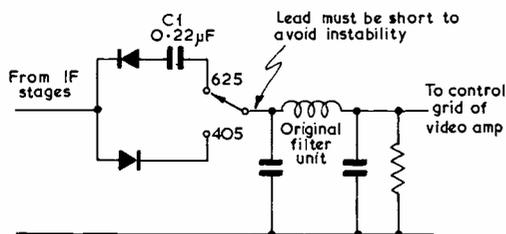
#### Two Metres

Occasionally, during exceptionally high ionisation, signals of up to 150 MHz are reflected by spor-E. Such conditions are rare, occurring only a few times during the summer months. The best way to check is first to monitor the higher Band I TV channels and if signals there are very strong, then check of the VHF/FM band to see if any Continental FM stations are audible—if so, a careful check over two metres could reveal some DX. Such an opening is usually short-lived, about an hour at the most, permitting such prefixes as EA, I, YU, HA, HG, OE, OK, SP and such to be worked.

The most common form of opening is tropospheric, permitting 5 & 9+ QSO's over distances of several hundred miles. Propagation on two metres follows a very similar path to that of Band III television. As with Band I signals it is possible to receive other TV transmitters regularly although once again they will probably be too weak to be of entertainment value, but they make excellent two-metre beacons. It is possible to receive TV stations from about 80 miles distant, which will vary in strength with conditions. The aerial required is at least a five-element Yagi on a rotatable mast (or an 8-ele in the loft should give results). The TV stations from the Continent will have to be coming through well before any 2m. DX is heard, because the TV transmitting aerials are usually between 500 and 1000ft. above the ground on the highest ground in the area, whereas the amateur's aerial is usually less than 50ft. above ground in



Modifications to Line oscillator for 625 line operation



C1 inserted to prevent positive bias being applied to video amplifier grid

Modifications to Video Detector



the average case. Also, the TV stations are pumping out several hundreds of kilowatts, yet the amateur is generally running not more than 500 watts e.r.p. But a TV receiver needs millivolts for operation, whereas the amateur Rx only requires microvolts, so there is a levelling out.

On July 6 the Dutch TV was coming through from about 1700 BST but it wasn't until 2030z, when the Dutch TV was quite strong, that the PA0's started to be heard. There were, however, only three stations on the band at the time, and so for half-an-hour we all had a ball until everybody else caught on to the fact that the band was open.

On the morning of August 25, the French TV came through at 0900z—so the two-metre rig was switched on and there was F6ALH signing with a station in London. The writer then gave him a call and back he came. By the time the locals came on at about 1000z, the band was flat again.

What is there on a morning on the TV set (which wasn't there the night before) often returns in the evening. One such occasion was September 7 when the Danish TV was coming through quite well on Band III. That evening there was an excellent opening to Scandinavia, Holland and Germany with SM's OZ's, DL's, etc. all pounding through at 5 & 9+, and on a Pye Ranger at that.

### Seventy Centimetres

The same follows on 70 cm. as for two metres except that the equivalent TV is on Bands IV and V. Again, power and height of aerials means that the TV comes through before the amateurs. 70 cm. can, however, be wide open when 2m. is flat. It is, therefore, obvious

that one should check the TV band that corresponds to the amateur band concerned.

Occasionally, depending on conditions and skip distance, EU amateurs can be heard, yet there is little or nothing on the TV, because there are no TV stations in the vicinity. TV aerials for Bands IV and V should be high-gain Yagis of 9 or more elements. The clarity of TV signals on these bands is really excellent and has to be seen to be believed.

### CODAR AIR-SPACED COILS

The Codar Radio Company tell us that their range of air-spaced coils is now available for much higher temperature applications. A new rod support material allows coils to be used in temperatures up to 145°C, whilst the electrical characteristics are similar to p.t.f.e. insulation. This new development allows extremely low-loss and lightweight air-spaced coils to be fitted where previously only bulky ceramic or glass-fibre former wound coils could be used.

The new coils are available in a wide range of types, in diameters from 1in. to 3in., wire gauges up to 14g. with spaced turns, integral switches or tap leads, varied pitch, and with vertical or horizontal mounting accessories.

### QRM FROM RF HEATING APPARATUS

The Ministry of Posts and Telecommunications announce new regulations, coming into force in October 1972, concerning the control of interference from RF heating apparatus in the range 150 kHz-1000 MHz. These specify limits of radiated field strength and terminal voltage within that frequency range. They apply only to users of equipment and give the Minister power to intervene in cases of interference and to advise on remedial measures with which, contrary to the present situation, compliance is mandatory. This sets up an entirely new situation in the context of RF heating and micro-wave cooking, and is long overdue. We hope that it will help G3CY with his local QRM problems—see p.424, September.

### RADIO TELESCOPE DEVELOPMENTS

The Astronomy, Space and Radio Board of the Science Research Council tell us that tenders will soon be considered for the construction of a 375ft. aperture dish for the Jodrell Bank group of astronomers and that studies are being undertaken on proposals for an accurately figured dish working in the millimetre band—this calls for a very high degree of engineering accuracy, to ensure the received signals being directed to the dipole focus. Also, detailed studies are being made of proposals for the development of radio pulse work and the cosmic ray detecting array at Haverah Park, near Leeds. Construction continues of the new 5 kilometre base-line Radio Telescope at Cambridge. The programme of repairs and modifications to the Mark I Radio Telescope at Jodrell Bank should be completed by the end of the year. The Mk. I was, of course, the first instrument used by Sir Bernard Lovell.

## THE 1971 J-O-T-A

*International Scout Event,*

*October 16-17, 1971*

**T**HIS year's Jamboree-on-The-Air, the 14th annual Scout QSO Party, was probably better supported than ever before, with nearly 50 prefixes outside the U.K. identified as running Scout stations specially for the occasion—and these callsigns included some choice DX. The U.K. participation was at a high level, many special GB callsigns having been issued for the week-end.

Though the Wx was very bad in many parts of the country, radio conditions generally were quite good, even 10 metres exhibiting a degree of activity. A preliminary survey by G3BHK (the U.K. organiser) shows that at least 287 overseas Scout stations were worked from the U.K.

The new time-rule—midnight Friday to midnight Sunday for anywhere in the world—was probably an important factor in the success of the 1971 J-O-T-A, because it gave a 48-hour period during any 24 hours of which DX would normally be workable from any part of the world.

We have received a number of interesting individual reports, and a summary of some of them follows:

**Dunstable, GB3EDS:** Operated for the 8th Dunstable Scout Group by G3DOT, G3YPP and G3ZSQ, using a KW-2000 on the 20-160m. bands, with some activity also on two metres. The inverted dipole put up for 20m.

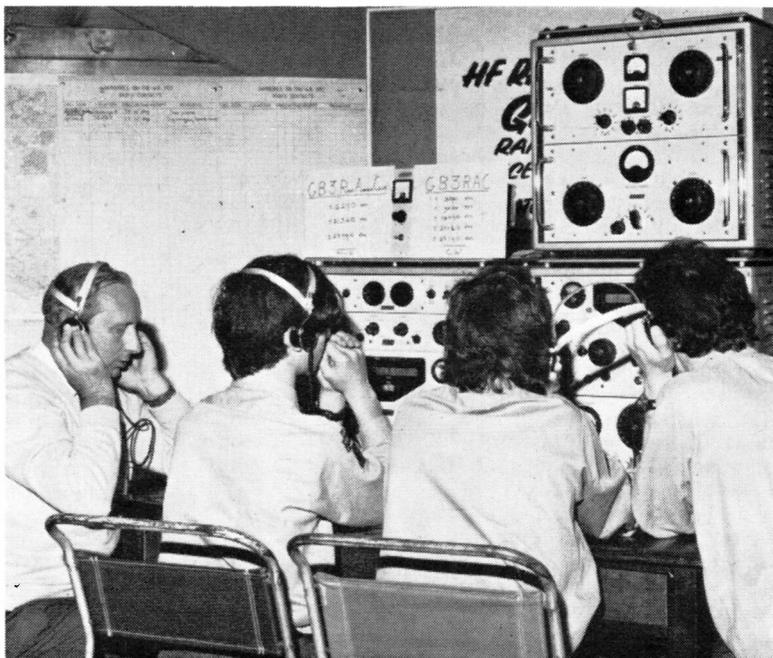
showed a perfect dipole polarisation pattern when contacts were plotted on a wall chart by the Scouts—which was in itself an instructional exercise for everyone concerned. The J-O-T-A stations worked were all European.

**Saltash, GB2SS:** Located at the Hq. of the 2nd Saltash Scouts, bands worked by the three Saltash Club operators (G3XCU, G3XCS and G8BKI) were 10-160m. and 2m. On the air for 27 hours, they raised 55 J-O-T-A stations in 19 countries, best Scout DX being ZS6PP, PY1BIM, PY1DBE, ZE4JS and ZC4AVU, these all being on specially for the occasion; one Scout station, I8WAM, was worked on 10 metres. The contacts most enjoyed by the boys were those with the Scandinavian stations, where the visiting Scouts and Guides were allowed to speak into the microphone.

**St. Germans (Cornwall), GB3SGS:** The Saltash & District Amateur Radio Club also provided a station for the recently formed St. Germans (Cornwall) Scouts and with six operators they kept going for 30 hours, making 48 J-O-T-A contacts in nine countries. Their most interesting DX was 5Z5KSA, at the Hq. of the Nairobi Scouts, using a special prefix. They also worked G3WLK/A on Brownsea Island, Poole Harbour, where Baden-Powell started it all 'way back in 1907. (We congratulate the Saltash group on a fine two-station effort and only regret that these few notes hardly do justice to their excellent reports on GB2SS and GB3SGS. —*Editor.*)

**Hale Barns (Ches.), G3AOS/G3WWX.** Once again, this was a highly successful local effort, even council officials coming in to listen to the QSO's world-wide the 1st Hale Barns Scouts were making. Out of about 300

GB3RAC, of the Racal Amateur Radio Club, Bracknell, on 21 MHz during this year's J-O-T-A, when they entertained a large contingent of Scouts from Berkshire, including young Prince Andrew, who is now a member of the Heatherdown School Troop. During the 48 hours, more than 200 contacts were made, many to DX. The Racal apparatus on display included not only gear for three complete amateur-band stations but also much ancillary equipment of communications interest.



contacts, 96 were with Scout stations. Two separate sets of equipment were in use, with appropriate antennae systems (including a 10/15m. three-element beam on a 45ft. tower). Their most interesting Scout contacts were with 9N1MN (Khatmandu), W19BSA ("Boy Scouts of America"), VP9BS and VE8RCS (representing a Scout group only 400 miles from the North Pole). Operation was kept up for no less than 40 hours out of the 48 and, such is the enthusiasm for Amateur Radio engendered by J-O-T-A, the Scout Hq. is to be enlarged to include a radio room with workshop facilities. Much of the credit for all this must go to Geoff Barns, G3AOS, who, with his helpers, has supported the J-O-T-A event from the first.

**Dublin, EI2BY:** Using three sets of gear with five operators (EI4CB, EI5A, EI7BV, EI7BZ and EI7CB), they had a fine assortment of antennae, including a rhombic with 280ft. legs—nice! The 81st Dublin Troop, for whom this effort was made, co-operated with enthusiasm and the whole event was much enjoyed by all involved. Out of about 200 contacts, 75 were with J-O-T-A stations, their "Scout DX" including 5Z5KSA, ZE4KS, ZE1DM, 5N5BSN, 9N1MN, PY2CUF and PJ2CE.

**Nottingham, GB3NCS:** Put on by the Amateur Radio Club of Nottingham for the 24th Cavendish Scout Group at their Hq., more than 40 operating hours were logged on 10-80m. and 2m., the all-band total of QSO's being about 200.

**Nottingham, G3EKW/A:** This was the No. 2 J-O-T-A station organised by the A.R.C. of Nottingham, the Scouts entertained here being the 31st Nottingham. The ops. put in 30 operating hours and kept to 20/80m., making 150 contacts, mainly on 80m.—though VK was worked on 20m. and VO1 on Eighty. Here again, the general feeling was that J-O-T-A is very much a worthwhile event (just look at the pictures that go with this brief summary)—and the Nottingham Club boys are to be congratulated on their two-station effort.



For this year's J-O-T-A, the 1st Hassocks Scout Group had G3ZZZ on the air, this being the personal call sign of Miss José Brooker, who had her father, G3JMB, helping her with the logging. They worked 41 J-O-T-A stations, including HV3SJ and K2BSA, of the New York Boy Scouts of America.

**Cullingham (Yorks.), G2SU/A:** The Northern Heights Amateur Radio Society organised this station for the 3rd and 11th Keighley Scout Groups, operating mainly on 20m., with some time spent on 15m. and 80m. The gear was provided by G3MDW—for these many years a stalwart in those parts—and operators were G3TFF and G8BMI. The latter, one of our well-known RTTY men, had contracted to produce a print-out of the Saturday football results, but something went wrong! (Never undertake to give a demonstration because something always *does* go wrong!—*Editor*.) Some ten countries were worked in the J-O-T-A context.

(over)



Operating from Scouts' Corner, Hereford, G3YDD/A was mounted by local amateurs for the Hereford District Scouts. They had a Swan-500C Transceiver and dipoles for 20/80m. Operators were G3EYH, G3RJB and G3WRA. As well as working many of the GB J-O-T-A stations, some 20 contacts were made with Scout groups outside the U.K., one of the most interesting being OY6NRA, Faroe Is., the first time there has been a Scout station on the Faroes.

Picture "Hereford Times"

**London, GB3BPH:** This is, of course, the U.K. Scout Hq., in Kensington, where they have a very fine Amateur Radio set-up, capable of working in any mode. Their trouble is background racket on all bands, in what is obviously a high-noise area, making the reception of weak DX difficult. However, they succeeded in knocking off no less than 141 different Scout stations in 18 countries—a creditable effort indeed.

**Geneva, HB9S:** This is the Hq. station of the World Scout Bureau—where, oddly enough, they had all sorts of troubles, attributable in the main to Murphy's Law, including being besieged by complaints of TVI! (What, in Geneva, with the local TV stations pushing 100+ millivolts into the Rx aerials!—*Editor.*) Anyway, they got through it all to work 143 Scout stations in 25 countries—totals rather down on last year, but again attributed to the machinations of Murphy. Some of their more interesting contacts included PJ2CE, with the Curaçao Minister of Communications visiting, and with the Principality of Luxembourg, which apparently had no less than eleven Scout stations on the air! (*Cor!*)

**Maidstone, GB3MLA:** This station was set up by Maidstone District Scouts, who stuck to 15-20-80m. All continents except VK were worked, their best Scout DX being HS4ABL on 20m.—a very nice QSO for anyone's book. Of the five operators on GB3MLA—G3ERY, G3NRU, G3YJS, G3ZHZ and G8LZ—three are active in the Scout movement locally.

**Ivinghoe Beacon, G8CBU/P:** Of all the reports we have had for the 1971 J-O-T-A, this one is unique—the station was operated, under canvas in appalling Wx conditions, on two metres only. The Scout group concerned was the 7th Icknield District (Luton), and G8CBU did all the radio work single-handed. The astonishing fact is that of their 90 two-metre contacts, no less than 24 were with Scout stations—implying that there was far more J-O-T-A activity on VHF

than has been reported. The narrative says that in spite of everything, they all enjoyed themselves—the boys kept the log, wrote out QSL cards and did the cooking, as well as taking turns to prevent the beam from being blown down, it being hard enough to keep it headed in the desired direction in the Force 7 winds during the night.

(This we regard as a Pretty Good Show.—*Editor.*)

**Seaford, GB3SS:** The Southdown Amateur Radio Society put this station on for the Seaford & Newhaven District Scouts, from their Seaford Hq. Three separate sets of equipment covered the 10-160m. bands, with an additional "loose" Rx on which the Scouts could tune around. Some 178 QSO's were made on the bands worked.

**Wigton, Cumbs., G3CBW:** On the air for the 3rd Wigton Sea Scouts, G3CBW in his shack kept a steady stream of boys interested in the operation. He put in two operating sessions of 12 hours each and accounted for 42 different Scout stations in 15 countries—in addition, 37 other stations were worked, with W5 and VE6 as best DX. G3CBW is Asst. Leader of the 3rd Wigton Sea Scouts and is to be congratulated on a most commendable solo effort.

**Scarborough, G4BP:** The callsign here may be said to be fortuitous, because it has been the Club call of the Scarborough Amateur Radio Society for more than 30 years. They have always had a very happy association with the 1st Scarborough Scout Group—which has a current membership of 70 Cubs, 40 Scouts and 18 Venture Scouts, owning their own Hq., built at a cost of £35,000 raised by the Scouts themselves. G4BP ran a fine array of modern equipment with antennae to match (a Mosley TA-33 at 40ft. for the HF bands and a K.W. trap dipole) and made about 120 QSO's in 36 different countries; of these, 41 were with J-O-T-A stations in the U.K. and overseas. They had one three-way contact with VK/ZL Scout stations; one with a

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The Scarborough Club, under their own callsign G4BP, had a large attendance from the 1st Scarborough Scouts for J-O-T-A, as reported above. Here, G3JBR is doing the operating.

Picture "Scarborough Evening News"

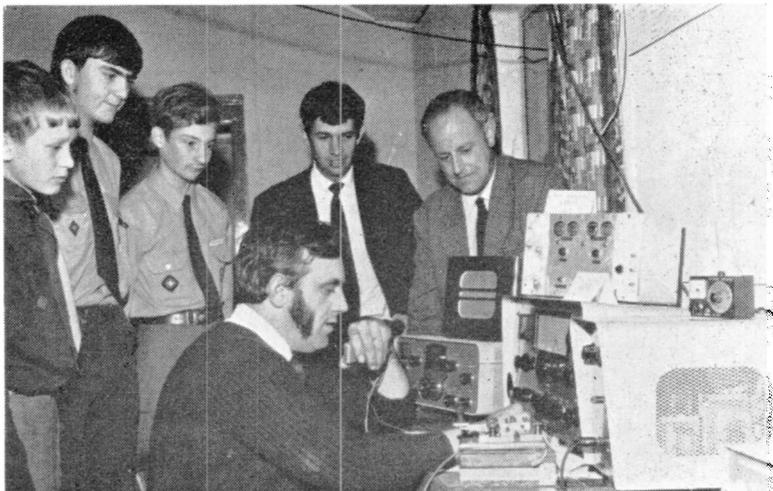
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Seaford & Newhaven District Scouts at GB3SS, put on by the Southdown Amateur Radio Society, with G3XUS, G3LFZ and G3ZFE (seated). The gear consisted of a Heathkit SB-300 Rx and K.W. Viceroy transmitter, with which 178 QSO's were made, including VE1HE/PI, Nova Scotia.  
*Picture "Sussex Express"*

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For this year's J-O-T-A, Edgware Radio Society organised two stations, both signing GB3FES, and entertained the 1st Edgware Scout Group, some of whom are seen here at the HF-band station, with G3SJE operating.

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Scout camp up on Mt. Hagen, New Guinea; and what is described as "a most useful QSO" with an OE Scout station, in the course of which arrangements were made about a suitable camping site for the 1st Scarborough's trip abroad next year.

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Foregoing is the most extensive J-O-T-A report, with illustrations, that we have yet published in SHORT WAVE MAGAZINE. It shows what Amateur Radio can

mean in the Scout context—not only in terms of contact world-wide but also in attracting youth to one of the most intelligent and interesting hobbies open to them. Such results as we have been able to report here would not have been possible without the co-operation and understanding of a great many licensed AT-station operators who themselves appreciate what they can do, in a practical way, to enthuse the young.

A.J.F.

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*"Short Wave Magazine" covers the whole field of Amateur Radio and should be obtainable to order through any newsagent.*

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# VHF BANDS

A. H. DORMER, G3DAH

WE'VE really done rather well with VHF propagation over these last few weeks. There was the opening early in October, and then the splendid lift to the Continent over October 22-24. The steady high pressure area over France gave plenty of warning that there should be something doing in that direction, but it was not until the 22nd that things really began to hot up. From the South, contacts right down into the South of France were being made on two metres in the morning, with F9NL well to the fore from his Pyrenean QTH, and several stations down in the Biarritz and Bordeaux areas at fantastic strengths. By evening, the best DX was coming from Brittany and the West Coast of France, with but few ON or PA audible. 70 cm. was also good into northern France. These conditions persisted through the night, with some DX audible from such unexpected quarters as the 5 & 8 signal (in Herne Bay) from EI9BC in Dublin, who was working one French station after another, but did not appear to be at all interested in working G stations! GC8AAZ made a welcome SSB appearance at 5 & 9 from Jersey. By early morning on the 23rd, the axis had shifted slightly, and propagation appeared best to the East, many QSO's being made with stations in Eastern France, as far as the Strasbourg and Vosges areas. By midday, the Germans were audible with "Checkpoint Charlie" and DLØER both up at 5 & 8, and

by evening, the EU QRM on 2m. sounded like that on 40m! Even the DM's were workable at good levels—and don't forget that DM counts as a separate country for the VHF Tables. Things had quietened down a bit by the next day, but SM and OZ were worked during October 26-28.

The first few days of November also produced good DX to the South and South East, with EA and HB9 both workable on the 2nd and 3rd of the month. 70 cm. kept in step, giving contacts into ON, PA and F, and good propagation into the West Country also. Two metres was good again on November 5 in spite of a fall in pressure of about 30 millibars from the previous day, and some appalling Wx conditions, with ON4RY one of the better signals from EU. Four metres has seemed uniformly dull, with little more than the usual activity, or the lack of it, to record.

What appears to be the end of the Indian Summer then set in, and at the time of writing all VHF bands are quiet again.

## Contests

**70 MHz Cumulatives:** Propagation was generally poor for the first of these events on October 13. Few DX contacts were made between the North and the South of the country, and even G3ZYC from his good site in Pentrich, Derbyshire, was only passing 008 towards the end of the allotted period.

Things were rather better for the second leg on October 27. Indeed, there appeared to be more life on four metres than on the other VHF/UHF bands, but even so, the DX was hard to come by, and by the end of the evening, things were quite back to normal—although two metres was then producing DX into SM! The best score heard was that of G3VPS/M near Crawley, who was passing 023 at 2050z. Two notable signals in the South were those of G3RLE (Cleckheaton, Yorks.) and G3SEK (London), who was doing very nicely with his SSB and CW.

There are more of these contests to come, on December 8 and 29th, and times are still 2000z to 2200z. **432 MHz Fixed:** Going was pretty tough in the South of the country for this event, but conditions

appeared to be slightly above normal in the Midlands and the North. GD2HDZ was a welcome signal, and G8BBB near Cambridge seemed to be going great guns with 32 worked by midnight. With little significant DX to be had, the average score seemed to be around 15-20, and ranges being what they were, a total exceeding 100 points is going to be fair going.

**144/432 MHz CW:** Propagation was not very good for this event, with the North/South path yielding few DX contacts, and the East/West axis not much better. This seems to have been the view of many operators, since there was very little activity on the bands after midnight on Saturday, November 6. Few scores above the 50 mark were logged on Two Metres, and results on 70 cm. were very poor indeed. There was a smattering of Continental activity in F and PAØ, and G3POI in London was heard just making it with a DK.

As might be expected, during a CW contest, VFO's were being used extensively to good effect, and the usual QRM at the lower end of the bands was not nearly so much in evidence on this occasion, although operators still apparently eschewed the 144.1 MHz to 144.15 MHz section.

It was quite an eye-opener to monitor the *Magazine* MCC Top Band contest over the weekend, and there is much to be learned from operators there as far as contest techniques and 25 w.p.m. CW procedures are concerned!

**3rd B.A.R.T.G. VHF RTTY:** This event was held in two sections on September 11 and 19th, and was open for operation on the three VHF bands. On two metres, the leading station was DJ8BTA with 662 points, followed by G8ATV and G3NTT with 263 and 249 points respectively. Only one entry was received for 70 MHz, that of G3YKB, and only one for 432 MHz, G8ATV. However, that was an advance on last year when there were none! In general, the timing of the event received approval, although the vexed question of speeds and degree of FSK shift were again obvious. It is proposed to organise a similar event next year, although there may be a change in the scoring system to

introduce points per kilometre, and the deletion of the Country bonus, which, as it stands, tends to favour the Continental countries.

### The Scottish Scene

The good two-metre openings into France in October and early November do not seem to have extended into GM, but they have had their share of the DX with some wonderful lifts to Scandinavia, with OZ and SM pounding in. Probably the most successful operator, at least in the Edinburgh area, was GM3FGJ, and this may have been due, largely, to his intelligent use of SSB, AM, FM and CW, as the occasion demanded. It's an old cry, but nevertheless true, that so many more contacts can be made on CW if only one bothers to use it. Charlie Sherritt, GM3EOJ, showed this to be true again when he got in on the recent aurora. He rarely misses, does Charlie! Swedish and Danish beacons were at good signal strength during these lifts, as was DLØPR, but it seems to be as true in Scotland as it is in the South, that reception of these beacons does not invariably result in contacts with the areas in which they operate.

GM3IVZ has recently returned from a business trip to YO and UA3, and is now putting out a very good quality NBFM signal on two metres and four metres. He has loaned gear to GM3AEY in Kirkcaldy, who looks like becoming a VHF fan after many years on the HF bands. GM3WIG (Hawick), is now QRV with an all-solid-state rig on 2m., and should be putting a signal across the border. GM3FYB is preparing gear for 23 cm. and GM3OOX is developing a solid-state rig for 2m. to incorporate CW, SSB, NBFM and AM. This should make him an even more worth-while target when he goes on his expeditions.

GM3XVJ and GM3XON are now resident in Edinburgh, and are both on two metres.

The Glasgow area is notable for the large amount of NBFM operation that goes on there, most of it good quality, too. They seem to have licked the problem of getting certain commercial equipment to operate at the correct deviation ratio! They have a very active net on 4m., and those looking for contacts might



For VHF/NFD this year, the Minehead Area Amateur Radio group, signing G8BGG/P, took themselves up on to Dunkery Beacon, Exmoor, a very fine VHF site—as A.J.D. himself found out years ago when, about 1936, he went up on Dunkery, 1,700ft. a.s.l., to do the first VHF/P GDX tests on five metres, as we had it then. Using an SEO Tx, a super-regen. Rx and an elementary dipole, 5-metre stations were worked from Torquay in South Devon round to Bristol and across to South Wales. Of course, the G8BGG/P boys were using rather more sophisticated gear and getting out to much greater ranges when they were up there this year!

check 70.375 MHz for the callsign GM3VQJ.

While on the subject of 4m. operation, GM6SR has had several replies to the request for skeds which appeared in this Column last month, but has been unable to take advantage of them all because he has had a nasty fall which, at the ripe old age of 83, is not very funny. However, he is on the mend, and hopes to be back in full operation soon.

Finally, the news that the Angus two-metre beacon is now back in operation on 145.95 MHz.

### VHFCC Awards

Heading the list of new members of the VHF Century Club this month is Clive Morton, G8EMS (Leeds) who gains Award No. 116 for 2m. He runs 30 watts to a QQV03-20A, a 6/6 slot at 38ft. on a 430ft. a.s.l. site, and a Pye Ranger Rx. The latter is shortly to be replaced by a mosfet converter and a Heathkit RA1.

G8DMB, Bill Green, operates on Two near Norwich, and gains Award No. 117. He first came on the air in July 1970 with a T.W. Communicator, but this was replaced in January this year with an HW-17A,

which feeds the 8/8 beam at 32ft. Major project in hand at the present time is the construction of a G3NNG Rx, as Bill likes to have as much home-constructed apparatus in the shack as possible, and this will be followed by a suitable Tx in due course.

Still on two metres, James Whittle, G3EKP (Blackburn) is awarded Certificate No. 118. He runs 18 watts to a QQV03-10 and a 5-ele Yagi at the 800ft. a.s.l. QTH. Reception is with an FET converter and an AR88. In spite of the height a.s.l., the site is badly screened to the East and South-East, but James seems to do quite well in other directions.

Two Awards this month for operation on Four Metres, after an interval of nearly a year since G3VSA got his claim through in December 1970. Certificate No. 6 goes to Eric Deveau, GC3OBM (Guernsey), and he becomes thereby the first GC to gain a 4m. certificate. Readers may recall that the announcement of the award of his 2m. certificate was reported in "VHF Bands" for September last, and at that time a note was included to the effect that he was only waiting for a few more cards to claim the

4m. parchment. That comment was noted by G3COJ of High Wycombe, who fixed a sked and sent his card which, with the three others which had by then arrived in response to requests with s.a.e., brought the total held to the requisite 100. Nice going! The Tx in St. Peter Port runs 40 watts input, and the beam is a 4-ele at 26ft. A 6CW4 converter and HRO Rx complete the reception facility. Eric says that activity on 4m. seems to have dropped considerably, and he considers himself lucky if he hears even one signal on a Sunday morning, his customary operating time. He has never heard another signal on that band from a GC station, with the exception of some from visiting portable operators.

Finally, Award No. 7 is gained by Keith Nearcroft, G3HBG (Godstone, Surrey). The Tx runs an 832 in the final with 30 watts in (at times!) and the antenna is a 4-ele at 20ft. An FET converter and a BC-454 Rx complete the picture. Although the site is at 400ft. a.s.l., it is badly screened to the North, and this must have made the completion of contacts with some of the centres of 4m. activity pretty hard going. Keith is also active on Two but is finding it difficult to get the cards in for the claim. Don't we all? It's frequently the real DX ones which take most time to arrive, he says.

\* \* \*

The next meeting of the South-East UHF/VHF Group at the University of Kent, Canterbury, takes place on November 26, when Geoff Stone, G3FZL, will be talking on developments in VHF Techniques. There is no meeting in December, but the AGM and open forum are scheduled for January 21 at Wye College, near Ashford. Contact G3DAH, QTHR, for details of the 1973 programme.

Many operators will have worked the "Golden Valley VHF Contest Group", under the callsign G4ABR/P, and so here is a bit of a run-down on them. Formed last year, their first operation was in the 144 MHz Open in which they landed second place—be it noted that they were then using the call GW8CEZ/P. They have now selected a permanent contest site on Cilfaesty Hill, 1732ft. up in Radnorshire. This is not only a good VHF site, but has the additional advantage

that the owner of a local inn is Harry Jordan, G3GEW, and with his help, and that of the local farmer, they can not only get the gear up to the site, but can call down for refreshments when the occasion warrants—and, presumably, also when it doesn't! To date they have confined their activity to 70 MHz and 144 MHz but should have 432 MHz going in time for the contest season next year. Other successes have included second place in the 70 MHz Open and the 144 MHz SSB events.

### General

*False Notes!* It was a noticeable feature of the recent openings that both British and Continental station operators seemed unwilling to give accurate reports on the quality of a CW signal. Two French stations were heard with quite appalling notes, but were getting T9 almost without exception. Similarly, two British stations in the South, with bad chirps, were getting T9 reports. Agreed there is no quantitative standard laid down for the "T" of the RST code, but the definitions are quite straightforward, although your scribe must confess that he has never heard the suffixes "C" or "K" to indicate "chirp" or "key clicks" used. Perhaps there is a need for a tape illustrating the various types of note and the corresponding "T" reports, to be played at regular intervals over GB2RS!

*FM Repeaters:* At the end of October there were some 43 NBFM repeater stations active in Germany. Not all of these are likely to be accessible to us even under the best of conditions, but the following should be usable at times:

*Channel I. 144.15 IN, 145.75 MHz OUT*

DLØZR	Dortmund
DL6FX	Hamburg
DJ7ZSA	Osnabrueck
DLØDG	Duisberg

*Channel II. 144.20 IN, 145.80 MHz OUT*

DLØHO	Hannover
DJ9CRA	Altenwalde
DBOWA	Aachen

*Channel III. 144.25 IN, 145.85 MHz OUT*

DJ4TA	Bremen
DLØRG	Cologne

When propagation is good, there is likely to be quite a pile-up if a G operator gets into the network, and from the experience of G3BA and

G2JF recently, it is a good plan to ask one of the German operators to act as M.C. for you, and to feed in the stations in some sort of order, or chaos and frustration on both sides of the Channel is likely to result!

*New German Calls:* The Germans seem to be issuing new licences very rapidly. DC1, DC2 and DC4, allocated on the same basis as our Class-B licences, were all active during the October openings, and DK1 and DK6 were also in use.

### News

*Four Metres:* G3TVW of Cheltenham puts in a plea for more CW on 70 megacycles, and quotes the FB results achieved by the local group operating as G3REP during the recent contest. He suggests, though, that more contacts would be made if operators stuck to the CW segment of that band rather than operating almost anywhere, and says that many operators do not appear to understand the meaning of "QLF"—tuning the LF end of the band.

Listening to G3FDW/P during VHF/NFD, one might have been forgiven for thinking that he had joined the Police, since the "pips" on his transmission had all the characteristics of those used by the Force. We are reliably informed that this is not the case!

*Two Metres:* G3XIX (Felixstowe) now has 450 watts p.e.p. to an 8/8—and a new baby daughter. Congratulations on both events! G3AUS (Exeter) worked 10 countries in 34 hours during the recent openings. G5DF in Reading was one of the fortunates who were on the band at the right time to make it with EA1AB on November 2. John is climbing steadily in the VHF Annual now that he is back from his sojourn abroad, and is to be heard on all the VHF bands. G3MED (Banstead) was married on Saturday, October 23, and it is rumoured that there were comments among the guests about Tony having to choose a week-end when there was a good opening to the Continent! G8ABP (Paignton) was given a 5 & 9 report by G2JF in Kent when he was running only 200 milliwatts of SSB.

G3OHH in Mow Cop remarks on the suddenness with which the October 22/23 opening occurred. At 9 p.m. the Wrotham beacon was at its usual S7-8, but a couple of hours

later it was at S9+ and the band was full of Frenchmen with hardly any ON, PA or DL to be heard, and very little GDX. With this state of affairs on 2m. it seemed likely that 70 cm. would be reasonable, and indeed it was. He worked three F's on the trot! He was also hearing French stations on 4m., but one hastens to add that these were not amateurs, but *taxis*. Still, it's unusual!

A well-known 2m. signal that will be conspicuous by its absence shortly, is that of G2JF, who leaves for a few months' holiday in South Africa in mid-December. He is already in contact with several prominent VHF workers out there, but it is highly unlikely that even Jim will be able to put a 2m. signal back into this country—although he may be able to get on the HF bands and the callsign to look for there will be G2JF/M/ZS6.

G3KDG near Okehampton, Devon, has been putting out a good signal since he has rebuilt the rig. He now has 48 watts output and heard/worked OZ, SM, DK, OE, EA and HB during the recent openings, so it doesn't look as if there is anything wrong with the receiving set-up. He is usually on CW at the bottom end of the band most evenings.

News has come in from G3UGF/MM on the coastal tanker *Esso Inverness*, to whom reference was made recently in this space. During the first month of operation afloat, he had 80 contacts on 2m. but still finds the going hard because of the lack of incentive for shore-based stations to look out to sea. He confirms that, from his observation, SSB will nearly always get through to him where other modes will not, and that contacts seem to be impossible when the local pressure drops below 1004 millibars. He is replacing the valve rig with a 10 watt, all-transistor, AM/FM job next month, which should be a little easier to cart around during the 200-mile journey he makes when going home on shore leave. He also remarks—"Don't be envious of my beam up at 45ft. with a sea path all the way round; much of the English coastline is over 100ft. high!" For QSL purposes, use the Bureau, or c/o Esso Petroleum Co., Ltd., Marine Dept., Victoria Street, London, S.W.1, and the name is Richard Constantine.

*Seventycems*: That the recent openings on 70 cm. were not restricted to the South and East is evidenced by a report from G8BKR in Bristol, that not only was he able to work ON4HN, but that F3LP had his S-meter right against the stop. G3PBV (Bovey Tracey, Devon), newly arrived on the band, also got

in on the act with 8 counties worked and 10 more heard. He has not deserted 2m. and is still running the Tx which won him the *Magazine* prize at the 1962 VHF Convention. He is putting out some really FB phase mod. Look out for GC8AWE in Alderney, C.I. and G8ABP in Paignton, both of whom should be on

### THREE BAND ANNUAL VHF TABLE

January to December, 1971

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3OHH	52	7	63	7	33	5	167
G3COJ	37	5	64	16	30	7	159
G3DAH	37	3	60	13	34	7	154
G3ZYC	45	5	37	8	46	10	151
G5DF	24	2	55	13	32	7	133
GD2HDZ	28	4	54	9	24	4	123
G8CUT	—	—	54	13	22	5	121
G8BCA	—	—	55	10	40	9	114
G8ATS	—	—	48	10	41	8	107
G3JXN	27	2	57	5	—	—	95
G3ZPZ	—	—	78	13	—	—	91
G3FIJ	4	1	45	9	17	6	82
G2AX1	24	3	39	4	8	2	80
G8BKR	—	—	48	6	21	4	79
G3EKP	27	6	24	7	8	6	78
G2JF	—	—	53	19	—	—	72
G8BWW	—	—	40	8	10	5	63
G3IAR	31	3	21	4	—	—	59
EI6AS	15	5	30	6	1	1	58
G8ECK	—	—	46	9	—	—	55
G8CBU	—	—	38	6	5	1	50
G8AUN	—	—	32	9	3	4	48
G8CXC	—	—	33	12	—	—	45
G8EMS	—	—	35	8	—	—	43
G4ALN	—	—	36	9	—	—	43
G8CYN	—	—	32	9	—	—	41
G8APZ	—	—	—	—	33	6	39
G8CVD	—	—	32	5	—	—	37
GM3EOJ	—	—	18	10	3	1	32
PAOLY (G3TMQ)	—	—	13	6	—	—	19

Claims should be sent to "VHF Bands," SHORT WAVE MAGAZINE, Buckingham. Please send in your claims for the year ending December 31, 1971, by the end of the first week in January, so that the final placings for the year can appear in the February, 1972, issue. The Tables re-open again w.e.f., January 1st, 1972.

the band very shortly.

While ducting is not an uncommon feature of 2m. propagation, it does not often occur on 70 cm. and yet a very good example of this phenomenon was experienced by G8APZ in London and G8AYB in Luton, Beds, recently, when they were both receiving the Sutton Coldfield beacon at S9+ and stable, though the 30-mile path between them was subject to heavy QSB, taking their S9 signals down into noise. GB3GEC, also at 30 miles range, was 5 & 4 at the time against the more usual 5 & 9. There have been other examples of this during the recent openings, when the stations in the South-West were at much higher levels in the East than they were in the London area.

G8AZV (London) had a QSO with OZ9SW on October 6 while running 2½ watts input to an all-transistor rig. The frequency of the projected 70 cm. beacon, GB3DM, is 433.7 MHz and not as previously reported. G8AYC of Gillingham, Kent, is now radiating *colour* TV on 70 cm. He has already exchanged video with G3WFC in Brentwood.

**23 Centimetres:** G8BBB of Ely had a fine QSO on this band with F2TU mobile/static in QRA DI71g on October 7. Reports were 5 & 3/4 both ways, with Roger at virtually sea level and the French station at 4.5K ft. a.s.l. 'BBB runs 8 watts output from a 2C39 into an 8/8 slot at 48ft., and uses the K6AXN-type converter. Since commencing operations on the band for the October contest, he has worked three countries and eleven counties, which is not bad going! Another who seems to be working out well is G3BYV in Dereham, Norfolk. He had 10 contacts during the October UHF/SHF contest, with the best DX at just on 300 km. with PAØMS/A. Best DX to date is with PAØWTE in QRA DN55a at 400 km. He has had several attempts at a QSO with ON4HN recently, and seems to have finally made it. He was copying ON5LM at 5 & 6 on November 3, when the Belgian was running 500 milliwatts! G3OHH in Mow Cop has still to get his dish up for 23 cm., but full-scale operation should not now be long delayed.

### Three Band Annual Tables

The year is drawing to its end, and so this is just a reminder that the



During the 1971 IARU Contest, the G3BA/G3BHT team, with G3URV, went over to Luxembourg, signing G3BA/P/LX. The two-metre gear, all designed and built by Tom Douglas, G3BA, is on the left, the rest being HF-band equipment used to maintain contact with their U.K. link stations. As well as having had a very good time, this experienced team learned a lot about VHF operating on the Continent.

VHF Tables close on December 31. The good openings during October and early November should have produced a fair crop of new counties and countries for many entrants, so please send your final claims (as at December 31), by the first week in January 1972, so that the final placings for this year can be published in the February 1972 issue.

In conversation with operators whose calls figure in the current list, one gathers that there is considerable interest in the performances of neighbouring amateurs, or those using similar equipment, and comparisons, invidious or otherwise, are always a

ready topic of conversation on Club nights.

Finally, the Tables will re-start with effect from January 1, 1972, and run through to December 31, as usual. The first new year's Table will appear as soon as we get entries.

### Deadline

Deadline for the next issue is **December 4**, and the address for news, views, claims and comment is: "VHF Bands", SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now, 73 de G3DAH and a very Happy Christmas to all who follow this piece.

### RACAL ELECTRONICS, LTD.

Most big companies, in the electronics field as any other, operate on secured bank overdrafts and report their annual results against the background of "what they owe the Bank". Though Racal Electronics, Ltd., have an overdraft of more than £2½m., they are able to pay a final dividend making 11% for the year, the gross cost of this being about £450,000 out of before-tax profits of near-enough £2½m., the Bank having been satisfied to accept a reduction in the overdraft of £1.6m. from last year's £3,973,000. All this means that Racal Electronics, Ltd., are in a nice way of business and the Bank is happy to go on carrying an overdraft of about £2,332,000.

# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Please address all reports for this feature to "Club Secretary," SHORT WAVE MAGAZINE, Buckingham.)

**T**HIS goes down to the printers just after MCC closed. From the point of view of the onlooker, so to speak, another very good and exciting Contest, fought out under reasonable GDY conditions on Top Band, with all the usual enthusiasm.

It was good to hear so many familiar Club callsigns pitching in, and such a wide representation—EI, GI, GM and GW, with quite a number of G4/3's batting for their Clubs (most of whom, let it be said, very good CW operators). Naturally, there was a certain amount of "pedestrian movement" in the CW sense—but that is nothing of which to be ashamed of if you get the message over.

There were a number of exceptionally strong signals—two of which we are investigating—and, as always, a great deal of much weaker MCC activity about "three layers down".

Just after 2100z on the Saturday evening a big signal was heard sending "Time, Time, Time" on any MCC QSO still going on! The invigilators were noticing this, too!

Remember, no Club reports next month, because this space will be taken up by the MCC story. The regular "Month With The Clubs" feature resumes with the February issue, due out on January 28, for which we want Club reports by *Friday, January 7*. Please condition your Club information accordingly.

The Club story for this month is once again by regions.

## The South

Our first customer is **Southgate**, who are usually in session on the second Thursday in every month, with, in December, the AGM as the pinnacle of the year's activities. Venue for this one—the Civil Defence Hut, Bowes Road, London, N.11, which is very easily located, even by a stranger, as it is opposite Arnos Grove Piccadilly Line tube station, and close to the North Circular road.

A junk sale and Christmas party is the fare for **Crystal Palace**, says G3FZL in his *Newsletter*, on December 19, 8.0 p.m. being the starting time at Emmanuel Church Hall, Barry Road, London, S.E.23.

At **Cray Valley**, they are celebrating their 25th anniversary as a Club this month, as their *QUA* shows by extracts from the first issue. On the meeting front in 1971, we notice Emsac are coming along on December 2, and a Natter Nite follows on December 16; looking at 1972, January 6 sees a lecture by Ken Ide on Intergrated Circuits, and another Natter Nite on January 20. All these sessions are at the Congregational Church Hall,

Court Road, Eltham, London, S.E.9.

**North Kent** and Cray Valley ran their annual dinner as a joint function recently. This crew have Hq. at the Congregational Church Hall, Bexleyheath, and they will be found there on December 10, nattering and operating the Club rig; there is another event being organised, but at the time of writing no date or details are to hand, so the G4ACQ will be your man to discuss it with—see Panel, p.626.

The Church Hall, Ampthill Road, is the home of the **Shefford** gang, and this month the normal weekly programme is amended by cancellations on December 23 and 30, for obvious reasons. That leaves December 2 for R.A.E. Questions, the 9th for G2DGF on Sound Motion Pictures, and the 16th for a VHF night.

**Maidstone YMCA's** Secretary is rather upset by reason of his letter last time not resulting in a mention—a pity it failed to reach us in time! All letters received by first post on the due date are invariably covered. *But* it has to be said that an awful lot of letters do come in late—usually *too* late; and quite often there comes one from an optimist who gives his letter an early deadline, forgetting that the postmark gives the game away! Anyway, G3WXL is one of the wise ones—he usually gets his letter in to us in plenty of time. For December he shows beginners' classes on the 3rd and 17th, with a talk on the adjustment and setting-up of transmitters and transceivers billed for the 10th. As December 30, they are not scrubbing it, but instead will be at the Swan, Loose. On to January, and here the beginners' class is down for the 7th and 21st, the "setting-up of transmitters" series to be concluded on January 14, leaving January 28 for G3ORP to talk about the delta-loop aerial and a simple multi-band vertical, also discussing the ways-and-means of getting an aerial "on the nose."

**South Bucks.** VHF Club (formerly covered in "VHF Bands"), have their corporate being at Bassetbury Manor, High Wycombe, where on December 7 there

### "MONTH WITH THE CLUBS"

The "Clubs" space in our January issue (due out on December 31) is being devoted to a report on the recent Magazine Club Contest (MCC). The regular "Month With The Club" feature will be resumed in our February issue (published on January 28) for which the closing date is first post Friday, January 7. The address is "Club Secretary", Short Wave Magazine, Buckingham—and please note that we cannot be expected to write in late reports!

is a Surplus Equipment Sale; the Christmas party on the 15th; and a talk on Transistors to open the New Year programme on January 4. Start time for all events is 8.0 p.m.

One might guess that the *Southdown Newsletter*, now being produced by G3VPS, would break some new ground; this time it is lessons in French radio-ese, for VHF types caught working over the Channel! However, Peter makes no mention of the Hq. address or the dates of meetings, so if you want to get to know this crowd, you will have to get in touch with G3ZQB, address as Panel below.

Another *Newsletter* of interest is that from *Mid-Sussex*. As regards the meeting, it is quite clearly noted—December 2, at Marle Place, Leylands Road, Burgess Hill, being a junk sale for those who have “things to dispose of or some Christmas shopping to do!” Due to the need for closing at 2215, all sessions start *promptly* at 7.45 p.m.

The p.r.o. at *Wimbledon* has obviously taken all the gripes from here about information being difficult to extract or missing altogether, as his letter is a model—thanks, Ken! It shows the AGM against December 10, and a very interesting title on January 14—“An introduction to Met. work, with regard to Radio Propagation,”

which will be given by G3ANQ. That leaves January 28, and for this evening, some films have been booked. All these events are at the St. John Ambulance Brigade Hall, 124 Kingston Road, South Wimbledon.

Welwyn Civic Centre is the home of the *Mid-Herts*. crowd, and on December 9 they will have unfolded to them the first details of the Club project, a two-metre D/F receiver, front-end for which, it is hoped, will serve as a useful 2-metre converter.

A general discussion is down for *Acton, Brentford and Chiswick* members on December 21, at the Trades and Social Club, 66 High Road, W.4.

It's a matter of every Friday if you belong to *Grafton*—unless, of course, you also attend the R.A.E. course there, too!—and in December there is a film show on December 3, followed by a junk sale on the 10th to empty the Club's own “overflowed cupboards.” They will then be in recess till the New Year term starts. Venue for *Grafton* these days is *Whittington School, Highgate Hill*.

#### Western and Welsh

The *North Devon* gang are still thriving, and still getting together at *Crinnis, High Wall, Sticklepath, Barnstaple*. A surplus sale is shown for December 8,

#### Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, CR2-1EZ.  
 BILLINGHAM: L. Crooks, 4 Victoria Grove, Fairfield, Stockton-on-Tees.  
 BRADFORD: G. Cooper, G3HJP, 25 Plantation Avenue, Leeds, LS17-8TB.  
 BRIGHTON (Tech. Coll.): R. T. Henley, G2CMH, 35 Wilmington Way, Brighton BN1-8JH.  
 BRITISH RAIL: R. Woods, 15 Grant Avenue, Slough, Bucks, SL1-3NB.  
 BURY & ROSSENDALE: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, Nr. Bury.  
 CARLISLE: A. R. Harper, 23 Roman Way, Stanwix, Carlisle, CA3-9DL.  
 CHELTENHAM: P. W. Legg, G8DUH, 4 Linworth Road, Bishops Cleeve, Cheltenham, Glos., GL52-4PB.  
 COLCHESTER: E. Jacobs, 26 Pondfield Road, Colchester.  
 CORNISH: J. Farrar, G3UCQ, Elm Cottage, Ventonleague, Hayle.  
 CRAY VALLEY: P. F. Vella, G3WVP, 78 Hurst Road, Sidcup.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, SE23-3BM. (01-699 6940.)  
 GRAFTON: T. Coleman, G8EEI, 14 Norman Court, London, N4-4QD. (01-340 9542.)  
 GRIMSBY (Wheatshaf): G. Wood, G3VIP, 9 Patrick Street, Grimsby, Lincs.  
 HULL: Mrs. M. Longson, 4 Chester Road, Wold Road, Hull, HU5-5QE.  
 KNARESBOROUGH: R. Troughton, 2 King James Road, Knareborough (3494), Yorks.  
 MAIDENHEAD: H. A. Willis, G3ZPK, 207 The Parkway, Iver Heath, Iver, Bucks., SLO-ORQ.  
 MAIDSTONE (YMCA): A. Walter, G3WXL, 31 Lansdowne Avenue, Maidstone, Kent.  
 MID-HERTS: D. Storey, G8CYX, 70 Ventnor Drive, Totteridge, London, N.20-8BS. (01-445 6757.)  
 MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Birmingham, 32.  
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.  
 NEWARK: (Name wanted), 35 Beacon Hill, Newark-on-Trent (71755), Notts.  
 NIGERIA: E. A. Lomas, 5N5ABG, P.O. Box 68, Kaduna, Nigeria  
 NORTH BUCKS.: P. Harman, G3WXO, 9 Calverton Road, Stony Stratford (3346), Wolverton, Bucks.  
 NORTH DEVON: H. G. Hughes, G4CG, Crinnis, High Wall, Sticklepath, Barnstaple, Devon.  
 NORTH KENT: L. Randall, G4ACQ, 118 Brook Street, Erith (40800), Kent.  
 NORTH LEEDS: T. Brown, G8CJS, 12 Hollin Hill Drive, Leeds, LS8-2PW.  
 NORTHUMBRIA: J. Temple, G3XAI, 4 Coquetdale Place, Bedlington, Northumberland.  
 NOTTINGHAM: M. R. Harris, G3VUI, 20 Durham Crescent, Bulwell, Nottingham.  
 PLYMOUTH: S. E. Martin, 32 East Park Avenue, Mutley, Plymouth, PL4-6PF.  
 REDDITCH: R. J. Mutton, G3EVT, Summerhayes, Hill Lane, Oversley Green, Alcester (2041), Warks.  
 RHYL: F. A. Cobb, GW3YIH, Mon Reve, Towyn Way, Abergele, Denbighshire.  
 SLADE: J. E. Drakeley, 186 Conway Road, Chelmsley Wood, Birmingham, 37.  
 SHEFFORD: A. Sullivan, G2DGF, 12 Glebe Road, Letchworth, Herts.  
 SOLIHULL: A. Bagley, G3XPY, 266 Warwick Road, Olton, Solihull, Warwicks.  
 SOUTH BUCKS. VHF: R. Diens, G3XBP, 77 Amersham Road, High Wycombe, Bucks.  
 SOUTHDOWN: A. Seabrook, G3ZQB, 6 Harebeating Gardens, Hailsham, Sussex.  
 SOUTHGATE: A. Dutton, G3TIE, 77 South Lodge Drive, London, N.14.  
 SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.  
 SPALDING: R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs., PE11-1QX.  
 THAMES VALLEY: C. Seaman, G3ATF, 40 Park Road, Ashford, Middx.  
 THORNTON CLEVELEYS: R. Bellerby, G3ZYE, 4 The Cop, Rossall School, Fleetwood, Lancs.  
 TORBAY: Mrs. G. Western, G3NQD, 110 Truro Avenue, Hele, Torquay.  
 VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford, Herts., WD2-5JQ.  
 WAKEFIELD: M. E. Garner, G3XVU, 13 Kingsdale Avenue, Drighlington, Bradford, BD11-1EY.  
 WEST OF SCOTLAND: V. T. Budas, GM3VTB, 28 Kelvininside Gardens, Glasgow, N.W.  
 WIMBLEDON: F. Hill, G3WDO, 20 Sunnymead Road, London, S.W.15.  
 WIRRAL: A. Fisher, G3WSD, 34 Glenmore Road, Oxtun, Birkenhead, Cheshire. (051-652 5078.)  
 WORCESTER: B. Jones, G8ASO, 12 Woodside Road, Larkhill, Worcester (29208), WRS-2EG.

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At the Cray Valley and North Kent dinner-dance on October 9, with G3GVV (left) speaking. At centre is G3VLX, chairman of Cray Valley, and at far right G3VFD (visiting), chairman of the North Kent society. The event was a great success, some 85 members and friends being present.

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and the normal December 22 meeting is scrubbed. In January, there is a talk on the 12th, and a Natter session on the 26th. Visitors or intending members *always* welcome.

On to **Cornish**, where things seem to be happening, with December 2 booked at Camborne, for G3OCB, on Hi-Fi; the evening after the Newquay crowd have G3XFL and G8DZE on Direction Finding Equipment. Then there is the Marconi Anniversary affair at Poldhu over December 11-15; in the New Year there is another Camborne "do" on January 6, when G3VWK will discourse on "Sound on Films." Extra to all this, there is talk of re-forming the Cornish VHF Group. Camborne venue is the SWEB clubroom, Pool, while the Newquay one is Treviglas School. More details, if needed, from the hon. secretary, at the address in the Panel opposite—he knows about the doings of *all* the sections!

**Yeovil** have your conductor a little puzzled. After mentioning December 2 as an Introduction to Electronics on Tape and Slides, they go on to say that December 16 is, quote, "Reg's Christmas Pudding." Whatever happens, the survivors meet again on January 6, for another tape and slide talk, this time on Electronic Tubes.

At **Rhyl**, one looks for the Mona Hotel, on the second Tuesday of each month; on December 14, to hear GW3GRY, who will talk about "Integrated Circuits and SSB." Looking on to January, we find it is still the Market Street venue, on January 11, when Dick Little is to talk about Industrial Electronics.

Our latest news of **Torbay** doings refers to November 27, but we have no idea what arrangements are being made for December, as the normal date would fall into the Christmas period. This being the case, it would perhaps be best to contact G3NQD, as Panel.

Again we have news of November, this time from **Plymouth**, where the annual dinner on November 20 is always enjoyed. The normal get-togethers are taken on the first and third Tuesdays in each month, and the address is Virginia House, Bretonside, Plymouth.

#### Middle England and North

An hon. secretary with a gripe is the South Manchester chap, who complains bitterly that he has only once appeared in these columns in four months—however, a proportion of the mail goes to make up the "short notices" section, and the records show **South Manchester** is "shorties" twice in the period mentioned; this leaves one month unaccounted for, and for that occasion we do not seem to have received a letter. However, all's well that ends well, and we are on the same wavelength this time, showing December 3 as a Discussion Evening; December 10 for that well-known tape-and-slide lecture on "Radio Aurora"; December 17 the Christmas party; and blanks on Christmas Eve and December 31. All this and VHF too—there is a separate section called the North-West VHF group, who have a shack at "Greeba," Shady Lane, Manchester 23, where they get together each Monday. The main meetings are, of course, at Sale Moor Community Centre, Norris Road, Sale.

On to **Midland**, where a Christmas party is a *party*, and no mistake; December 21 sees the Midland Club event, at the Midland Institute in Margaret Street, with the presentation of all the club cups and prizes, judging of home-constructed equipments, all the ladies present at their best, and to top it all a raffle for a hamper. If you come from "Brum" you can bet your bottom dollar that hamper will be worth winning, too!

Not far up the road is **Solihull**, where, in the High Street, is the Manor House, and nearby the Malt Shovel. Try the Manor House on December 21 at 7.30 for the formal meeting, or the Malt Shovel for the natter on December 7, the latter starting at 9.0.

Wow! Don't know how long it is since last we heard from **Slade**, who are on the opposite side of Birmingham from Solihull, at the Church House, in Erdington High Street. Their dates for December are 3rd for a Junk Sale, and the 17th for a film show.

#### Special Interests

A heading that takes in quite a variety. For a start we have **British Rail**, who show the wideness of their spread by way of an article on a holiday tour in the

## SHORT CLUB NOTICES

CLUB NAME	HEADQUARTERS LOCATION	MEETING DAY MONTHLY
Billingham	Community Centre (also Station Hotel on	Wednesdays Friday, Dec. 10)
Bradford	10 Southbrook Terrace, Gt. Horton Road, Bradford, 7	Dec. 7, 21 Jan. 4, 18
Brighton	Tech. Coll., Richmond Terrace	Dec. 13 and alt. Mondays from Jan. 3
Bury and Rossendale	George Hotel, Market Street (also Elton View Hotel on	Dec. 14 (AGM) Jan. 11 Jan. 29)
Carlisle	Currock House, Lediard Avenue	Mondays
Cheltenham	Community Centre, Brooklyn Road	Wednesdays
Colchester	N.E. Essex Tech. Coll., Sheepen Road	Wednesdays
Maidenhead	Victory Hall, Cox Green	Dec. 6, 21
Newark	Tech. College	1st Thurs. each month
North Bucks.	<i>Not quoted</i>	Dec. 12, 18
Northumbria	3 Wheatsheaf Yard, Morpeth (first meeting each month at Sun Inn, Bedlington)	Thursdays
Nottingham	<i>Not quoted</i>	Weekly from Dec. 2
Redditch	Old People's Centre, Park Road	Dec. 9, 23
Thames Valley	Three Pigeons, Portsmouth Road, Long Ditton	Dec. 1 Jan. 5 (AGM)
Thornton Cleveleys	St. John Ambulance Hq., Fleet- wood Road North, Thornton, Blackpool	1st and 3rd Wednesdays
Verulam	Town Hall, St. Albans	Dec. 22, Jan. 19
Wakefield	Wakefield Youth Centre, Ings Road School	Alternate Tuesdays
West of Scotland	81 Virginia Street, Glasgow	Fridays (Dinner on Dec. 10)
Wirral	Sports Centre, Drill Hall, Grange Road West, Birken- head	1st and 3rd Wednesdays
Worcester	Crown Hotel, Broad Street	Dec. 11 Jan. 15

*N.B.*—In each case, secretary's name and address appears in Panel, p.626.

Middle East, a long piece on railway operating methods in America and the agenda for the international rail radio-amateur organisation, FIRAC.

The Nigerian group, N.A.R.S., has grown a new title, according to the editorial of their *Newsletter*; "Anti Nuisance and Teleprinter Society." This seems to be a very fair comment, bearing in mind that on a given morning they measured about 79 kHz of the 14 MHz phone allocation as unusable. As the *amateur* RTTY signals usually stay in their appointed spots, this means it is a good chance these signals could be classed as non-amateur intruders without bothering to put a 'printer on them. Anyone with ideas of going to Nigeria, or who has been in that country, should be a member of this group.

A.R.M.S., of course, cater for the interests of the mobile operator, both by way of their Saturday net (on 21280 kHz at 1330 GMT) enabling the overseas members to join with G4AMS—and their *Mobile News*, which always carries something of interest for the /M types.

## Northerly Parts

North Leeds first, where the chaps meet every Tuesday evening, mainly for nattering, although the lads can use all bands from Top Band up to 10 cm., with 3 cm. to come! They have at the moment a particular interest in tee'ing up skeds on 144 MHz with RTTY-equipped stations or listeners—obviously to try out the gear. All the latest data on the Club and its activities can be obtained from G8CJS—see Panel p.626.

Is anyone in the Harrogate-Knaresborough district interested in forming a club there? If so, they should contact the chappie shown in the panel under "Knaresborough," by letter or phone. Your scribe must admit to being a wee bit surprised that a club for those parts has not been proposed and formed before now (with his knowledge that there are members of Otley Club who travel in from as far afield as Harrogate). We will hope to hear next time round that they are "open for business."

Now to Hull, at 592 Hessle Road, on December 3, for talk about regulations by the GPO, and the 10th for one on Unidentified Flying Objects by Mr. C. Watson. December 17 is the date for all to enter their home-brew goodies in competition with the others, and on the 24th to stay at home—it's Christmas Eve! That leaves December 31, and unlike most groups who would have been using this date, Hull are going to open shop and have a social evening. Extra to all this at Hq., there is the annual dinner on January 7, with tickets available from the hon. secretary; this is slated for the Beverley Arms Hotel.

At Spalding they are pretty well known for their open events; the next one is on December 17, at the Ship Albion in Albion Street, starting at 7.30. Admission at three bob covers a ticket in the draw and refreshments; there will be a Surplus Stand, to which you can add your own goods, ready priced, as well as just running an eye over it for something to take home. As if this were not enough, there will also be a stand by J. Birkett of Lincoln; and if you intend to bring a lorry to take away your purchases, the car park will provide more than enough room without any cramping of the others. Details from G3VPR, as Panel.

It is nice to hear that the gang who used to foregather at the Wheatsheaf, Grimsby, for a social natter and a pint on Sunday evenings have now formed themselves into a full-blown society. Unusually, this crowd are very much contest and DX-minded, most of the members being active on the bands, the more so as W3CTR is one of them and they often work him on Twenty or Fifteen at weekends.

## Sign-Off

We have to remind you that there will be NO Club Reports in the January issue, as the space will be taken up, in accordance with tradition, by the coverage of the MCC results. Thus, our next clip should cover your programme forecast for February, giving dates, venue, details of how to find the place if it is at all tricky,

At the 24th annual dinner of the First Class CW Operators' Club on October 2, G3IEW (retiring president) addressed the company of nearly 140 members and visitors, no less than 11 countries being represented. GB2FOC was on the air for the occasion, from Lords banqueting suite, London, where the dinner was held. The new president is the well-known operator and DX man G2PL (left) and the hon. secretary G8VG, seated right.



the current Secretary's name, address, and *home* telephone number, plus any other less vital or social chat. However, it really helps us to help you—we are always getting letters from newcomers asking if we know of a Club in their part of the world, and there are many others who find the information they want in these

columns.

The deadline for next time (February issue) then, will be first post **January 7**, addressed to "Club Secretary," **SHORT WAVE MAGAZINE, BUCKINGHAM**. Meantime, a Happy Christmas and a Prosperous and Healthy New Year to you all. 73.



Part of the new HF SSB transmitter system for the Royal Navy includes the Redifon R.550 receiver, which provides unbroken frequency coverage from 100 kHz to 30 MHz in 100-Hz increments by frequency synthesis. It also incorporates VFO tuning, a great help in searching congested calling bands. The basic Naval Rx assembly is designated CJP(1), operating with the Redifon GK.203 drive unit and GA.481 broad-band 100w. linear amplifier, covering the range 1.5 to 30 MHz. Valves are completely eliminated, the whole set-up—Rx, driver, Tx and PSU—being solid-state. Correct adjustment for any required frequency, selected on the synthesiser dials, is effected by tuning for maximum meter reading on an ATU which is part of the assembly. The drive unit itself provides output for either CW/MCW/RTTY/DSB/SSB, with USB or LSB as required. Redifon broadband linear amplifiers are also available for RF output powers up to 1 kilowatt.

# NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

- G2KA**, J. F. A. Lavender, 22 Honicombe Park, nr. Callington, Cornwall. (*re-issue*).
- G3ZNX**, T. R. Johnson, 13 Meadow Close, Budleigh Salterton, S. Devon, EX9 6JN.
- G4AFD**, C. R. Moore, 13 Belah Crescent, Carlisle, Cumberland.
- G4AFR**, F. Nicholson, 29 Vengeance Street, Walney Island, Barrow-in-Furness, Lancs.
- G4AGH**, S. W. Pearson, 15 Orchard Avenue, Gillingstool, Thornbury, Bristol.
- G4AID**, J. Mulholland, Glen Tor, Colin Road, Dunmurry, Belfast. (*Tel. Belfast 617800.*)
- G4AJF**, N. Ingman, 78 Weston Road, Ashton-on-Trent, Derby.
- G4AJT**, J. W. Samways (*ex-G8DAL*), 7 Fife Court, The Hydneye, Hampden Park, Eastbourne, Sussex.
- G4AKB**, M. L. Court, Orchard Cottage, Huckford Lane, Kendleshire, Bristol, BS17 1AP. (*Tel. Winterbourne 3596.*)
- G4AMW**, V. M. Goom, 48 Wayne Road, Parkstone, Dorset. (*Tel. Parkstone 295.*)
- G4AMZ**, P. J. Leach, Walters House, King Williams College, Castletown, Isle of Man.
- GW4ANK**, R. H. Davenport, 14 Milward Road, Barry, Glam.
- G4ANQ**, P. J. Clayton (*ex-G8ENV*), 110 Mersham Road, Thornton Heath, Surrey, CR4 8NQ.
- G4ANS**, J. S. Redgate, 30 Douglas Avenue, Carlton, Nottingham, NG4 1AJ.
- G4ANT**, East Anglian Contest Club, c/o Mosley Antennae, Rackheath Airfield, Norwich, Norfolk, NOR 02-Z.
- G4AOE**, G. D. Woodcock, 6 Meadow Close, Beltinge, Herne Bay, Kent.
- G4AOH**, T. E. Bryan, 42 Max Road, Coundon, Coventry, Warks., CV6 1EQ.
- G4AON**, D. A. J. Johnson, 5 The Green, Lund, Driffild, Yorkshire.
- G4AOQ**, D. R. Ward, 2 Lincoln Road, Oxford. (*Tel. Oxford 47771.*)
- GM4AOR**, K. C. Henderson, 97 Granton Road, Edinburgh, EH5 3NH.
- GM4AOX**, G. C. McDowall, 22 Spey Terrace, Pilrig, Edinburgh, 6.
- G4AOZ**, F. Sherwood, 12 Albion Close, Heaton Norris, Stockport, Cheshire, SK4 1TU.
- G4APF**, M. Richards, 42 Arundel Road, Wordsley, Stourbridge, Worcs.
- G4APU**, R. C. Kenward, 9 The Crescent, Farnborough, Hants. (*Tel. Farnborough 42524.*)
- G4APV**, R. G. Harris (*ex-G8FEN*), 6 Chestnut Avenue, Lutterworth, Rugby, Warks. (*Tel. Lutterworth 2284.*)
- G4APW**, F. E. King, 10 Cranny Avenue, Carnlough, Co. Antrim.
- G4APX**, R. Kinghorn, 31 Kings Road, Bedlington, Northumberland, NE22 7DX.
- G4AQP**, W. Ford, 43 Halkyn Road, Newton, Chester, CH2 3QD.
- G4ARS**, Carlisle and District Amateur Radio Society, Currock House, Carlisle, Cumberland.
- G8EPV**, A. J. Shawcross, Driftwood, The Riverfront, Exton, Exeter, Devon.
- G8EUT**, Dr A. V. Barford, 26 Cala Drive, Edgbaston, Birmingham.
- G8EZZ**, R. S. Chambers, 15 Barnfield Close, Braunton, Devon.
- G8FAL**, P. C. Draper, 115 Chesford Road, Stopsley, Luton, Beds., LU2 8DP. (*Tel. Luton 31560.*)
- G8FAT**, B. W. Haines, 20 Westfield Gardens, Kenton, Harrow, Middlesex.
- GW8FDD**, M. R. Cronin, 11 Austin Avenue, Newton, Porthcawl, Glam.
- G8FHG**, P. King, 34 Spring Lane, Colden Common, Winchester, Hants.
- G8FHH**, R. Catt, 25 Moss Road, Winnall, Winchester, Hants.
- G8FHI**, M. Clarke, 43-A Fraser Road, Springvale Estate, Kings Worthy, Winchester, Hants.
- G8FHU**, G. Dodwell, 28 Summerleaze Park, Yeovil, Somerset. (*Tel. Yeovil 3928.*)
- G8FID**, S. T. Heapey, 31 Bakers Lane, Sutton Coldfield, Warks. (*Tel. 021-353 2962.*)
- G8FIE**, N. J. McFetridge, Ramore, Manor Road, Ashford, Middlesex. (*Tel. Ashford (Middlesex) 54511.*)
- G8FJE**, P. A. Braham, 5 Larkdown, Wantage, Berks.
- G8FJG**, R. P. Shoulder, 77 Manser Road, Rainham, Essex, RM13 8NP. (*Tel. Rainham 57326.*)
- GW8FJK**, P. Edwards, 1 Matthew Terrace, Pentrepiod Pontypool, Mon., NP4 6PU.
- GM8FJM**, J. P. Harkin, 12-A Wallace House, Cumbernauld, Glasgow. (*Tel. Cumbernauld 25104.*)
- G8FJZ**, S. L. Newport, 101 Elibank Road, London, SE9 1QJ. (*Tel. 01-850 3304.*)
- G8FKG**, P. I. Fox, 193 Conway Avenue, Great Wakering, Essex, SS3 OBL.
- G8FKR**, Dr. P. Keates, 10 Hollyshaw Grove, Leeds 15, Yorkshire. (*Tel. Leeds 645257.*)
- G8FKV**, G. A. Ash, 46 Stafford Road, Ruislip Gardens, Middlesex, HA4 6PH.
- G8JH**, G. F. Budden, M.B.E., 4 St. Bernards Close, Buckfast, Buckfastleigh, Devon, TQ11 OEL. (*re-issue.*) (*Tel. Buckfastleigh 2586.*)

## CHANGE OF ADDRESS

- G2NA**, H. Frost, Copythorne, Hook Park, Warsash, Hants.
- G3CRC**, Clacton and District Radio Club, Sea Cadets Headquarters, Sadds Yard, Skelmersdale Road, Clacton-on-Sea, Essex.
- GM3EHI**, J. Mathieson, 106 West-end Drive, Bellshill, Lanarks.
- G3GST**, G. E. McCracken, 22 Ennerdale Avenue, Maghull, Liverpool, Lancs.
- G13HNM**, C. E. Davies, 71 Causeway Street, Portrush, Co. Antrim.
- G3IFG**, W. R. C. Scott, 57 High View Road, Guildford, Surrey.
- G3IGV**, J. W. Birkbeck, 4 Tregullan View, Bodmin, Cornwall. (*Tel. Bodmin 3202.*)

- G3OAZ**, J. Randall (*ex-DL2VM/5A4TZ / DL2BC / GW3OAZ*), 9 Appledore Close, Eastbourne, Sussex.
- G13OLV**, A. S. Coombes, Carragh House, Main Street, Kesh, Enniskillen, Co. Fermanagh. (*Tel. Kesh 349.*)
- G3PDS**, W. Lawrence, 30 Hernehurst, Quinton, Birmingham, B32 1RP.
- G3PIM**, E. N. Alcoat, 10 Heather Close, Croftmede, Nuneaton, Warks.
- G3PLR**, D. Skye, 16 Pie Gardens, Flamstead, Herts.
- G3PYN**, J. A. Birley, 16 Sharman Avenue, Watton, Thetford, Norfolk.
- G3RUS**, L. S. Beaumont, 39 Lakeside, Darlington, Co. Durham. (*Tel. Darlington 60466.*)
- GW3RYP**, D. R. Craggs, The Cottage, Great House Farm, Mamhilad, Pontypool, Mon.
- G3TRB**, T. A. Barber, 48 Newland Road, Droitwich, Worcs., WR9 7AG.
- G3UFB**, N. G. Brinkworth, 7 Squires Lane, Finchley, London, N.3.
- G3UTX**, R. A. Ridley, 23 Greenacre, Worlebury, Weston-super-Mare, Somerset.
- G3VFB**, A. R. Matthews, 5 Thorne Street, Barnes, London, S.W.13.
- G3WKC**, J. W. Birkbeck, 4 Tregullan View, Bodmin, Cornwall. (*Tel. Bodmin 3202.*)
- G3XCF**, D. White, 83 Meeting Lane, Penketh, Warrington, Lancs.
- G3XLL**, J. L. Lockwood, 29 Coppice Avenue, Hellesdon, Norwich, Norfolk, NOR. 49-M.
- G3XMZ**, C. A. Dodd, 9 Meath Green Avenue, Horley, Surrey.
- G3XVY**, P. Coull, c/o Dyno DX Club, P.O. Box 49, Aberdeen.
- G3YAI**, T. A. Mills, 75 Lymington Avenue, Clacton-on-Sea, Essex, CO15 4PL. (*Tel. Clacton 21664.*)
- G3YJD**, J. H. Davies, 71 Charlock Way, Holywell Estate, Watford, Herts.
- G3YTU**, C. J. Coward, 11-B Hillcrest Close, Scaynes Hill, Haywards Heath, Sussex. (*Tel. Scaynes Hill 431.*)
- G3ZCF**, R. J. Trebilcock, 10 Norton Way North, Letchworth, Herts., SG6 1BX. (*Tel. Letchworth 2063.*)
- G3ZQT**, J. Yu, 21 Langley Avenue, Surbiton, Surrey, KT6 6QN.
- G3ZZR**, P. J. Revill, 46 Abbey Road, Witney, Oxon.
- GW5YB**, R. Ashton, Bryn-y-Fedwen Cottage, Gaerwen, Anglesey.
- G8BMI**, G. T. Theasby, 12 Southfield Avenue, Riddlesden, Keighley, Yorkshire.
- GM8BWT**, R. A. Lapsley, 48 Springfield Road, Linlithgow, West Lothian.
- G8CFI**, J. K. Downs, 101 Chorley Lane, Charnock Richard, Chorley, Lancs., PR7 5EZ. (*Tel. Coppull 750.*)
- G8CRI**, B. K. Middleton, Kent House, Lincoln Road, Welton, Lincs.
- G8ddb**, W. F. Kirby, c/o Sgts' Mess, R.A.F. Bruggen, Germany, B.F.P.O. 42.
- G8DJL**, J. Renaut, 62 Waverley Avenue, Chingford, London, E4 8HT.
- GW8EHR**, D. B. Davies, Graig House, The Graig, Burry Port, Carmar.
- G8EPK**, Mrs. Dawn Skye, 16 Pie Gardens, Flamstead, Herts.
- G8TP**, P. H. Askew, Town End, Sedbergh, Yorkshire.

#### AMENDMENTS

- G4AHM**, J. W. Stratton, 11 Bondfield Avenue, Northampton, Northants., NN2 7RD.
- G4AMH**, A. McHale, 19 Chantry Hurst, Epsom, Surrey.

#### SUCCESS OF X3 SATELLITE

The X3, Britain's first technology-proving satellite, launched from Woomera, Australia, on October 28, is now in earth orbit and successfully transmitting data from all the experiments on board. First results, now being analysed by Marconi Space and Defence System engineers who also developed and built all but one of the satellite's electronic systems, indicate that the power supplies, data handling system and all the experiments carried by the satellite are performing well. The remaining experiment, a micro-meteoroid detector provided by Birmingham University, is also stated to be operating satisfactorily.

The main purpose of the satellite is to test and prove a wide variety of advanced techniques needed for communication and navigation satellites of the future. Equipment in the X3 includes a complete power conditioning system, telemetry transmitters, telecommand receivers, high and low speed encoders, programmer, horizon crossing indicator, electronics for experimental solar cells and a hybrid electronics experiment. Although the on-board electronic systems require only ten watts, the power system has been designed with the requirements of future spacecraft in mind and is therefore rated to supply up to thirty watts continuously. The equipment accepts unregulated DC power from the solar cell array, fed *via* an isolator and hold-off contacts, to the main DC/DC converter. The output is fed to number a

of power regulators supplying stabilised DC voltages used throughout the satellite's own system. The solar cell array, activated by the sun, also charges the 6 amp-hr. nickel-cadmium battery.

A modular pulse-code modulation (PCM) data handling system is employed, a system which could easily be extended to create the more complex data systems required for future spacecraft. The telemetry transmitter is duplicated to provide increased overall reliability. Two receivers are used, connected in "polarisation diversity," to reduce the modulation of the RF signal produced by the rotation of the satellite.

One of the most important experiments, from the point of view of constructional techniques, is the HEE (Hybrid Electronics Experiment), which has considerable implications for future spacecraft design. Its purpose is to assess the performance of a particular form of hybrid micro-circuit construction in the space environment. The experiment comprises, in effect, a replica of the analogue multiplexer and analogue-to-digital converter in the main data encoder, except that these are built using hybrid techniques in which the conductor patterns and resistors are deposited on ceramic substrates. The other components and semi-conductors, including precision resistor networks on glass substrates in "chip" form, are bonded to the circuit, the whole being encapsulated.

Altogether, "Prospero" (X3) is quite a package—and, regrettably, the last such to be launched from Woomera.

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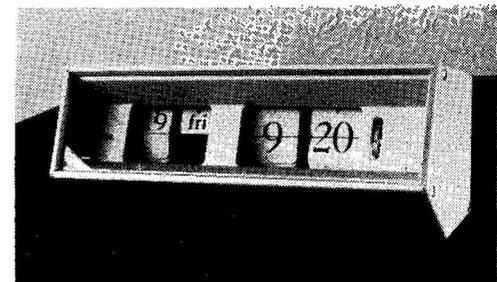
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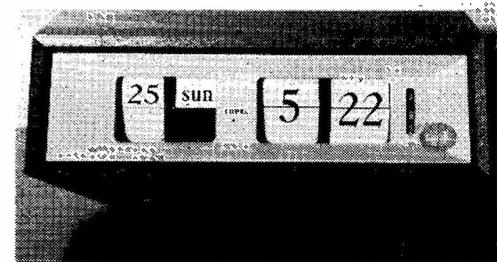
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**JANUARY Issue:** Appears December 31. Single-copy orders 25p, post free, to reach us by Wednesday, December 29, for posting on December 30.—Circulation Dept., Short Wave Magazine Ltd., 16 Victoria Street, London, SW1H 0HF.

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**GOING QRT:** KW-600 linear amplifier, £50. KW-2000A, with Q-multiplier, £150. Codar 12/NS, £6; 12/RC, £1-50. CV-323 klystron, £1-50.—Rose, G3WGF, QTHR.

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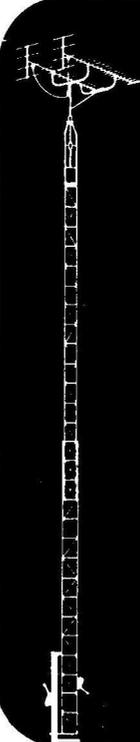
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**SELLING:** Trio JR-599, new late September, price £165. Prefer buyer to inspect and collect, otherwise carriage extra.—Morris, G4HU, 34 Birch Avenue, Romiley, Cheshire.

**SALE:** Heathkit SB-301E receiver, fitted AM crystal filter and Heathkit two-metre converter, factory aligned and tested, price £130. Top Band Tx and PSU (as "Short Wave Magazine," April, 1970), £15. National HRO-MX receiver, with nine GC coil packs and PSU, £25. Heathkit grid dip meter, £10. Codar PR-30 preselector, £2. All this apparatus in mint condition.—Gowen, 11 Milton Close, Yate, Bristol.



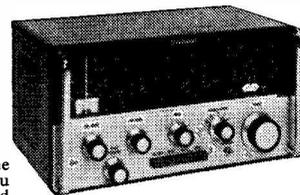
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**WANTED:** Zenith transistorised receiver, in good condition, must be reasonably priced.—Jackson, 1 Evelyn Crescent, Southampton (73112), SO1-5JF, Hants.

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**SALE:** Heathkit GR-54 de luxe five-band receiver for AM/CW/SSB, factory built, one month old, with manual, list price £80-65, offered at £50.—Ring Lance, Birmingham 706 0557.

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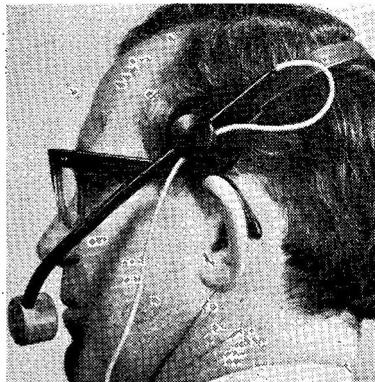
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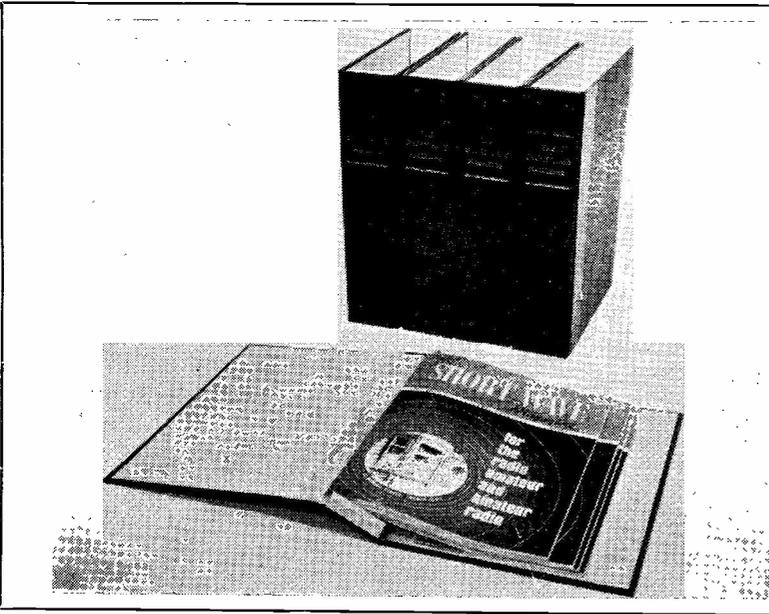
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