

25p

The
SHORT WAVE
Magazine

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NUMBER 12



WORLD WIDE COMMUNICATION

LOWE ELECTRONICS

119 Cavendish Road, Matlock, Derbyshire, DE4 3HE

Tel: Matlock 2817 or 2430 9 a.m. - 9 p.m.

John: G3PCY

Bill: G3UBO

Alan: G3MME

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

Service and Sales : A good range of our equipment is available (evenings and weekends only) at the following : John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel : Ringmer 812071. Sim GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel : 041-771 0364. Alan GVV3YA, 35 Pen y Waun, Ffaiil Isaf, Nr. Pontypridd, Glam. Tel : Newton Llantwit 3809. Peter Ward G3XWX, 47 Radstock Avenue, Ward End, Birmingham, B36 8HD.

Service only (evenings and weekends) : Dave Dryden G3BKQ, 205 Main Street, Thornton, Leics.

MAIN DISTRIBUTOR FOR YAESU MUSEN EQUIPMENT

Yaesu Equipment

FT101 160-10m	£255	FRdx400 SDL 160-10m. fitted ALL	
VF101 VFO	£38	factory extras including 4m.	£160
SP101 Speaker	£10	SP400 Speaker	£10
FL2100 Linear	£148	FLdx400 80-10	£146
FT200 80-10m.	£134	FL2000B Linear	£148
FP200 AC psu/speaker	£38	YC355D 220 MHz Counter	£111
DC200 DC psu	£46-50	FT2FB 2m FM	£89
FV200 VFO	£38	FT2AUTO	£143
FT401 80-10m	£230	FR50B 80-10	£59
SP401 Speaker	£10	FL50B	£68
FV401 VFO	£38	FV50B VFO	£27-50
FT75 80-10	£99	SP50B speaker	£5
FP75 AC psu	£22-50	DC75 DC psu	£22-50
FV50C VFO	£27-50		

Yaesu Accessories

FT101 modification kit to improve I.M. performance. If any of our customers are interested, we will give details on request.

FRdx400 2m. or 4m. converters, £12-50.

FT101 fans, £8. FT101 CW filters, £15.

FT101 AM filters see filter list.

FT401 CW filters, £15. 100 kHz crystals, £2-50.

11 pin accessory plugs, 45p

Manuals : FT200, FT101, FT2F, FT401, FT560, FT75, YC305, 65p each.

Log Books : Nice glossy jobs produced by Yaesu, 45p each.

2m. crystals : The FT2AUTO and FT2FB supplied by us are fitted 144-48, 144-60 and 145-00 MHz as standard. Extra channels available at £3-20 per channel are 144-30, 40 ; 80 ; 145-20 ; 40 60 ; 80 and of course the repeater channel (145-15/75).

NEW ITEMS

Yaesu SIGMASIZER 200 channel 2m FM transceiver. Complete coverage of 2m. in 10 kHz steps by frequency synthesis.

Yaesu FT501 : 80-80m. digital readout. 560W p.e.p., mostly transistor, but a 6BZ6 r.f. amplifier is used and a 6UBA first mixer to insure the best S/N ratio without degrading I.M. and cross mod. performance.

VHF Equipment

In addition to the popular Yaesu 2m. FM equipment we also stock the following :

Linear 2	2m. SSB transceiver fully tunable, both Rx and Tx (which in addition has RT) over 145-25 to 145-49 MHz. 20W p.e.p. input. All transistor. Crystal synthesis ensures unconditional stability. Requires 16-16v. DC and so is ideal for mobile	£138
Inoue IC21	Base station or mobile Matching VFO	£130 £35
Braun SE600 DIG	The complete 2m. station. AM/FM/SSB with digital readout	£535
Braun SE600	As above but without digital readout	£460
Braun SE280	80 channel 2m FM. Ideal for all European repeaters.	£198
Braun DGTC22	2m. converter 28-30 MHz IF.	£20

Braun DGTC 1702 70 cm. converter (2m. IF)	£36
Braun LVV270 Varactor tripler 2m/70cms.	£35
Braun TTV 1270 2m. 70 cms. transverter	£24
Braun CWF 02 Active CW filter	£15
Weir 2m. Mosfet converter. Extremely good value for money 28-30 MHz I.F.	£13-65

The Dycomm Range of FM Amplifiers

Type	E	ES	1-10-0	C	D	10-0	35-0
Input W	1-2	1-2	1-2	4-12	9-12	7-15	25-40
Output W	20-25	35-45	100+	15-30	45-55	80-125	80-110

These amplifiers have RF VOX and can be remotely switched. Ideal for mobile or fixed station—choose from the wide range the model which suits you best.

Station Accessories

SWR Meters : Hansen single meter, £4-70 ; Asahi twin meter, £7-20. PL259 plugs to suit, 30p. Reducers, 10p.

Kuranishi Wattmeters. Dummy load wattmeter 5" x 5" x 10", switched 20 or 120 W (s.d. flat 50 ohms to 500 MHz. Not to be confused with frequency conscious so called power meters. This is an accurate, direct reading instrument. £32-00

Headphones, low impedance padded, £2-75

Microphones. The handsome Yaesu YD844 desk mike at £12 or the very popular YD846 at £5.

Kasumi EK9X electronic keyers £8-20

CW practice oscillators £2-20

Anextra solder dispenser—fastens on to the soldering iron and dispenses solder automatically. By combining the solder and iron in one hand, you have a hand free. £3-75

Digital Clocks : Copal 222, £7-50 ; Copal 227 (alarm) £8-50 ; Copal 601 £14-25

PL259 plugs, 30p ; reducers, 10p ; sockets, 30p ; connectors, 75p.

Special : 4CX250 bases complete with chimneys £2-95

Books : World's Short Wave and Medium and Long Wave Radio Stations and FM and TV listing 35p

Comprehensive Radio Valve Guide Books, 1, 2 and 3 30p each

Transistorized Test Equipment and Servicing Manual 25p

Transistor Equivalents and Substitutes 40p

Handbook of Radio, TV and Industrial Tube and Valve Equivalents 40p

Filters

Mechanical

900Hz, CW, £12-50 ; 2-4 kHz SSB, £10-50 ; 5-3 kHz AM, £7-50 ; 20 kHz FM, £7-50.

Carrier crystals : 453-5 and 456-5 kHz, £2 each.

Crystal 9 MHz

Crystal 9 MHz

2-4 kHz SSB, £14 and £18 complete with carrier crystals.

3-75 or 5-0 kHz AM, £16.

0-5 kHz CW complete with carrier crystal, £16-00.

Other Frequencies :

SEI QC 1246AA 5-2 MHz.

SSB filter, £16-20 carrier crystals, £2 each.

SEI 3-2 MHz AM (5kHz) specially made for us for the FT101, £18.

Coaxial Cable

UR43 52 ohms 5.1mm. dia. 4.33dB/100ft. attenuation at 100 MHz, **8p** yard.
 UR70 72 ohms 5.8mm. dia. 4.65dB/100ft. attenuation at 100 MHz, **10p** yard.
 UR67 (RG8/U) 52 ohms 10.2mm. dia. 2.2dB/100ft. attenuation at 100 MHz, **22p** yard.

Balanced Twin Feeder

Type 302 75 ohm 2.9dB/100ft. attenuation at 50 MHz, **5p** yard.
 Type 306/B 300 ohms 1.0dB/100ft. attenuation at 50 MHz, **5p** yard.

Rotator Cable

4 core for AR22, etc., **15p** yard.
 12 core for TR44 and Ham-M, **30p** yard.
 This is heavy duty cable, well above minimum requirements for trouble free service.

PLEASE NOTE THAT POSTAGE IS EXTRA ON ALL CABLE.

Baluns

Either 1 : 1 or 1 : 4 in stock.
 Improve your antenna system.
 HZP 2H 1 : 1 for dipoles, **£4.80**.
 HZP 1B1 : 1 for beams or quads, **£4.80**.
 HZP 1C 1 : 4 for folded dipoles, **£4.80**.
 Kirk 5075B 1 : 1 for beams rated 2KWV, **£7.50**.
 Kirk 5075D LF 1 : specially for 160, 80 and 40 rated 2KWV, **£7.50**.

Antennas

Echo 8G-40-10 trap vertical, **£18.50**.
 Diamond KB103 80 and 40 trap vertical, **£32**.
 Diamond KB104 20, 15 and 10m. trap vertical, **£17.50**.
 Diamond KB105 80, 40, 20, 15 and 10m. trap vertical, **£34.50**.

Multi-Element Beams

Asahi full size 3 element 20m. beam, **£60**.
 Asahi full size 3 element 15m. beam, **£32**.
 Asahi full size 4 element 15m. beam, **£40**.
 Asahi full size 4 element 10m. beam, **£33**.
 Asahi full size 3 element 10m. beam, **£18**.
 Carriage paid on fixed antennas.

Quads

New from the States—the Polygon fibreglass quad 2 element 3 band.
 Write for details.

Mobile Antennas

Tavasu base loaded 160 to 10m. complete set **£14**, post paid.

G-Whips

Tribander (20, 15 and 10m.), **£10.50**.
 Ranger 160m., **£8**.
 Duobander (160 and 80m.), **£9**.
 Multimobile 71 (20, 15 and 10m.), **£12.50**.
 160, 80 and 40m. loading coils for Tribander and Multimobile, **£4** each.
 Top whip section for loading coils, **£1**.
 Base section for all G-Whips, **£1.45**.
 Carriage. The whips are too long to go by mail, so we send them British Rail costing 50p. We can, if you wish, send them Securicor for **£1.85**.

"J" Beams

2 Metre Aerials

2/4Y	4 element folded dipole Yagi with 1" boom	£2.90
2/6Y	6 element folded dipole Yagi with 1" boom	£3.50
2/8Y	8 element folded dipole Yagi with 1" boom	£4.20
2/10Y	10 element "Long Yagi" with 1½" boom and 45 braces	£9.00
2/14Y	14 element Yagi with 1½" boom and 45 braces	£12.00
2/10XY	Crossed 10 element Yagi with 1½" boom	£12.10
2/14P	14 element "Parabeam" with 1½" boom and 45 braces	£14.30
2/8	Double 4 slot-fed Yagis with 1" booms	£5.10
2/12	Double 6 slot-fed Yagis with 1" booms	£6.75
2/16	Double 8 slot-fed Yagis with 1" booms	£8.40
2/HO	"Halo" mobile aerial, head only	£1.35
2/HM	"Halo" mobile aerial, with ½" mast	£1.65
2/XD	Crossed pair of centre fed dipoles c/w harness	£4.60

2/OV	Omnidirectional or Bidirectional Dipoles	£7-15
PM2/2	Coaxial harness to match and phase two 2m aerials	£2.90
PM2/4	Coaxial harness to match and phase four 2m aerials	£6.10
Plus 2 unit 2 metre add on 2 unit		£0.85
Plus 4 unit 2 metre add on 4 unit		£1.65

NOTE: Please state nominal impedance required 50 or 75 ohms.

Antenna Rotators

AR-22R for 2m beams or similar **£25**.
 TR44 for bigger arrays **£45** and the Ham-M for full size heavy beams **£70**
 All items carriage paid unless stated otherwise.

Valves

6AH6, 80p	6BZ6, 40p	6CB6A, 42p	6U8A, 80p
6CL6, 50p	6AN8, 74p	6EW6, 75p	6EH7, 45p
6BM8, 50p	6AW8A, £1.15	7360, £3.10	12BY7A, 70p
EF183, 45p	6GK6, 92p	6I46B, £3	6JM6A, £1.25
6JS6C, £1.75	6KD6, £1.75	6JB6A, £2	572B, £8

Second-Hand Equipment

We have the best selection in the country of immaculate, fully tested and reconditioned second-hand gear. We give a 3 month or more guarantee with all second-hand stuff and in addition you have our normal money back guarantee if you're not happy. All you have to do is tell us you're not happy and we collect the gear by Securicor. You get your money back, less carriage, without question. Buying from us takes all the risk out of buying second-hand. A s.a.e. will get you our latest second-hand list and a large envelope with a 6p stamp on will get you our complete catalogue which runs to over 50 pages, and includes circuit diagrams of all gear.

Trade-Ins

We are always happy to trade in used equipment if it is something we can recommend to another customer. We don't mind if it's faulty because we service all the second-hand gear before resale anyway.

Equipment for Disposal

If you have gear for disposal—give us a yell, we are always interested in good quality equipment. Alternatively we can often sell it for you on commission.

Hire Purchase

We can arrange Hire Purchase terms on both new and second-hand gear. The deposit is a mere 10% and repayment may be spread over 12, 18, 24 or 36 months. Your trade in gear is perfectly acceptable as a deposit.

Yaesu News

* The YC355D counter which we have been selling for some weeks at **£111** supersedes all previous Yaesu models and is a marked improvement over the obsolete YC305D at no increase in price.
 * The latest FRdx400 super de luxe has been fitted with the latest Murata FM and AM filters for several months now.
 * The latest FT-2FB and FT-2AUTO have modified front ends.
 * The latest FRdx400 has much increased audio gain.

Our turnover is such that you are always assured of getting the latest in fresh factory stock. We don't make a big song and dance about it—just another of our fringe benefits. If you have any doubts when considering gear and want to avoid buying old stock—check with us. If you have already bought gear from us and want to know about latest modifications—check with us.

If you want an English handbook for the FT75—check with us.
 If you have bought an FR50B from us and want it to cover the whole of 10m. for 2m. converter use—check with us.

If you want a tune-up device which will allow you to run an FTdx401 or FTdx560 (or any SSB rig for that matter) at FULL INPUT for hours on end—check with us.

In fact, whatever you want wherever you are, you would be well advised to check with us, because above all else, our customers come first, and we look after them.

Service

You may be lucky—your rig may never go wrong. You may never ever require a hard-to-get spare in a hurry. But should anything ever at any time go wrong, you'll be glad you got your gear from us, because all you have to do is pick up the phone and tell us. We arrange collection repair your rig and return it to you within a very short space of time—average total elapsed time less than four days (excluding weekends of course), although on many, many occasions, we have repaired the rig and returned it the same day as received, making the total elapsed time 48 hours. This service is a result of years of experience of Yaesu, years of experience in communications equipment generally, top quality test equipment and an extensive stock of spare parts. This service is, we are convinced, the best in the country, and it is for OUR customers. If you bought gear elsewhere, we will do our best to fit you in but quite clearly OUR customers MUST come first.

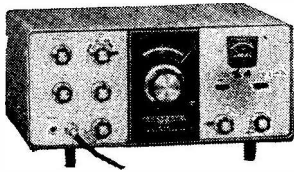
LOWE ELECTRONICS

119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE, DE4 3HE

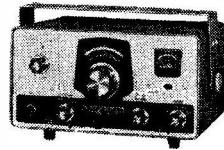
Tel. MATLOCK 2817/2430

MEMBERS OF THE AMATEUR RADIO RETAILERS ASSOCIATION

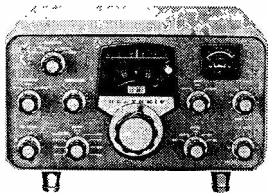
Look what HEATH can supply . . .



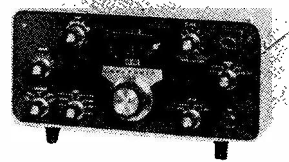
80-10m. Economy SSB Transceiver kit, HW-101
£129.50 carr. 80p



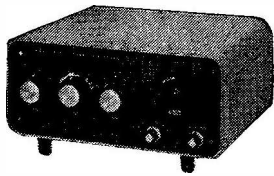
Single Band SSB Transceiver Kits
HW-12A £67.00 carr. 70p HW-32A £69.00 carr. 70p



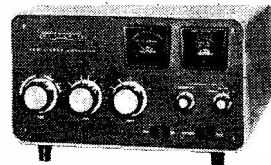
SSB Receiver kit, SB-303 £175.00 Carr. 90p



80-10m. Amateur Band Transmitter kit, SB-401
£190.00 carr. £1.00



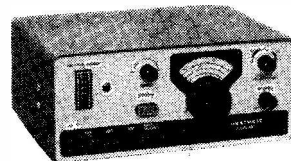
1 KW Linear Amplifier kit, SB-200
£127.50 carr. £1.00



2 KW Linear Amplifier kit, SB-220
£178.00 carr. £1.50



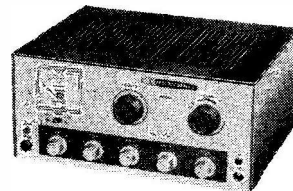
80-10m. De Luxe Transceiver kit, SB-102
£199.00 carr. 90p



40, 20, 15m. CW QRP Transceiver kit, HW-7
£35.00 carr. 40p



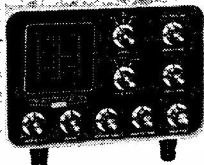
80-10m. Five-band Receiver kit, HR-10B
£44.00 carr. 60p



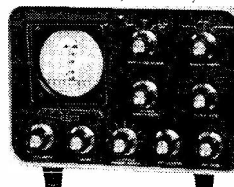
80-10m. Phone & CW Transmitter kit, DX-60B
£55.00 carr. 80p

SEND FOR DETAILS OF OUR 'NO DEPOSIT' & EXTENDED CREDIT TERMS

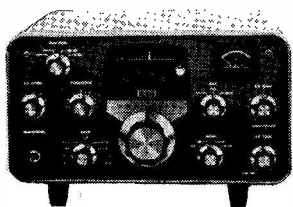
They're all in the Latest catalogue



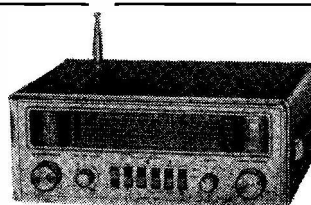
Signal Monitor kit, SB-610E
£47.50 carr. 50p



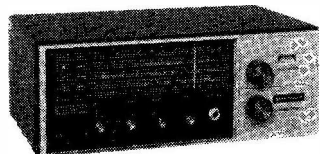
Spectrum Analyser kit, SB-620
£73.00 carr. 70p



Solid State SWL Receiver kit, SB-313
£185.00 carr. 90p



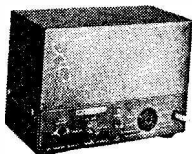
Solid State General Coverage Receiver, GR-78
£69.00 carr. 50p



Transistor Gen. Cov. Receiver kit, SW-717
£31.50 carr. 70p



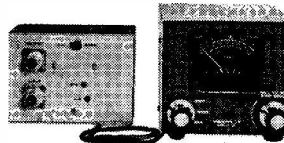
Digital Frequency Counter kit, SB-650
£79.00 carr. 60p



AC Power Supply kit
HP-23B £24.80 carr. 50p



Mobile Power Supply kit
HP-13B £37.50 carr. 50p



Wattmeter/SWR Bridge kit, HM-102
£15.50 carr. 40p



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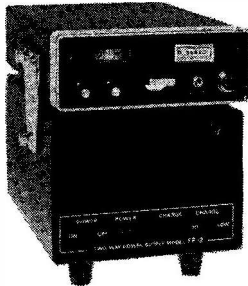
DONT FORGET OUR ANCILLARY AND AUXILIARY EQUIPMENT.



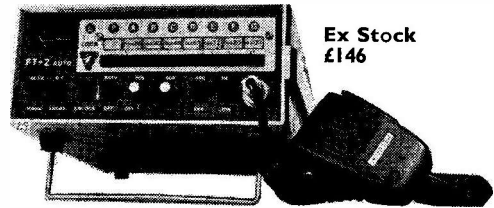
OUR AESU MUSEN DISTRIBUTOR

WESTERN

Ex Stock



NEW —FT2FB. Similar to FT2F but with more efficient transmitter, tone for repeater triggering and improved receiver filter. Takes less current! The FT-2FB opens the door to noise-free broadcast quality two metre FM operation. It is a highly advanced all solid-state unit complete with an automatic toneburst signal. Channel capability of 12 simplex or duplex frequencies. Three channel frequencies included. Advanced cct design protects automatically from damage of transistors caused by antenna trouble or reverse connection power supply. Portable or home base operation can be achieved with the addition of the optional FP-2AC/B power pack which provides regulated DC power for the transceiver and charging voltage for the leak proof re-chargeable colloidal type batteries. Spec. frequency 144-148 MHz., 12 channels. Frequency modulated, power drain, Rx 0.5A Tx2A. Dimensions 6½" x 2½" x 10". Weight 4 lb. Standard accessories. Dynamic mic., and mobile mount. Transmitter RF power 10 or 1w. o/p Stability. + 0.001 per cent.



Ex Stock
£146

NEW 2m. FT-2 AUTO SCANNING TRANSCEIVER

The receiver automatically scans the 8 channels and will indicate on which one there is a signal. Power output: DX, 10w. Local, 1w. Frequency coverage: 144-146 MHz. Weight: 4.2 kg. Size: 210w. x 95h. x 270d. mm. Mode: F3. Power requirements: AC, 100, 110, 117, 200, 220, 230v. DC, 13.5.

This unit offers the user continuous monitoring of the power output of his amplifier. Power is read directly in watts on the meter. This head is plugged into the control jack of any Tempo amplifier. It can be mounted in any convenient location, away from, or next to the amplifier. It then offers the user not only power output monitoring but also the ability to turn the amplifier off and on. The control head can also monitor the battery voltage. Power is detected in the amplifier by a printed circuit directional coupler which is built into all Tempo TPL VHF power amplifiers.

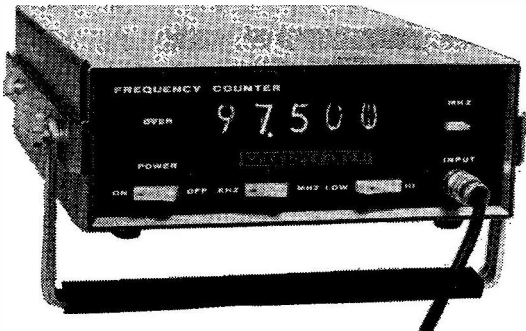
TEMPO TCP I2A

TEMPO 2 METER FM AMPLIFIERS

Model	Drive Power	Output Power	Current	Price
1002-3	5-25 watts	100-135 watts	17 amps	£119.97
802	5-12 watts	70-90 watts	12 amps	£98.90
502	5-15 watts	35-55 watts	5 amps	£57.95
TCP I2A Control Head				£17.85

All the amplifiers operate on 13.8v. D.C.

YC305 FREQ. COUNTER (Ex Stock) £85



YC-305D, 220 MHz COUNTER, £111

The compact digital frequency Counter which is equally suitable for laboratory, industrial or amateur applications has the following specifications: Compact design by advanced IC technique to count side frequency range 5Hz-30 MHz. Dual range system provides 8 digit measurement with MHz and kHz indicators. 240v. AC/12 DC dual power pack built-in; accuracy—time base stability + 1 count, gate time 1 m.s. or 1 second; input Z 1MΩ, low 55 Ω; input capacity = less 20pF, max. i/p 60 v-p-p less than 10 sec. 20V. p-p continuous; time base frequency 1000 kHz crystal controlled; stability 0.0005 per cent at 25°C, 0.0025 at 40°C. Dimensions 8½" x 3½" x 10½". Weight 8 lbs.

NEW CATALOGUE (10p) "COMMUNICATIONS EQUIPMENT"

YAESU, OMEGA, AMECO, ROBOT, TEMPO OSKER, ASAH, KATSUMI, CASLON, HONDA are all represented plus a price list of all our equipment including antennas, masts, etc.

FT75 10-80m. SSB TRANSCEIVER (Ex Stock)

The great new FT75 with an output power in excess of 30W p.e.p. on any band. Equally suitable for mobile or fixed station. Operation could not be easier! You simply select the band, press the channel button and talk! Microphone included.

The FT75 requires the FP75 for mains operation or the DC75 and mobile mount for mobile operation. A VXO facility allows the crystal frequencies to be moved slightly during crowded band conditions.

Specification:

Crystals fitted: 3.760, 7060, 21.350, 28.550 (14-200 optional extra £2.20) others available to order. VXO swing: 3.5 MHz, 3 kHz; 7 MHz, 6 kHz; 14 MHz, 3 kHz; 21 MHz, 20 kHz; 28 MHz, 12 kHz. Size: 210 x 80 x 300 mm. Weight: 3.8 kg.

RECEIVER —Sensitivity 0.5μV for 10 dB S: S + N. Selectivity: 2.3 kHz (-6 dB) 4.5 kHz (-60 dB). Audio o/p 1-8W.

TRANSMITTER —Modes SSB or CW, Carrier suppression better than 40 dB at 1 kHz. Current drain DC Standby 1.4A, heaters of 3.5A, transmit 5.5A.



ELECTRONICS (UK) LTD

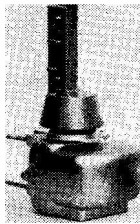


FL2000B
(Ex Stock)

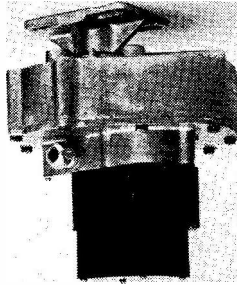
The FL2000B operates at a maximum i/p or 1200w. p.e.p. on SSB and covers 80-10m. All grid i/p circuitry is screened. Two cooling fans fitted, one for each rugged 572B carbon anode tube. Built-in SWR bridge functions when linear is "off" or "on"! Safety interlock on lid switches AC supply off. Safety interlock on PA compartment lid bleeds residual A.T. to earth thus preventing shock from the storage capacitors. All in all the FL2000B is quite a linear!

NEW/USED EQUIPMENT

Collins 7551. Excellent ...	£175	KW Viceroy 3 ...	£65
Codar AT5 +AC+DC PSU's ...	£25	KW PEP Meter ...	£10
Codar Preselector ...	£5	KW2000 + AC + DC PSU ...	£150
Drake R4B. 3 weeks old ...	£210	Lafayette HA350. Excellent ...	£55
Halicrafters HT32B ...	£80	National NCX-5. Mint ...	£175
Hammarlund HQ170A/VHF ...	£80	National NCX-500. Mint ...	£175
Heath SB303 + CW. New. Assembled ...	£238	Racal MA79G ...	£485
Heath GR78. Mint ...	£55	Sommerkamp FT500. Excellent ...	£149
Heath HF23E ...	£16	Sommerkamp FT250. Superb ...	£135
Heath Mohawk ...	£59	Sommerkamp FT-100 + 160m. ...	£150
Inoue IC700R. Mint ...	£60	Telford TC7 + TC9. Mint ...	£35
Inoue IC700R and T. Mint ...	£120	Tristao Tower. 105ft., teles. ...	£225
KW 77. Very good ...	£59	Trio 9R59D ...	£30
KW 202. Few months old ...	£119	Trio IR5005G. Mint ...	£49
KW204. Few months old ...	£119	Trio JR310. Superb ...	£60
KW Atlanta. New ...	£199	Trio TS510. Mint ...	£140
KW Atlanta. Excellent ...	£150	Yaesu FT-101. Mint ...	£199
KW Vespa 2's. Superb ...	£90	Labgear LG50 ...	£25



Rotators
Ex Stock
24/48 hour
Securicor
delivery £1
Shown far left
AR20, left
AR22R, right
Hy-Gain 400.



We stock the best range of rotators, CDE and HY-GAIN and spares. Our stocks are good so you'll get fast delivery plus the after-sales service which counts.

- AR20** This model replaces the old AR10 and is ideal for VHF beams, £20 (40p)
- AR22R** This model will turn HF antennas of TA33 Jnr. size and can be mounted on the top of masts up to 2 1/16" diameter or onto a flat plate. It can carry a deadweight of 150 lbs. Requires a 4-wire cable, £25 (65p).
- TR44** This model is also for HF beams as the AR22R but carries a 500 lbs. loa and has better braking. The control unit requires a 7-wire cable, £45 (75p).
- HAM-M** The best of the CDE range. Carries 1,000 lbs. deadweight for large HF beams and employs a solenoid operated brake. Requires an 8-wire cable, £70 (80p).
- HY-GAIN 400** It's a brute but takes masts up to 3" dia. and automatically rotates to the desired direction by setting the compass control knob points as required. Mounts to standard tower plate on Versatower, £115 (£1).

Note—All above rotators are ex-stock and orders are despatched the same day.

HY-GAIN

(Ex Stock)

Hy-tower, 10-80m. (self-sup.)	£110-00
15V., 10-80m. vertical	£12-85
12AVQ, 10-20m. vert. "	£16-50
12AVQ, 10-40m. vert. "	£24-50
18AVT, 10-80m. vert. "	£35-50
LC8CO, 80m. coil for 14 AVQ	£7-75
TH6DXK, 10-20m. 6 ele. beam	£97-00
TH3MK3, 10-20m. 3 ele. 2 kW	£75-00
TH3 Jnr., 10-20m. 3 ele. 600w.	£51-00

ANTENNAS

Hy-Quad, 10-20m. 2 ele. ...	£74-50
BD10-15, 10-15m. 3 ele. ...	£57-50
204BA, 20m. 4 ele. beam ...	£80-00
203BA, 20m. 3 ele. beam ...	£72-00
153BA, 15m. 3 ele. beam ...	£36-00
103BA, 10m. 3 ele. beam ...	£28-50
18TD. Reetape portable dipole	£41-00
LA1 Lightning arrester ...	£14-50
LA2 Lightning arrester ...	£2-50

MOSLEY (Carr. pd.) (Ex Stock) from us for fast delivery

Mustang, 10-20m. 3 ele. 2kW ...	£45-50	TA33 Jnr., 10-20m. 3 ele. ...	£36-50
TA33 Jnr. 'E' for 2" mast ...	£37-00	TA32 Jnr. 1-20m. 2 ele. ...	£26-00

SWL Listeners dipole ... £12-50

BANTEX FIBREGLASS MOBILE ANTENNAS (Carr. 50p) including base (Ex Stock)

70 1/2. 70 MHz, 1/2 wave ...	£3-00	BGA, 144 MHz, 1/2 wave ...	£6-15
144 1/2. 144 MHz, 1/2 wave ...	£2-85	B5, 144 MHz, 1/2 wave ...	£4-35

Magnetic mount ... £6-15
All aerials complete with base.

Note. Deduct 50p from price of aerial if base is not required.

G WHIPS (Carriage 50p coils, 20p) THE FINEST MOBILES (Ex Stock)

Tribander 10, 15, 20m. ...	£9-45	LF160 160m. coil ...	£4-00
LF40 40m. coil ...	£4-00	Whip for LF coils ...	£1-00
LF80 80m. coil ...	£4-00	160/80m. Duobander ...	£9-00

160 Ranger ...	£7-50
Multimobile '71' 10, 15, 20m. 40m. coil ...	£12-50
40m. coil ...	£4-00

80m. coil ...	£4-00
160m. coil ...	£4-00

J BEAM ANTENNAS (Carriage paid) (Ex Stock)

10/4 10m. 4 element array	£24-10	2/10Y 2m. 8 element folded	£9-00
4/3Y 4m. 3 ele. folded ...	£4-25	2/14P 2m. 14 element	£14-20
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2/4Y 2m. 4 element folded	£2-90	2/0V 'Omni' dipoles ...	£7-15
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2/8Y 2m. 8 element folded	£4-20		

2/12 2m. Double 6 slot fed	£6-75
2/16 2m. Double 8 slot fed	£8-40
2/HO 2m. Halo mobile ...	£1-45
2/HM 2m. Halo mobile ...	£1-75
70/16 70 cms. Double 8 slot fed ...	£5-60

70/14Y 70cms. 14 ele. folded ...	£7-10
70/18P 70 cms. 18 ele. ...	£7-45
70/18M/46 70 cms. 46 ele. ...	£10-50

RF COAXIAL CABLE AND PLUGS (Carriage extra) (Ex Stock)

50 ohm UR43-2" dia. per m.	15p	75 ohm UR57 .4 dia. per m.	30p
50 ohm UR67 RG58 U.L.	30p	75 ohm twin ...	5p
75 ohm .22 dia. UR70	15p	150 ohm twin ...	5p
75 ohm UR39 .31" dia. "	22p	300 ohm twin ...	5p

50 ohm UR76-2" dia. per m.	15p	50 ohm UR76-2" dia. per m.	15p
UHF Plugs 259A .4" dia. ...	37p	UHF Plugs 259A .4" dia. ...	37p
UHF Plugs 259A .3" dia. ...	37p	UHF Plugs 259A .3" dia. ...	37p
UHF Plugs 259A .2" dia. ...	37p	UHF Plugs 259A .2" dia. ...	37p

UHF in line coupling connectors 60p
UHF 'L' angle connectors 90p
UHF 'T' angle connectors £1-20
UHF panel socket SO239 27p

AGENTS, G3UDR, Shipston-on-Stour 61839. G3PRR, Chesham (02405) 4143.

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IMPORTANT ANNOUNCEMENT

Since all amateur equipment is exempt from purchase tax, when VAT commences 1st April, all prices go up by probably 10% (the exact figure is yet to be announced). We have increased our large stocks, spares and service department and staff to assist the discerning customer to take advantage of the following scheme. By taking advantage of our H.P. facilities supplied by the Lloyds and Scottish banking group, which is even more competitive with the present bank rate, then providing you send a 10% deposit and we invoice before 1st of April, the rest of the payment may be made after without the VAT tax up to 3 years. Please don't forget we supply a 5 star service :

★ **GUARANTEE**—we maintain the Yaesu 12 month guarantee backed up
★ **SPARES**—We carry a full range of factory recommended spares and more besides.
★ **SERVICE**—We do all labour free on warranty claims.
★ **DELIVERY**—We deliver within 24 hours of receipt of order all items in stock providing they are less than 5ft. in length (boxed). This is the fastest delivery service in the country and costs £1 per parcel only! 48 hour service to Scotland and remote parts.
★ **COLLECTION**—In the unlikely event of you having faulty equipment under warranty, all you have to do is phone/write and we will collect by Securicor at our expense and return the unit to you at our expense.

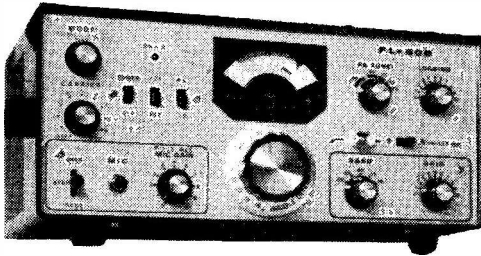
NEW! YAESU FT-501

This is a 500w. p.e.p. 10-80m. transceiver modelled along the lines of the FT-401 ; i.e. mainly valved and using 2/6KD6 for o/p. It has digital readout and comes complete with matching separate PSU/Speaker unit (FP-501). Price Circa £300 (+10% VAT on orders placed after 1.4.73). Delivery : Not before late March (that's why we haven't mentioned the unit earlier !)

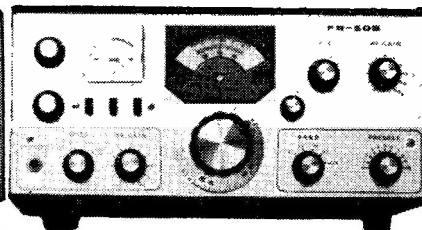
NEW YAESU SIGMASIZER — 200

A 200 Channel Frequency Synthesised FM Transceiver. Price Circa £150 (+10% VAT on orders after 1.4.73).

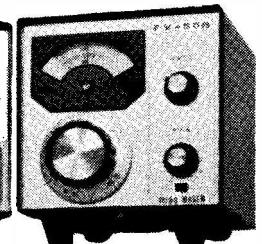
FL-50B TRANSMITTER (Ex Stock) £68



FR-50B RECEIVER (Ex Stock) £59 - £63



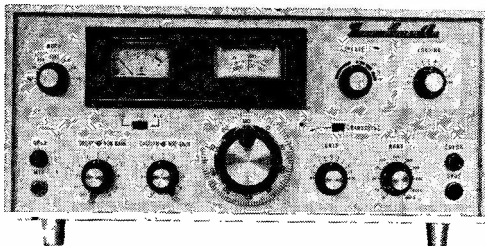
FV-50B VFO £27.50



The **FR-50B RECEIVER** —Amateur bands only, AM/CW/SSB double conversion offers first class value for money, comes complete with built-in speaker, crystal calibrator and WWV at £63 (less cal/WWV, £59) 100 kHz cal cct., tunable BFO, I.F. trap in r.f. cct., S meter fitted, readout to better than 1 kHz, noise limiter, built in muting and monitoring cct. for use with FL50B transmitter.
SPECIFICATION : Sensitivity : 0.5 μ V. 10 dB SN ratio. Selectivity : 3.6 kHz 6 dB ; 10 kHz 50 dB. Frequency coverage : 3.5-4.0, 7-7.5, 14-14.5, 21-21.5, 28-29.2 MHz. Image ratio : better than -50 dB.

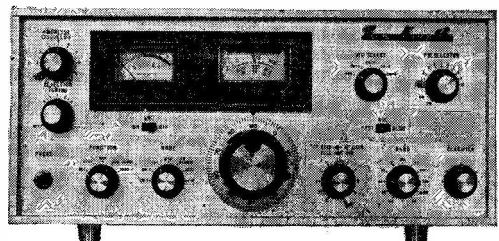
The **FL-50 SSB-CW TRANSMITTER** operated on SSB/AM and CW Power i/p 50w. p.e.p. 80-10m. Carrier suppression. Unwanted sideband and spurious radiation are all -40 dB. The unit is VXO controlled or will transceive with FR50. With FV50 VFO control is possible.

The **FV50B REMOTE VFO** for both FT75 or FT-50.



The **FLDX400** Transmitter runs 240w. p.e.p. and is designed to transceive with FR100B or FR400. AM and "break-in" CW keying are fitted. **SPECIFICATION** : Frequency coverage 3.5-4.1, 6.9-7.5, 13.9-14.5, 20.9-21.5, 27.9-28.5, 28.5-29.1, 28.9-29.5 MHz. Selectable USB or LSB. Stability : less than 100Hz/hr. after warm-up. Sideband suppression 50dB. Carrier suppression better than 50dB. Netting facilities for zero-beating will receive if not switched to "transceive". Provision for listening on transmit frequency as well as the frequency to which the receiver is tuned. ALC fitted to secure effective performance and a "clean" signal. VOX/PTT operation. Relays operate linear amplifier and receiver. Dial read-out to 1 kHz.

THE
GREATEST
VALUE
SEPARATES
ON THE
MARKET
fitted 4m.
+ 160m.-2m.



The **FR400SDX** (Super de luxe) receiver is now available fitted with 4m. This model is only available from us and covers 160, 80, 40, 20, 15, 11, 10, 4 and 2m. 4 mechanical filters are fitted for SSB (2.4 kHz), AM (5 kHz), CW (0.6 kHz) and FM 24 kHz. Dial readout to 1 kHz from stable VFO. Rejection tuning to notch-out unwanted heterodynes. Clarifier control permits adjustment of SSB/CW received signals when working transceive. VFO select for internal VFO or 4 crystal frequencies. Monitor facility enables transmitted signal to be monitored at all times. Squelch circuitry silences receiver for noise free AM/FM reception. FM discriminator fitted to SDX model, 25/100 kHz calibrator. WWV band to check calibrated. 3 step AGC. Built-in noise limiter. Basic FR400 receiver from £120.

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THE MOST!**

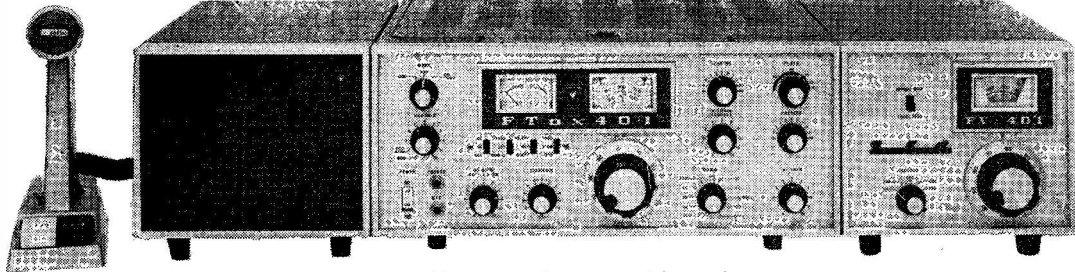


YD844

SP400 (Ex Stock)

FT 401 (Ex Stock)

FV 401 (Ex Stock)



THE FT401 offers a high power SSB/CW transceiver with many extra features at a minimum price. SPECIFICATION : 260w. p.e.p. (p. SSB/CW), 75w. AM, 1 kHz readout on all bands 3-5-4, 7-7.5, 14-14.5, 21-21.5, 28.5-29 MHz. (3 optional crystals available for 28-28.5, 29-29.5 and 29.5-30 MHz. Stability: 100Hz 30 mins. after warm-up. Sensitivity: 0.5µV check the 25/100 kHz calibrator plus 3 spare band positions. VOX is built-in (not an extra). Dial readout to 1 kHz on all bands. Selectable USB/LSB. for 20 dB S/S ± N. Selectivity : 2.3 kHz (6dB), 3.7 kHz (60dB). CW filter 600 Hz. Clarifier 5 kHz. Break-in CW with sidetone. Selectable USB/LSB.



FV200

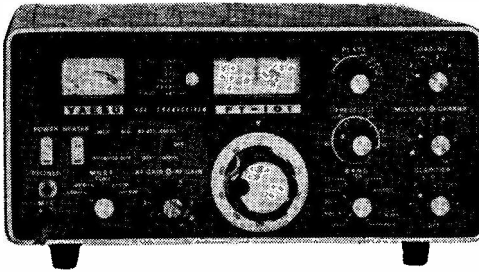
FT200

FP200

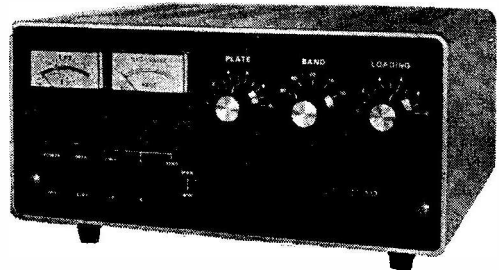
All
Ex Stock

THE FT200 is without doubt one of the "best buys" available. Compare its features with similarly priced units and kits. SPECIFICATION : 260w. p.e.p. (p. SSB/CW), 75w. AM, 1 kHz readout on all bands 3-5-4, 7-7.5, 14-14.5, 21-21.5, 28.5-29 MHz. (3 optional crystals available for 28-28.5, 29-29.5 and 29.5-30 MHz. Stability: 100Hz 30 mins. after warm-up. Sensitivity: 0.5µV 10dB/S + N. Selectivity : 2.3 kHz (6dB), 4 kHz (60dB). Solid state FET VFO with excellent linearity (like all YAESU VFO's), 100 kHz Calibrator, VOX/PTT. Separate DC supply available for mobile use. Clarifier ± 5 kHz. Break-in CW keying.

THE SUPERB FT-101 (Ex-Stock)



MATCHING FL-2100 LINEAR (Ex Stock)



FT101 £229
with one year
guarantee.
Remaining old
stock only months
old or fitted
160m.
£239.

The FL-2100 is designed to match the FT-101 and runs 1200w. p.e.p. If it's as linear you require for some other exciter, compare the FL-2100 with 2 fans, AC and HV safety interlock and fully screened input circuitry. You'll not find better value!

NEW:- FT101 - £249 or £255 with 160m.

260w. p.e.p. SSB 180w. CW 80w. A.M. Improved cross modulation and noise blander performance 160m. factory fitted, and improved inverter stage. Selectivity : 2.4 kHz (6 dB down) 4.2 kHz (60 dB down). Sensitivity : 0.3 micro volt, or 10 dB signal to noise. Full amateur band coverage plus 27-27.5 MHz. Built-in AC P.S.U. or 110-234v. AC. Consumption 3 amps. max. Built-in DC P.S.U. for 12v. DC, 0.5 Rx standby, 5 amps. Tx standby, 20 amps. modulation peaks. Weight : 30 lbs. Complete with noise blander, 20 dB attenuator, 25 and 100 kHz calibrator, Vox, ± 5 kHz clarifier, CW break in with side tone, 1 kHz readout. Compatible AM and internal speaker. Microphone supplied as standard.

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DC-75 DC PSU/SPKR/Mount	£22.50
FT-101 Transceiver, 250W	£249.00
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FR-400S Receiver	£120.00
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FL-2500 Linear, 2kW p.e.p. 160-10m	£122.00	YD-846 Hand Microphone	£5.00
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YC-305 35 MHz Counter	£85.00	FR-50DX L.P. Filter	£6.60

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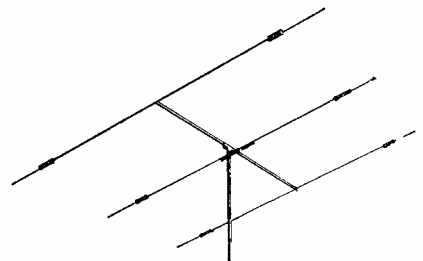
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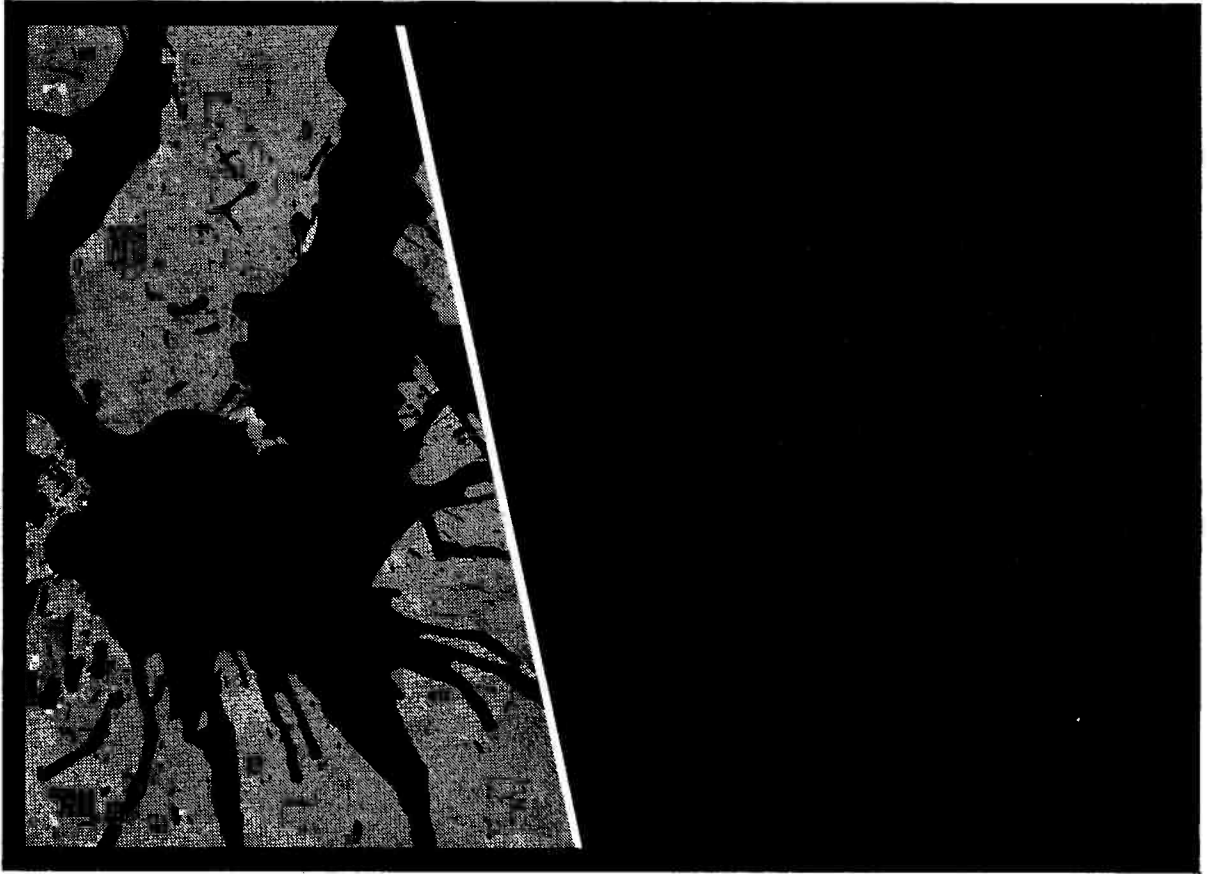
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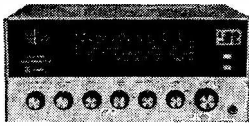
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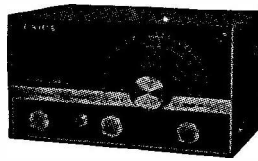
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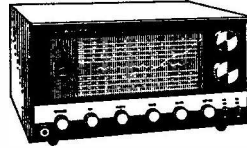
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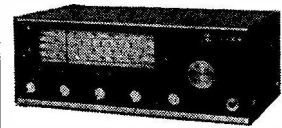
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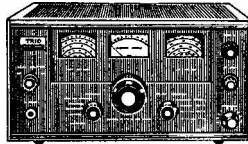


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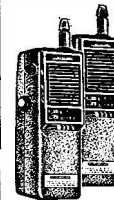
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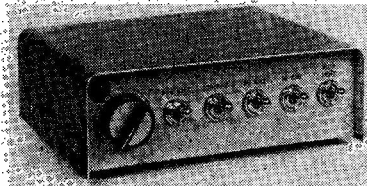
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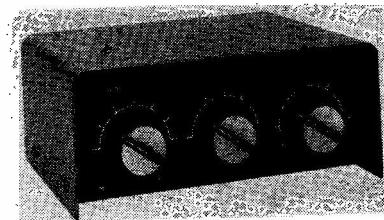
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(GB3SWM)

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E D I T O R I A L

Clubs

Ever since SHORT WAVE MAGAZINE saw the light of day 35 years ago we have, consistently as a matter of policy, given space to the Club interest—that is to say, the reporting of Club activities and the maintenance of records affecting the Club movement in the U.K. Amateur Radio context.

This policy has always been severely criticised, in the sense that the space we give is “wasted” or of “no interest to the reader.” But the reasoning behind our policy was (and still remains) simply that it is mainly through the Clubs, nation-wide, that the practical interest in Amateur Radio is maintained locally and new adherents gained.

Over the years, we have seen—and continue to see—a great many newsletters and Club journals devoted to the activities and interests of local groups. In many instances, these compilations run to several sheets of photostat or roneo and really represent mainly the enthusiasm of the individual charged with their production—in other words, while at the early stage expressing his ego, when he wants to give up or pass the chore to somebody else, the production dies. We have noticed this too often and can now practically foretell when such-and-such Club’s bulky newsletter will cease to appear. It is almost axiomatic that the more ambitious a Club newsletter is at its beginning, the shorter it has to live. The membership is either unable or unwilling to keep up the flow of material, or is really not much interested in the compiler’s labours anyway.

On the other hand, we do see excellent examples of what a Club newsletter ought to be—the facts of immediate interest clearly stated on a single sheet, with no attempt to extend coverage beyond what directly concerns the local membership.

Of course, so far as we are concerned, we shall continue to support the Club interest as we always have done over the years—in fact, it could be said that the present strength of the Amateur Radio Club movement in the U.K. (with the prospect it has always held for future recruitment) is largely due to the support and influence of SHORT WAVE MAGAZINE.

*Austin Forsyth
G6FO*

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

WINTER has not, to the time of writing, produced the real Christmas-card weather, the only hazard to /M operating having been fog; but the winter on the bands, at least under the period we are reviewing, has been pretty poor during the average amateur's operating hours of an evening, certainly on the HF bands. Chez G3KFE the situation has not been assisted by a keen young relative who volunteered to lop a tree. The offending big branch, all of fifteen feet long came down all right, but carried away the LF aerial in the process; and to add insult to injury he discovered, the hard way, that green apple-wood is reluctant to burn! Oh, well, that long-wire was due for a spot of preventive maintenance anyway . . .

Sad Note

Observant readers will know that G2DC is one of our most regular and knowledgeable correspondents on the DX scene, and for years has lightened the load of your scribe by his efforts. Jack has been taken to hospital after a stroke, and at the time of writing it is understood he will be out of action for a while—he has been quite seriously afflicted. No possibility arises of having the rig at the hospital, so he is no doubt feeling pretty fed up. Our best wishes for as complete and as speedy a recovery as possible.

The Bands

Your conductor has already indicated his own personal view of conditions; but it must be said that not everyone would agree with him, particularly those who can get on during the times when most of us are at work.

Let us make our start, as usual, with Ten, a band which the correspondents have, in the main, "treated with ignore."

GW4BLE (Newport, Mon.) found a short-skip opening over the Christmas holiday which filled in a few vacancies in the countries-worked list, such as France and

Portugal! In addition, QSO's were had using SSB (to the 18AVT/WB aerial at fifteen feet) with CR6GO, CX6AM, KP4DJE, KG4FG, TJ1BB, YV3ZS, ZE1AA, ZE4JW, 9J2DT, 9J2XZ and 9J2LF. The latter, incidentally, would like his regards passed on to his old pals in U.K., and particularly to G3LYW with whom he lost touch many years ago. 9J2LF's call, for the record, was G3LWF.

A nice long letter from W6AM (Long Beach) this time; Don has been giving all the bands quite a going-over, as usual, but his 28 MHz entertainment has been by way of listening to the Oscar return signals, almost every W district and Canada having been logged. Each pass has produced signals, usually on a dipole, but quite often signals have been better on a rhombic, each time a different one, from his collection. On a different tack, W6AM, although he has a station to dream about by most people's standards, can always find something which can be improved around the place. The latest move is to provide timber framing on which to mount the *eighty* relays, which have to be used to switch the rhombics, in such a manner as to reduce to a minimum the interaction between aerials and any consequent loss of gain on a particular aerial.

During the two weeks prior to his letter, G3NOF (Yeovil) found Ten dead at times when he could monitor. Around mid-December there were a few openings to W in the mornings. SSB QSO's were knocked up with W1, W2, W3, W4, ZS1JP, ZS6AWU, ZS6U, ZS6XP and 9J2RC.

Fifteen

G4ALG (Reading) has acquired an FT-DX401 and been trying it out to dipoles. While nothing exotic has been worked yet, encouraging reports have been obtained from WA5UVS/KP4, VE3BVD, W2CRW, WA3ATX, WA4SQM, WA5PHP, W8BT, W9IRH and 9Y4EH.

G3RFG (Henlow) comes back to the scene at this point; Stan's CW seems to have forsaken Ten, and to have not ventured lower than Fifteen, where he worked K1AKV, K4GSU, K8BPL, PY1DVU, PY2BGA, PY7VHB, VE2WQ, WØEUX, W3ARC, F5XB/W2, W2CSQ, WA3ONE, WB4BMR, WN3TLC, W4JBQ, W4LHW, WN4ZXJ, W5BSR, W6KTB, W8DAW, W9BR and W9BLT.

A first report from G4BKY (Dursley) who has, on HF, an LG50 transmitter and AR88 or RA-1 receivers, to a choice of TA33 aerial or 180 feet end-fed strung around the garden. With six watts, and CW, WN8NSZ has been raised on Fifteen. With the big rig, all call areas other than W6 and W7 have been worked *in Novices*, plus WISF, WA2DLH, K2JUV, and WAØUGJ. Incidentally, the TA33 can be loaded up, without tuning units, on Forty and Eighty to get QSO's on those bands, and even takes power on 144 MHz!

Rhubarb! So says G3ZPF (Dudley) who reckons conditions have been dismal of late, although David has managed to tangle with SSB from CR7FM, PZ1DR, ZS6ATA, HK3CXW, VQ9HCS (Aldabra) G4AMJ/VP9 (so that's where our wandering boy is!), 9K2BQ, ZL3UY, ZD8TS, EP2SP, W1, W2, W4, W8 and WØ.

For GW4BLE there were a few pickings, notably CT2BG, KP4DJE, KP4DPN, KV4AD, KV4CI, PJ2MI, 6W8AL, ZM3JC, 9H3WPD, 5N2AAN and 9G1HE.

The only 15-metre contact W6AM reckons worth noting is one on December 10 with VR3AC (Fanning). Another who has only one contact to mention is G3JFF, via G2NJ—he has been, naturally enough for an RNARS member, interested in the /MM's and was pleased to cross swords with JA5CEQ/MM when the latter was just south of Bombay.

Comparisons between a couple of fixed beams, and the Quad, were

of considerable interest to G4AMT (Land's End), and in the process Terry found VP9GE, G4AMJ/VP9, 3V8BB, VQ9HCS, A4FA, VK5FH, VK5MF, KV4CI, 9J2DT, VK6LF, VK6HE, FR7AE, and all W call areas on sideband, but only W and VE on the key.

G3NOF, despite changes to just about all the machinery, still has TVI on this band, which is a bit limiting. However, out of TV hours there were contacts with CR7ZZ, FL8NA, FL8OR, VK5PB, VK5SU, W1, W2, W3, W4, WA6AXE/KG6, Wb5DJA, ZD8RR, ZE1CL, ZL3PD, ZL4RB, ZS4LW, 9G1HE, G91HO, 9J2DT, 9K2BQ and 9L1JT. In addition were gotaways like FL8BC, FY7AE, and TJ1BB.

Now Twenty

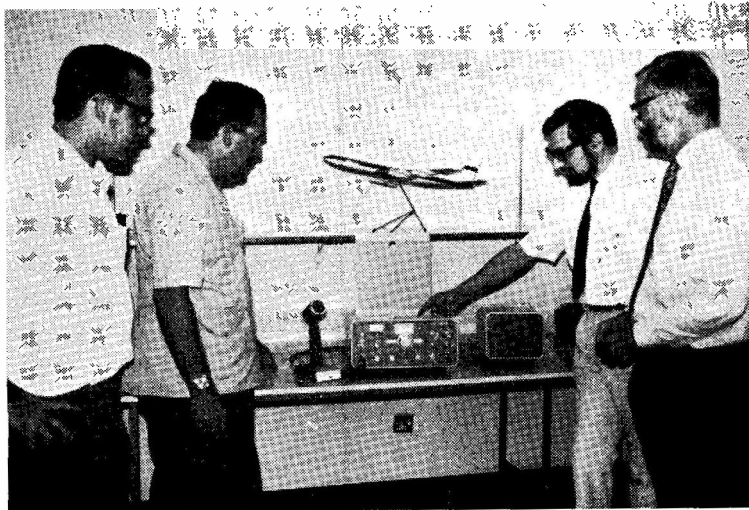
GW3ZQN (Cardiff) is still using the M. & G. rig and spent his time on Twenty, in the main, conferring with SM, LA and DK stations, who seem to have better command of English than many Europeans. One amusing contact was with an SM on Christmas Eve, who was operating from a Swedish High School, with 30 or so pupils listening to the proceedings. The QSO ended up with all the youngsters simultaneously wishing GW3ZQN a Happy Christmas over the air.

One QSO of G4ALG's was with HB9XTZ for his first HB9 contact, the operator being otherwise G5AXC, who did the honours running just four watts p.e.p., while Stephen had the full 400 watts output of his transmitter, which seemed faintly silly! Other contacts of note were with JR1VMC, VE2DKK, VE3XQ, SV1EC, WA1KLF, W2JIV, W3ANZ, WA9ZWL and ZB2A.

CW-only is the rule at G3RFG, who connected with KØORK, K3YVA, KV4AB, PJ2NR, PZIAP, UWØIN, VE2DEG, VE3DMO, VE3EU, VE3RIT, VE5XC, VE6AIF, W2WY, W2ZT, WA2NYR, WB2KJO, W3HBJ/3, W3URE, W2AA/4, WB4QKG, WB6PNJ, WB6VGF, W7NW, W8GE, W8MWN, W9BPW, W9ELG, W9GDT, W9KHU and 8P6AE.

G4BKY had a pretty thin time on Twenty, with mainly EU's worked, although he had a leavening of W's sprinkled in the log.

Twenty for G3ZPF yielded some



The Barbados Amateur Radio Society now possess a KW-2000B for their DX activities. Left to right here are 8P6BN, 8P6AZ, Caribbean Airways manager John Maxwell (who shipped the rig over) and 8P6DS. They operated the gear as 8P6SJ/4 for the recent J-O-T-A Scout event.

amusement at the Europeans hollering for some W to help them get over to VR3AC, who was very weak over here. Otherwise, there were W1, W4, VE8RCS, EP2JP, VK6MK, ZC4DS, MP4TEE, A4FA, A4FD, PZ1DR, SU1MA, ZB2A, 9M2DQ, ZL1BKR, KV4AA, 4W1BC, OX3JW, 3B8CO, to fill the pages of the log.

At GW4BLE the GPO wallahs have still not turned up with their ferrite rings, so TVI remains his problem. However, SSB was used during non-TV hours to hook up with CT2AO, FP8CT, IZ9LMK, MP4TEE, 9Y4EH, PY7ZAK, 9M2DQ, ZC4DS, VE8DJ, ZB2A, 9G1HE, XT2AE, G4AMJ/VP9, 5R8BF, ZD8RR, 4S7PB, 8P6DV, PZ2AB, TU2DB, 7Q7LA, ZD8KO, 9H1BX, VE7KC and 4W1BC.

The antenna set-up at G4AMT is now a two-element beam firing E-W at 35 feet and another firing N-S at forty feet, which have given quite encouraging results, especially bearing in mind the hills in the near locality of the shack which screen in some of the desirable directions. On SSB, all W call areas were worked by the short path, plus W6, W7, and W9 the long way round, VE1-8, VP9GE, G4AMJ/VP9, OX3GT, OX5AA, OX3ZI, OX3JW, 3B8AW, FØADO/FC, VQ9DC, VQ9HCS (Aldabra), VP9K, VK6EB, VK6VW,

VK6JY, VK6TF, VK6HR, VK6FN, VK2TX, VK5TJ, VK7CL, and VK9XI (Christmas Is.)—all these VK's being short path around 1330z—EP2TC, UH8BX, 9M2DQ, M1D, FB8ZZ, TF5TP, 7X2HS, KL7BZO, KL7HFQ, JY6HFM, HI8XPA, ZB2BL, XE1IJJ, KH6BB, ZL1VY (with the ZL beaming West and G4AMT looking East, at 1800z), PZ1DR, VU25MX and YBØAB. On CW the pickings were CT3AS, West coast W's and smaller fry.

14 MHz has always been a favourite band with G3NOF, who has returned to the fray with a vengeance. The early-morning opening has not been starting until 0830, and the path to VK has been open till 1030 but not strongly; the short path opening has been around lunchtime, accompanied by some Asians. Africans have been good from 1700-1900 accompanied by S9 signals from W6, W7, VE7, VE8, and ZL's over the pole around 18.30. The band has stayed open on occasion to 2100, but often has been out by 1900 unless one takes into account occasional short-skip openings to GM till sometimes after midnight. Don made his number on SSB with A2CCY, FC2CG, ET3DS, G4AMJ/VP9, HR2WTA, JX3P, JY9VO, K7GGJ, K7LET, K7ZIA (Utah), KV4AB, KZ5JF, OX5AY, PZ1DR, PZ2AB, SVØWU (Rhodes),

VA6NQ/6, VE6PP, VE6SF, VE7ATV, VE7BEN, VE7HN, VE7MT, VE7TL, VE7YF, VE8MA, VE8DJ, VE2SA, TN8BK, VK's, WA7RDK, WA7SSZ, W7GSP, W7GVA (Nevada), W7HQC, W7KT, ZD8KO, ZD8RW, ZD8TS, ZE3JU, ZE6JA, ZL1ABO, ZL1AH, ZL1AVS, ZL1PZ, ZL4BC, ZL4BO, ZS's, 3B8AW, 3B8CJ/MM, 5R8AD, 5R8BF, 5Z4GK, 5Z4OB, 6W8DY, 7P8AD, 7Q8LA, 9G1HE, 9N1MM and 9Y4EH.

Next we come to the batch from W6AM, who offers 5R8AG, VU2NI, VR3AC (who gave him 59 plus ten when the rest of the W's were at RS55!) and JA1MWI/BY on CW, plus 9K2AU, VR3AC, 5X5NK, JY9VO, VK8CW, EA5AX, 9H4G, and JY9LOM on SSB.

BRIEF DX DATA

Call	Details
W2CTN	John M. Cummings, <i>The QSL Manager</i> is now a Silent Key. <i>Vale</i> .
MI	M1C, Tony, is QRV all bands CW/SSB; QSL via 14FTU. M1D, try 14170 or 14220 kHz around 0700 - 0800. QSL via 14FTU, Giovanni Olivari, Via Gaime Pintor 6, I-47037, Rimini (Forii), Italy.
TY5ABK	Will be there till March. Afternoons, 21300 or maybe 28542 kHz. QSL via W8CNL.
4W1..	Try British Commonwealth Net, 14170 kHz for 4W1BC; or 14248 kHz, Wed. or Fri., with 7Z3AB, 1330z.
"5X5NA"	This station, reported on Twenty, is phoney. Real 5X5NA has been QRT since June last.
"JA1MWI /BY"	Claiming to have been at the Chinese Trade Fair, Kwangtung. Not known by JA1ZZ, and JA's say the signals are coming from the wrong direction!
4K1C	14180 kHz, 1730, 1830, 14200 2340z, is from U.S.S.R. Antarctica base Vostok. Operator's name Rem.
ZL3KK/C	Chatham Is., often 3780-3790 kHz, 0730-0830z. QSL to ZM4CR.

Reporting the HF Bands

One of the advantages of school holidays is that the younger element can get on the air after some DX—G3ZLP (Bristol) did just this, with his HW-100 and ground-plane, and contacted JA1, 2, 3, 5, 6, all W call areas, VK's, ZL's, KP4DLC, KP4DTN, UA9IS, UA0's, OD5LX, EA8FH, KL7MF, 9L1QH, YK1OK and suspected phoney "ZFISB"—although the latter call *is* in the *Call Book*.

For G2HKU (Sheppey) things seem to have been livelier than of late; Ted offers JH1PUR, YA1DT (a new country), ZB2A, ZL1KN, ZL1VN, ZM1BMK, ZL3PD, ZL3RS.

G4AWT (Doncaster) gives details of a /MM contact on 14026 kHz with the 37,000-ton Swedish tanker *Seaswallow* (SLJD), operated by SM7EVO, while off the coast of East Africa, bound for Genoa, to arrive by February 2. So SM7EVQ/MM should be workable again on Twenty.

Snippets

The BARTG Spring RTTY contest covers the period from 0200z March 24, till 0200z March 26, although not more than 36 hours of the 48 can be operated, taking rest periods of at least 2 hours. Use the ARRL countries list, but count KL7, KH6, and VO as separate countries. Exchange RST, message number and time in GMT. Score 2 points for each two-way RTTY QSO in one's own country, outside one's own country ten points, plus a bonus of 200 points for each country worked. The final score is obtained by multiplying QSO points by the number of countries worked, then adding this to a second number obtained by multiplying one's total country points at 200-a-country by the number of continents worked. Contests logs and further details from Ted Double, G8CDW, 89 Linden Gardens, Enfield EN1-4DX.

G6XJ, of Eddystone fame, writes to say that he is off to ZL again, with a visit to VK after six months

in New Zealand, the calls being ZL2ACN and VK3AMM. It is also hoped to return *via* ZS, but the ZS authorities are not at the moment prepared to grant a call without Arthur sitting the ZS version of R.A.E.!

A merry letter comes in from G3YRR (Grimsby) who has solved the problem of the capacity hat on his vertical in a novel way—it blew off and only one of the five components was recovered, so Charles tried tuning up and raised a station in Caracas—no more panic! On a different theme, G3YRR has been practising his Swedish, and finds it useful in odd ways—he was trying on the band and got a YA back to a CQ this way, who turned out to be a Swedish engineer.

Piracy again. G3XFH (Bristol) operates only CW on 7, 14, 21, 28 MHz, but is troubled by a pirate using his call on Eighty. Anyone meeting the guy, please treat with the chop!

G5LC's settling down to radio-and-caravanning in retirement didn't last long; Leslie comes out of retirement to do six months for the old firm in New Zealand and put the show on its feet as a change from the old-age pension.

From G3ABG we once again have the details of the WAB contests, dated as follows: *HF Phone*, March 11; *HF CW*, March 25; *LF Phone*, April 1; *LF CW*, April 8—in each case 0900 to 2100z. The HF contests cover 14-21-28 MHz, the LF 1-8, 3-5 and 7 MHz. Score five for each station worked (you can work him again on a different band for another five points), times a multiplier of one for each WAB area worked, plus one for each DXCC country. Note that if a WAB square lies over two counties, each county's bit scores separately. Overseas stations give RS(T) plus serial number, U.K. stations give the same plus, WAB area number and county. In either home or overseas cases, if you hold a *WAB Book* you add that to your contest exchange. Logs, within fifty days after contest,

go to Norman Booth, G2DSF, 49 Baggrave Street, Leicester. For all other details, contact G3ABG, QTHR. And don't forget that the whole exercise is aimed at earning money for the RAIBC.

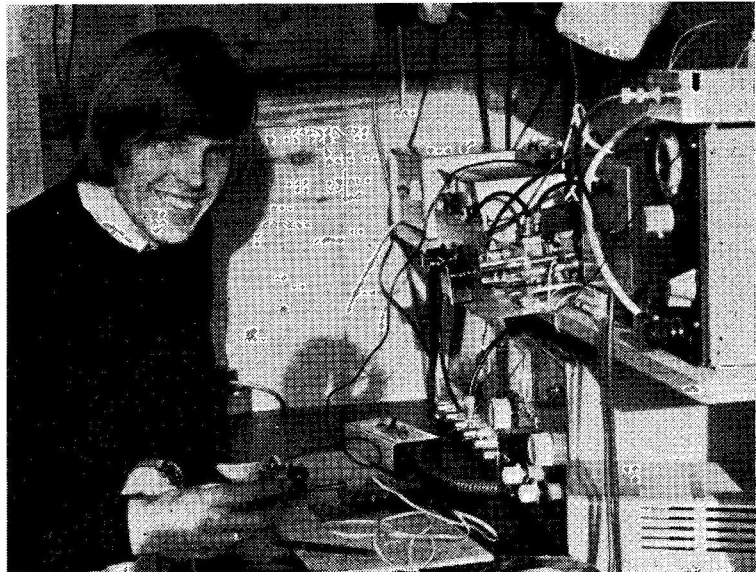
From YLRL we have the details of the results of the October-November 1972 "YL Anniversary Party", from which we notice that G8LY was operating in both the CW and the Phone legs, worthily to uphold the honour of the U.K. YL's.

Changing our theme completely, we have a welcome letter from W4WFL/1, which encloses a photostat copy of a letter regarding HV3SJ, from which it seems that the authorities are keen to have him off the air, and are withholding grants to enable the Collins-line gear to be repaired—it is almost completely u/s now for want of funds. It seems strange that the Vatican should be acting in this way, when HV3SJ is such a popular station, with amateurs all over the world, and when at the same time there is a station on the air, 9H3WPD from the Pope John Peace Laboratory, commemorating World Peace Day.

We had almost forgotten the existence of "DX-pedition of the Month" activities, due to the absence of any *Bulletins*, until one arrived a day or so ago, explaining that there had been a bit of a *hiatus* with the DOTM Bulletin but *not*, they say, the QSL-card side, saving the odd cases where a station using DOTM facilities is tardy with the sending of logs. For the record, DX-pedition of the Month address is Box 7388 Newark, New Jersey 07107.

The "International Symposium of Radio Hams in the Satellite Era" (*golly!*) is for June 24-29 in 4 x 4; there will be papers on subjects of amateur interest, not to mention a programme of events for the ladies. For more details, write to Mrs. Y. Bar Uryan, P.O.B. 16271, Tel-Aviv, Israel.

An interesting letter from G3WW (Wimblington) details the situation as far as the use of the Robot SS/TV camera by U.K. stations is concerned, as stated by the MPT. The allowable bands are, for a two-year period at the moment, all 40, 20, 15, 10, and 2 metres. Specification: 128



Christopher Zeal, G4BGM, 57 Wordsworth Drive, Bletchley, Bucks, runs a Codar A.T.5 for the LF bands and a Heathkit DX-40U to explore the DX possibilities. His Ae. is a G5RV-type with a Z-Match. Though working local phone on Top Band, his main interest is CW—and he can swing either a pump-handle or a semi-auto key with equal dexterity.

lines per picture, plus or minus 8; Aspect ration 1 : 1; Horizontal frequency (frame) 16 2/3 plus or minus 1; Vertical frequency 7.68 secs—limits 6.79 to 8.68 secs; Horizontal sync pulse 5 milliseconds, nominally; Vertical sync pulse 30 milliseconds nominally; FM sub-carrier sync 1200 Hz; black 1500 Hz; white 2300 Hz. This information appeared in a letter from the Ministry to G3WW, but we would assume that in effect it makes it legal for any station to acquire Robot SS/TV gear, or any other to meet this standard, and use it on the air.

Forty

Quite a wedge of stuff comes in from G2NJ (Peterborough) on 7 MHz, QRP and /MM-collecting activities. Perhaps the most interesting is the letter from ON4TA, who figures so large in the QRP reports. André's forbears came from Birmingham 150 years ago, and he himself spent a couple of years in Frinton-on-Sea during World War I. He has been fifty years on the air, and gave up use of high power back in 1969. Nowadays, his *input* is less than two watts, and often no more than 0.5 watt—with 800 milliwatts

input he has worked VE3AU on Fifteen at 549, and switched to phone for a report of RS45! About 60 W's and 15 VE's have been raised with inputs of less than two watts—mainly CW because André is not particularly a phone man. He has also worked SM6CQU with 1.8 watts input on Two, on which band he has no crystal, but a 12 MHz VFO multiplied up—for we HF types to talk of stability, André's VFO shows a drift of plus-or-minus 8 Hz on the counter at two metres! That is, he says, the result of patience; but your conductor would suggest it is darn good engineering as well.

Still with QRP, G2NJ mentions G3GQE (Brighton) using one watt, and then he goes on to the /MM stuff. Here, first he gives detail on the two-amateur ship, m.v. "Sugar Producer" (GYNL) whose picture we showed recently—G3ZXH/MM had a highly successful trip and in the first ten weeks each had worked 800 stations, while G3ZXH hoped to top the 1000 mark before he got back to England. In addition there were contacts with LA2MA/MM, off the Pembrokeshire coast, and 4Z4GG/MM who was in the Adriatic.

G8HX (Mansfield) still works

Forty in the main. However, Frank's letter is concerned more with the question of Top Band, of which more anon, and of awards to be obtained in Europe. G8HX has a system for filing QSL's towards any award he may be working for, by the use of a loose-leaf file, which means that at the flip of a page, he can see how many he has got and how many are needed for any one of a dozen awards he may be after. A system—that's what G3KFE needs!

Forty for G3RFG means CW, as with all his operation, and with this mode Stan managed to raise on 40m. JA1OHV, JA5ACF, KP4DJX, PY1DPP, PY2FQP, PY7BBX, UA9MAX, VK2EO, VK3XB, W1FGT, G3SKR/W2, W3DBT, W3DQZ, W4NH and WB5AOF.

Only one contact on 40 metres is reported by GW4BLE, who worked CT2BG after they had hooked up on Eighty and the latter had asked Stephen for a QSY to Forty. Very little time also was spent by G4AMT, as the coax switch was cannibalised for another project—bad boy!

GW4BCC (Swansea) has 150 watts and an AR88LF coupled to a full-wave rectangle fed in the middle of one of the long sides; with this he has worked ON4TA's 800 milliwatts, as well as VK3XB and a string of W's. Sad to say, Rob is fighting a bout of TVI, but is slowly making progress.

For G2HKU it was all CW, with PY6AGI, UI8OB, VE3AKG and ZC3BI.

Special Activity

A letter from G8EUS, John Douglas, notifies us that BBC staff in Glasgow are hoping to operate a special station under the call GB5SC to commemorate the 50th anniversary of the start of broadcasting in Glasgow from station 5SC in March 1923. The dates of their activity will be March 6-10, and they will be specially interested in QSO's with other BBC staff and with OT's who recall those early broadcasts.

Net

A net has been formed for holders of G3ZZ—callsigns, meeting on the first day of each month, 3725 kHz plus-or-minus the QRM at a start time of 2000z to 2030z. Details from

G3ZZY, or phone Tavistock, Devon 2827.

International Contests

Last time out we mentioned the **ARRL DX Contest** in some detail; this time there is just space for a reminder that the dates are February 3-4 and March 3-4 for **Phone**, and February 17-18 and March 17-18 for the **CW** ends.

Eighty

GW4BLE has always, from SWL days been keen on 3.5 MHz in the DX context, and his comments are therefore of considerable interest. He feels there are not many DX types in the real sense on the band, most people favouring its use for semi-local and round-EU working, taking their bit of DX if and when it is there *for the asking*. Of those who complain so bitterly about the DX net and its operation—and there is not all that much U.K. support for the DX net—Stephen is prepared to lay a small stake that the complainers haven't a clue about what is involved in organising a DX group of *any* sort! His own 80m. bag for the month, using the 18AVT and 240 watts SSB, came to DJ7ZG/CE0A (Easter Island) CT2BG, FP8CT, JX9TM, OH0NJ, KV4CI, XE1IIJ, ZL2BT, K3WEU/6Y5H, 6W8DY and all but the seventh W call area, plus VE1-2-3.

G4AMT is in dispute with the Clerk of the Weather, who ordered a series of gales which carried-away his 3.5 MHz aerial three times! It is now down from its usual 75 feet to 45 feet and will stay there till the weather eases a bit, but there was a noticeable difference in the DX audible. However, not to worry, the following stations were angled for successfully on SSB: XE1IIJ, OY7BD, KZ5PW, ZL4KF, G4AMJ/VP9, WA1PND/VP9, VP9GR, and various Eastern W and VE stuff. CW was also used to work East Coast W/VE signals.

For G2HKU the current month was not heavily Eighty-orientated, but several successful S8-S9 SSB contacts were made with 9H1BX.

G3RFG next; Stan has bookings to offer from JA9BE, K1ZJA/2, K2QIL, K8MFO, VE1ABX, VE1EVL, VE2LI, VE2WA, W2AO, W2FB, W2VV, W2HXI, W2JVU, W2MUM, W5MCO and YV1AD, all of course on CW.

COUNTIES TABLE

Callsign	TOP BAND		Total Score
	Counties CW	Counties Phone	
GM3YOR	71	48	119
GW3ZQN	39	66	105
G3VLX	33	41	74
G4ASV	3	69	72
G4ALG	44	27	71
GW3WSU	—	57	57
G3YPT	44	8	52
G4AXP	—	43	43
G3DCS	14	—	14

This is the last appearance of this Table.

QSL Addresses

W4WFL/1 writes to let us know that he has taken on the QSL chore for WA1RDH/VQ9. U.S. amateurs send an s.a.e., others an addressed envelope and one IRC, to BM/W4WFL, London, WC1V-6XX. On a different tack, Morgan is pleased to relate he has just made DXCC from the /1 location, although it was a bit of a sweat waiting for the last few cards, and he lays a bet that now he is over the 100 the cards will positively *roll* in!

A list from G3NOF contains *FY7AE*, to WA4WTG; *ST2SA*, Box 253, Medani; *FL8BC*, to P.O. Box 4, Djibouti; *FL8OR*, Box 1279, Djibouti; *TN8BK*, to JA4BLY; *9LIJT*, to WA4ZYQ; *G4AMJ/VP9* to G4AMJ; *ZD8TS* to G3WDV; *9GIHO*, U.S. Embassy, P.O. Box 194, Accra; *A2CCY*, to P.O. Box 298, Francistown; *VA6NQ/6*, P.O. Box 592, Calgary, Alta.; *7P8AD* to VE2JH; *JX3P*, to LA6OL; *JY9VO*, to P.O. Box 5089, Amman; *9N1MM*, to W3KVQ; *5V7YH*, to VE3GHL; *6W8DY*, to VE4SK.

Top Band

G2HKU feels one of the troubles with Top Band is the over-emphasis on what he calls the super-DX rather than on the counties; this in Ted's view must demoralise many others. In addition, he would like to see details of the aerials *and* the earths used by stations who really can raise the super DX, rather than lists of stations worked. A good point. Turning to his own list, we

see SSB exchanges with GM4BBL in Shetland and PAØPN, plus CW with GM3WDF, GW3UCB and PAØRCH.

G8HX has deserted Top Band for these many years, but Frank still has a feel for what goes on. He suggests a ladder based on the idea of working all British Isles and counties, by prefixes, as a replacement for counties alone.

One does not normally think of W6AM in terms of Top Band, but Don came on during the Dec. 9-10 tests and worked 23 stations around the States—a pity they were not 23 G's; G-W6 on Top Band would stir thing up!

G4ALG comes in with a score for the final tabulation, although this last few weeks has seen desertion to the attractions of the HF bands with the new rig. However, in his earlier letter, he had some good points to make. He also feels there is too much stress on super-DX and he would like to see a combined score for counties, or even a separate ladder for each mode, with *no* countries, so as to cater particularly for the stimulation of inter-G working.

G3ORP (Maidstone) has 166 feet of Inverted-L aerial at fifty feet, with which he has had many Trans-Atlantic contacts, with such as KV4FV W1BB/1, VE3's, W2EQS,

W3IN, W5SZ in Texas, and K8RRH, with signal reports varying from S4 up to S8. The ground system seems to comprise four 68-foot and four 132-foot counterpoises plus other stuff, and the indoor tackle is the Drake R4B-T4XB line.

GW3ZQN thinks it would be fun to nominate a certain prefix, for example G3G--, as the "prey" for a period, and to score points for each one you work. Quite a thought, but a bit of hard work for the few unfortunate G3G stations on the band who suddenly find themselves faced with a pile-up to get through.

For G4ASV, activity has been a little thin since mid-October, as he is at University and has to study. However, in slack times, he worked four new counties, Anglesey, Moray, Nairn, and Monmouth, plus SSB contacts with HB9AMO and DL8PC.

Now we come to G3YMH (Staines). Ron is in opposition to all the others, being the only one who reckons activity is just the same as it ever was, and tries to explain it all away in terms of the normal change of activity from summer to winter conditions, plus people's short memories. On a different tack, Ron agrees that the inter-G CW activity is lower than it used to be, but he defends this by asking, *from the point of view of a regular key-puncher*, why it is considered good

to work them on the key when you can have a nice solid S9 SSB contact? On the DX front, G3YMH's CW accounted for 4W1AE, K2GNC, W1BB/1, W1HGT, K1PBW, VE1MX, VE1AXT, WA2SRQ, W1SG, W8KWN, WA8IJ, W3BUR, W4BSB, W2EQS and PY1DVG, with gotaways in KV4FZ, EP2BQ, VE3EK, and many W's. However, the VK skeds have not been very good, no hearings at all this end, and G3YMH only heard once in VK, at 1912z on December 29, at 229.

Conclusion

That's it once again. Your letters and comments and whatever, should be sent in to arrive on **February 6**, latest—a pity it has to be so tight—addressed as ever to "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, keep digging.

Editorial Note: After February 6, closing dates for the receipt of reader-correspondence for this feature will be: Tuesdays March 13, April 10, May 8 and June 12—allow at least one full week for airmail delivery, otherwise post over the week-end immediately preceding, first class. Always use the QTH given—simply CDXN, Short Wave Magazine, Buckingham (England).

R.A.E.—NOW SUBJECT No. 765

We are informed by the City & Guilds of London Institute, 76 Portland Place, London, W1N 4AA, that our old familiar "Subject No. 55" has been renumbered No. 765—this should be quoted in all enquiries. The R.A.E. syllabus for 1973-'75 and question papers for the years 1970-'71-'72 are now available as one package at 25p, post free, from the Sales Section, City & Guilds.

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Though SHORT WAVE MAGAZINE should be obtainable to order through any newsagent, we receive frequent complaints that this is not so, or that it is received very late. This is in spite of the fact that our bulk orders for wholesalers and retailers are always despatched—and we do mean always—at least two days before the monthly publication date, the last Friday in the month.

The cost of a direct-subscription order placed with us is £3.00 for a year of twelve issues, first class posting

(or £2.75 second class) despatch being on the day before publication. Many 100's of readers pay by banker's order, for which we can supply a form. Orders, with remittance, to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H-0HF.

BIT SURPRISING

It will probably interest many people to know that *Oscar VI*, now being much talked of in the VHF context, is a rectangular box about 6½ x 12 x 17in., weighing 40 lbs. (at take-off level) and 50% covered with n.p.n. silicon solar-cell panels to keep up the power supply. The PSU consists of a rechargeable 6 amp/hour nickel cadmium battery with a nominal terminal voltage of 24v. The aerials are a 10-metre dipole contrived from an ordinary carpenter's rule, with quarter-wave spikes made of no more than piano wire for the other frequencies. Yet, with hardly more than one watt of RF output available, *Oscar VI* is giving amateur VHF communication between Continents and over thousands of miles. You might say "Well, wonders will never cease".

SOLID STATE RECEIVER FOR TWO METRES

FINAL LAYOUT AND CONSTRUCTIONAL DRAWINGS

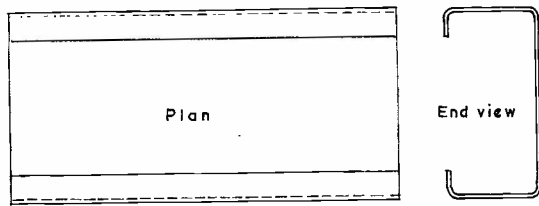
J. H. JONES (G3GBH)

PART I of this article appeared in SHORT WAVE MAGAZINE for January and here we take it up from p.683 of that issue.

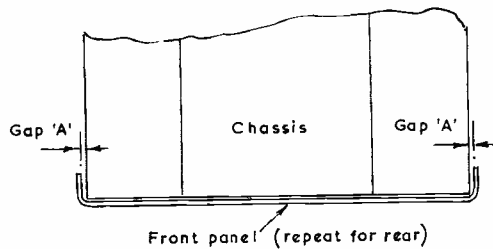
On the subject of the possible second IF stage around 1.6 MHz, to compensate for loss of gain and to increase selectivity, this could be built as an extra unit—it is a matter of individual choice and some experiment.

At present-day prices the tuning dial and mechanism can cost almost as much as the rest of the receiver. The

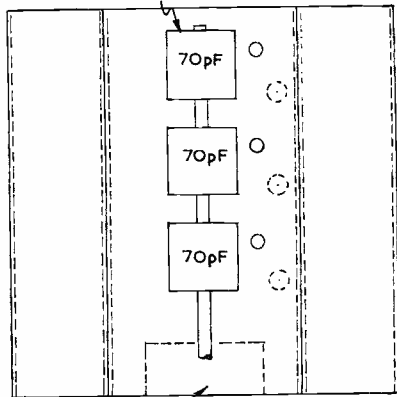
Chassis Channel Section — 3 off
Formed from 8 inch squares of 18g. Aluminium



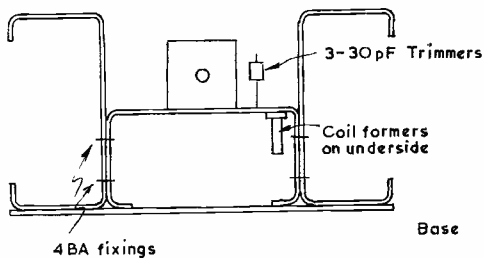
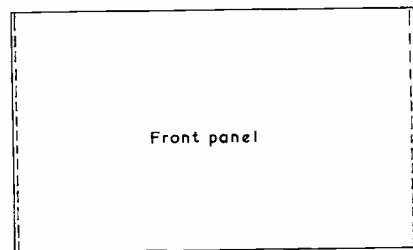
Gap 'A' proportioned to provide snug sliding fit for 18g. side panels



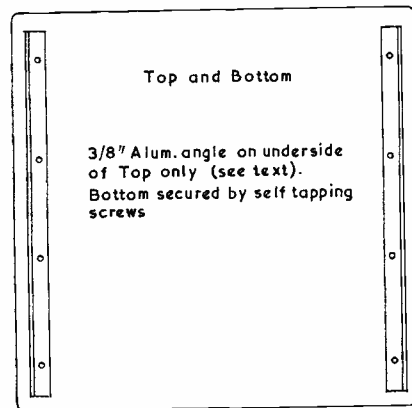
Tuning capacitors



Cut-out for tuning mechanism (if requ'd).



Three Channel sections to form Chassis



For details of 'Slide-in' side panels, see text

Fig. 4

R
594

Fig. 4. Useful Constructional Drawings

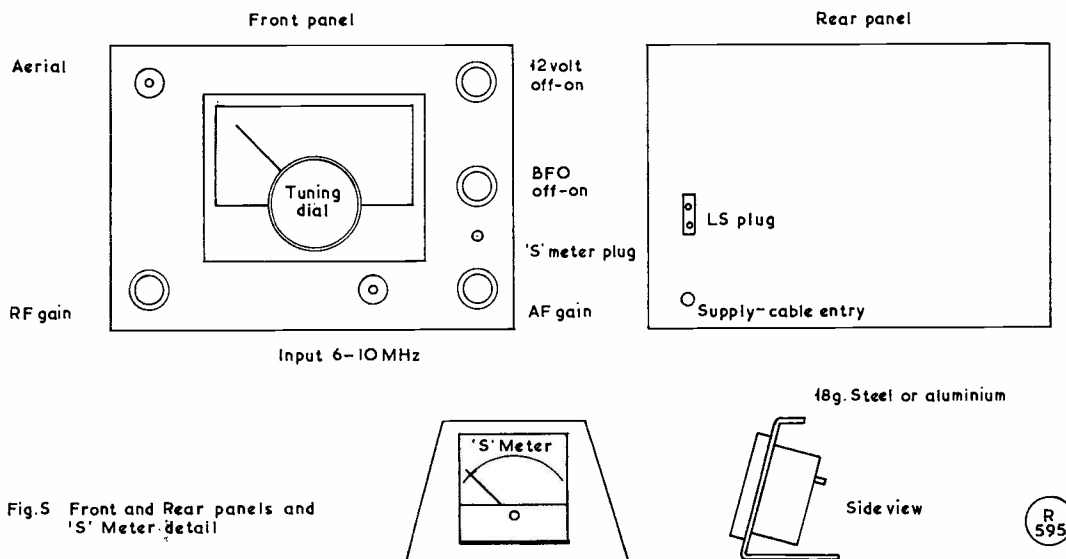


Fig. 5. More Constructional Layout Diagrams

T.U.5 slow motion drive was found to be a very adequate substitute. This type of drive normally has a 2½ in. diameter dial, immediately in front of the panel, fastened to a flange by three small screws. This was discarded. A semi circular scale, as large as panel room will allow, was drawn on an oblong of stout white card and stuck direct on the panel. From thin tin-plate a circle, with a thin needle extending from it, was cut and fashioned to fit in place of the original dial. The needle portion was turned through 90° to present a "knife edge" needle to the scale when fitted in position.

Again using thin tin plate, a scale cover and window

was cut and bent up and the corners soldered. The window was backed with transparent plastic and the cover bolted into place using 6 BA bolts and nuts. A 2 in. diameter knob completes the tuning control. The dial needle and the dial cover were painted black, using quick drying enamel. The front panel and the S-meter panel were spray painted, light blue, using a car touch up *Aerosol*.

The aerial input and the tunable I.F. input on the panel are standard Belling Lee coax sockets. The S-meter has a short screened lead and connects via a phono type socket on the front panel.

ELECTROMAGNETIC COMPATIBILITY

This is another term to be added to the jargon. Shortened to EMC (or emc), it means the problem of keeping radio transmissions out of audio-frequency circuitry, e.g. as when an amateur transmission comes out on local hi-fi equipment, or on the electronic organ in the nearby church—or even on next door's electric cooker (which has happened!). The radio amateur's attitude should be that such interference is a matter between the owner of the equipment and its manufacturer—though he should be prepared to try to help by putting in RF chokes and filters here and there (in mains leads, audio input circuitry, etc.) to eliminate or minimise the interference.

The trouble is that much audio circuitry has the built-in capability to rectify RF transmissions where the field strength is high enough—as when you are on 80m. SSB with full power and your neighbour has put on his stereo hi-fi to listen to a few records.

Years ago, we wrote an Editorial on this very subject,

pointing out the pitfalls that could face the amateur identifying himself on AM (as it then would have been). The theme of that comment was the "mutual antagonism" (as we called it) between various modes of transmission and methods of reception. It is now dignified by the term Electromagnetic Compatibility—but the problem remains the same. (Surely it should be Incompatibility.)

SIDEBAND AT SEA

All deep-sea vessels operating telephony services for long-distance communication are now changing over to SSB and Coast stations are to be similarly equipped over the next two years. This I.T.U. ruling applies at present only to the maritime wavebands but it is considered desirable (according to a note in G2BVN's *Region I News*) that the Amateur Service—sharing the 1.8 and 3.5 MHz bands with the maritime services—should show willing by likewise declaring Sideband telephony as the only acceptable mode for the future. And with this we are in entire agreement.

TOP BAND CONVERTER FOR CAR RADIO

SMALL TRANSISTORISED UNIT

THIS is a simple converter to work into a car radio Rx for the reception of signals on Top Band. An incoming signal at 1.8-2.0 MHz is mixed with the output of a crystal oscillator at a nominal 2.6 MHz. The beat output at 600-800 kHz can be tuned at around 450m., MW band, on the car radio.

It is essential to connect the converter to a loaded whip Ae. sharply resonant on Top Band. This is because the RF side of the converter is relatively broadly tuned and requires the selectivity conferred by the tuned whip to avoid break-through of strong signals off-frequency. In other words, swamp effect can be minimised if the loaded whip is itself tuned for Top Band.

As regards construction, the coils may be the only items to be difficult. However, by using miniature canned coils, on standard 3/16th in. dia. slugged formers, with cans to match, L1 and L3 can be two layers of 34g enam. close-wound at about 3/8th in. in length and L2 one layer of 24g. enam. wound over L1. By soldering a 470 μF capacitor across L1 and L3, it was found that (using a GDO) their tuning range was about 1.8-2.6 MHz by adjustment of the slugs; this alters slightly when the cans are put on. The actual transistor used for Tr1 is not at all critical—any of the usual RF types should do.

For the prototype a piece of 2½ in. by 2 in. *Veroboard* was used. Size overall will be determined by the coil dimensions. A small dural box, such as a *Verobox*, with room for a PP6 cell, the switch and Ae. sockets will do admirably.

Setting Up

First check that the oscillator is working by measuring current when a 9-volt battery is connected. Current should be around 0.5 mA when Tr1 is oscillating and this can be obtained by peaking the slug of L3. RF can be detected at the collector of Tr1 either by an RF sniffer or by monitoring on a receiver tuned to the crystal frequency.

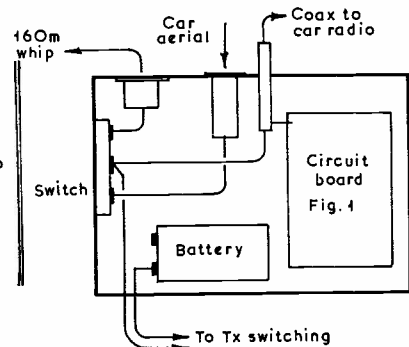
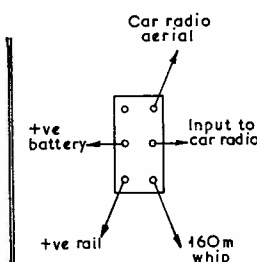
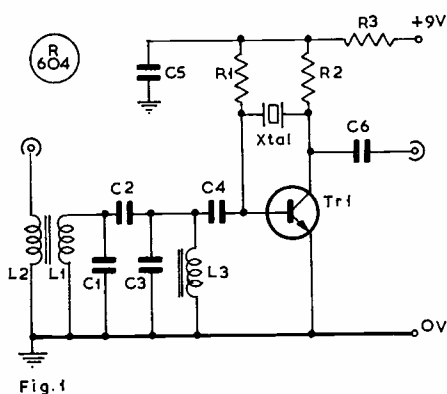
Now connect your mobile whip to L2 and take the output of the converter to the car radio, tuned to around 450m. (MW) and, with the car radio gain turned well up, tune for a signal on Top Band; then peak the slug of L1 for maximum response.

Next, try adjustment of the slug of L3 to find whether the signal can be still further improved. It should be found that the slugs can be set up for maximum signal in the area of Top Band in which you are interested. The car radio tuning dial can be "visually calibrated" to correspond to Top Band coverage.

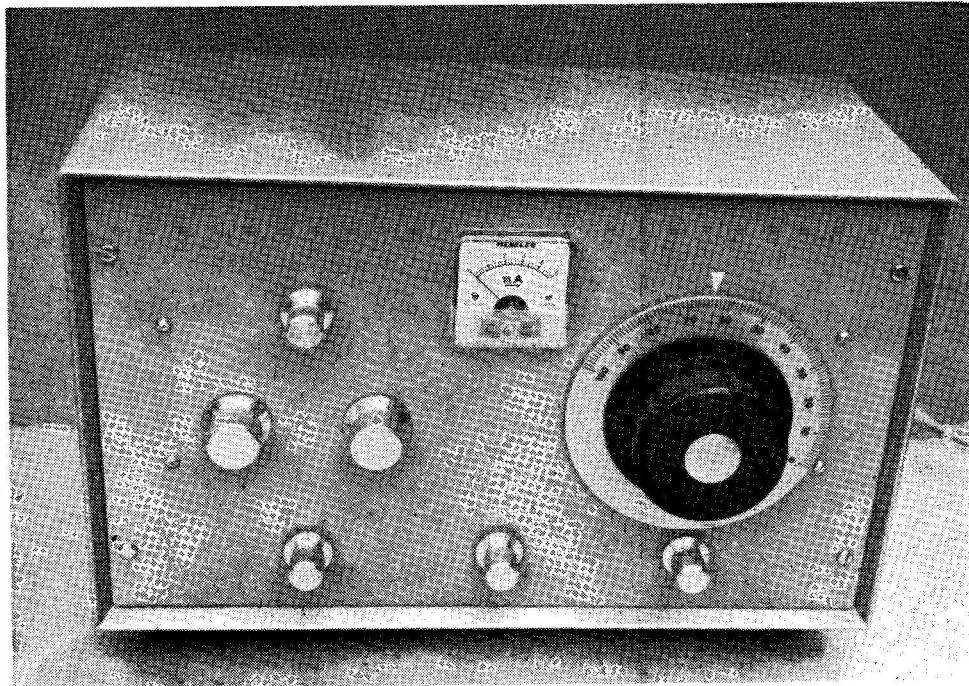
Wire the switching as shown in Fig. 2, using a DPDT toggle. If you are operating a transmitter from the car then the lead to +ve battery should be broken and taken either to your Tx/Rx switch, or the appropriate relay contacts, so that when the Tx is on, the converter unit is off.

Values for the circuit shown herewith can be: C1, C3, 470 μF ; C2, 33 μF ; C4, .002 μF ; C5, .033 μF ; C6, .001 μF ; R1, 820K; R2, 4.7K; R3, 10K; Tr1, BC107, BC108, BC109, or similar RF type, not critical; Xtal, 2.6 MHz.

Editorial Note: This is the sort of circuit with which one can do quite a lot of experiment. Being untuned at the front end, it can be made frequency conscious by using a fairly sharply tuned input, as explained. The circuitry and notes are due to G3UJF and G4APA, writing in *Compass Points*, the newsletter of the Dartford Heath D/F Club.



Details for the Top Band car radio converter



Front view of the completed transmitter, as described in the text. Controls are: Top left, grid-anode switch for meter; below, aerial loading and PA tuning; lower line of controls are send/receive switch, netting switch and drive level adjustment. Main dial is VFO tuning.

ADAPTABLE 30-WATT TRANSMITTER

BASIC DESIGN — EASILY
CONSTRUCTED
THREE-BAND OPERATION

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

THE circuit of this transmitter has been the subject of a good many changes from time to time, and is in fact one which can quite easily be altered in various ways. The maximum input is 30 watts CW, or AM with an external modulator, but it also does very well with 10 watts input, so is also suitable for Top Band (160 metres).

It was built to try interchangeable coils in the VFO, buffer and PA, and this method of band-changing is a successful one. A great advantage of using such coils is that if interest is only in one band, such as 160 or 80 metres, it is only necessary to fit coils for this, and regard the equipment as a single-band transmitter. Yet if later a change of band is wanted, all that is required is to substitute inductors for this. There is also some latitude in the way the stages are used. As example, if the VFO tunes about 1.75-2.0 MHz this will give coverage of Top Band and Eighty, the buffer being used as a

doubler for the latter band. On the other hand, with the VFO on 3.5-3.8 MHz for 80m., doubling allows working in the 7 MHz band. So though buffer and PA coils have to be changed to move from one band to another, in some cases the VFO coil may remain the same.

Tx Circuit

This is shown in Fig. 1, and brief details of each stage should prove useful: (*see overleaf*)

VFO: VI. This is a well known and reliable circuit, and one in which frequency and coverage are easily modified. L1 is a miniature plug-in coil, to simplify changes of band, as already mentioned. In view of the fact that plug-in coils are used, the VFO tuner VC1 has a numbered dial, and it is intended that exact operating frequencies be read off the receiver. It is, however, in order to fit a VFO scale calibrated in frequencies, or to log these, so that the frequency of operation can be taken from the VFO. If so, the adjustable core of L1 must be locked, and a check ought to be made with the aid of the receiver and a crystal marker, or similar means, after changing bands. If the Tx is used on one band only, or on two bands by doubling from the VFO, then the VFO tuner can be calibrated in the usual manner.

The actual coverage given by VC1 is not too important, provided there is reasonable bandspread and operation over the wanted band is possible. Ways of adjusting coverage here are described later.

(over

Buffer: V2. A miniature plug-in coil L2 is fitted for this stage, which may operate straight-through when output frequency is the same as the VFO. Alternatively, by changing L2 this stage can act as a doubler. With this stage doubling, easily enough drive was obtained for the PA. VR1 adjusts SG voltage, and hence output and PA grid current.

Keying for CW is in this stage only, and the way in which this worked out was felt to be very satisfactory. Other ways of keying can easily be tried, as mentioned later.

A switch allows HT to be put on the VFO and buffer only, to adjust grid current, and spot the working frequency with the receiver.

PA: V3-V4. The PA is a pair of 5763's in parallel. These were chosen for their small size and several other reasons. The pair of valves will run up to 100 mA at 300v., or 30 watts input. Also, they are not so large that their presence on Top Band, with 10w. maximum input, is a bit pointless. Nevertheless, should 160m. only be in mind, one valve can be pulled out. In the same way, a single valve here can be used if not more than 15w. will be wanted on a higher frequency band, or if the power supply available will only do for up to that power level anyway.

It was felt necessary to be able to check grid current, so a switch and 5 mA meter allows indications of 0-5mA for grid current, or 0-100 mA for PA anode current. Grid current only needs to be checked occasionally, as when setting up the transmitter or making a wide change in frequency.

The tank coil L3 is selected for the wanted band. Though this means a complete change of coil, it does avoid the possible losses inherent in multi-band coils, or the winding and switching to provide for bands which may never be used.

Some fixed bias is applied to the PA. This can easily be obtained from two 6.3v. heater windings, but can in some cases be omitted without too much disturbance.

Clamper: V5. The presence of this stage arises from keying V2 only. When V2 is operating, PA grid current develops enough bias voltage to cut off the anode current of V5 almost completely. V3-V4 then receive their normal SG voltage, giving usual RF output. When the key is open and drive ceases, V5 conducts heavily, and as a result the PA SG voltage drops to a low level and RF output ceases. VR2 allows adjustment of the clamper operating point.

A clamp valve is most usually found in larger equipment, such as that for 100-150w. It was found to work well in this circuit. Advantages include the fact that there is no actual keying of the PA current, while the total HT drain of the Tx fluctuates considerably less with this method of keying, than with a key in the PA cathode circuit. Even so, it ought to be said that cathode keying can be practical and saves one valve. Incidentally, V5 could be a 6AQ5 or almost any pentode or tetrode of somewhat similar type.

Switching: To some extent control switching is a matter of personal choice. The switching actually included gives a change over of aerial to the receiver. At its simplest, a switch for putting HT on the Tx only would suffice. But at least one set of extra contacts

would be desirable, to energise a relay to change over the aerial circuit to the receiver, and possibly mute the latter. If wanted, with the present method the receiver speaker can be muted automatically by having an extra pole on the switch, connected to complete the speaker circuit on "receive" and wired through a 2-way socket strip on the Tx chassis.

Operating Voltage

The heaters need 2-4A at 6.3v. Removing one 5763 and V5 for low power Top Band and working reduces this to 1.2A if essential.

With the HT supply, the limiting factor is to use not over 300v. and maximum input is 50 mA at 300v. for one 5763, and twice this for the two. SG current is about 5 mA each. The other stages (not forgetting the voltage regulator) draw about 35 mA, so a 150 mA pack is suitable. Naturally the PA can be operated at lower input, but less than 250v. here is not much recommended.

Optional Modulation

Modulated HT can be taken to the PA HT circuit, and a small 15-20w. push-pull modulator will be ideal for this. For Top Band, a smaller modulator is sufficient. In fact for this band a single Class-A modulator using a 6BW6, EL84, or similar valve can be used with complete success.

Construction

Fig. 2 on p.742 shows dimensions on a chassis 5 x 10½in. There is probably no particular reason to follow this exactly, provided VFO, buffer and PA RF circuits are segregated from each other. The panel is 7 x 12in. Panel, chassis and two side brackets were provided with the case listed and are for use with it. No doubt other cases could be employed instead.

The VFO dial listed has a ball-drive in the knob, and VC1 can be fitted to the panel. Other drives could be used. L1 has a screen formed by the container in which it is supplied. Cut or punch the lid to take the coil holder. The can is screwed on after inserting a coil. Wiring should be rigid, though the large values of C2, C3 and C4 tend to swamp stray circuit capacitances.

The VFO dial listed has a ball-drive in the knob, and VC1 can be fitted to the panel. Other drives could be used. L1 has a screen formed by the container in which it is supplied. Cut or punch the lid to take the coil holder. The can is screwed on after inserting a coil. Wiring should be rigid, though the large values of C2, C3 and C4 tend to swamp stray circuit capacitances.

L2 is screened in the same way as L1. A 4 x 5in. vertical screen near L2 as in Fig. 2 helps to segregate the PA valves. For 40m. a screen 1½ x 3in. across the PA valveholders underneath, to separate grid and anode circuits, was helpful. This is not necessary for 160m. or 80m., however.

All RF wiring should be short and direct. With V2, V3 and V4 run a lead from one soldering tag, across to the holder spigot, and on to the heater tag and chassis. This helps to reduce coupling between grid and anode circuits. For the same reason, bend tags 1 of V3 and V4 out a little, and take a lead directly through a hole adjacent to each tag. These leads join at an insulated tag supporting

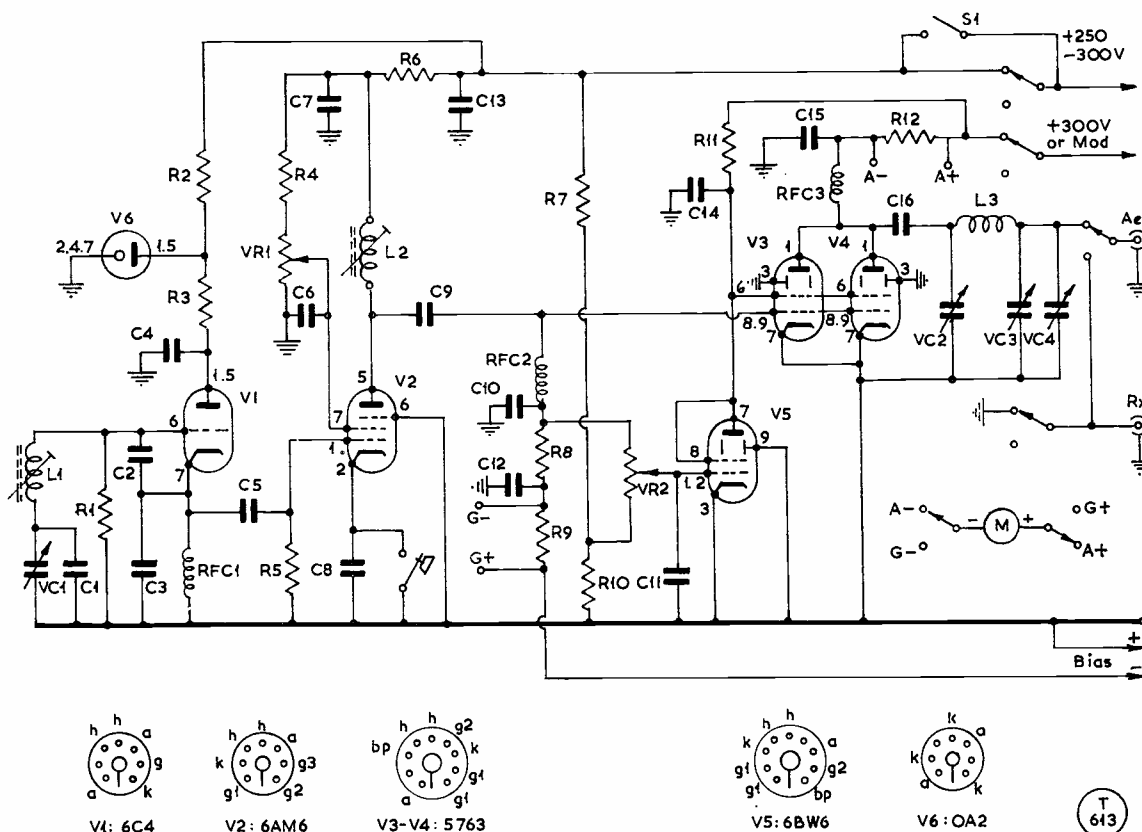


Fig. 1

Fig. 1. Circuit of the 30-Watt Transmitter

Table of Values

Fig. 1. Circuit of the 30-Watt Tx

C1 = 150 $\mu\mu\text{F}$, s/m	R1 = 68,000 ohms, $\frac{1}{2}\text{w}$.
C2, C3, C16 = .001 μF , silver mica	R2 = 5,600 ohms, 5w.
C4, C6 = .02 μF	R3 = 2,200 ohms, 1w.
C5, C9 = 100 $\mu\mu\text{F}$	R4 = 10,000 ohms, 1w.
C7, C8, C10, C11, C12 = .01 μF	R5 = 100,000 ohms, $\frac{1}{2}\text{w}$.
C13 = 0.1 μF	R6 = 1,000 ohms, 1w.
C14, C15 = .002 μF	R7 = 68,000 ohms, 1w.
VC1 = 75 $\mu\mu\text{F}$ min. sir-spaced var.	R8 = 10,000 ohms, $\frac{1}{2}\text{w}$.
VC2 = 500 $\mu\mu\text{F}$ Rx type	R9 = 1,000 ohms, $\frac{1}{2}\text{w}$.
VC3, VC4 = 2/500 $\mu\mu\text{F}$ Rx type	R10 = 47,000 ohms, 1w.
RFC1 = 2.5 mH RF choke, min. type	R11 = 5,600 ohms, 15w.
RFC2 = 2.5 mH Rx type	R12 = Meter shunt, as required
RFC3 = 2.5 mH, rated 100 mA	VR1 = 50,000 ohms, 2w. carbon
	VR2 = 250,000 ohms, carbon
	V1 = 6C4
	V2 = 6AM6
	V3, V4 = 5763
	V5 = 6BW6
	V6 = OA2

Notes: Coil values for three bands given in text. Metal work: Home Radio (Mitch.m) BX5 case, BX5A chassis and CU40B flanged member for screen, size overall $12\frac{1}{2} \times 7\frac{1}{2} \times 5\frac{1}{2}$ in. Jackson 4489/C slow-motion dial. VC2, VC3, VC4 all air-spaced Rx type.

RFC3 on top of the chassis, Fig. 2.

VR2 is fitted at the back of the chassis, as it does not require frequent adjustment.

Leads in the PA tank circuit need to be stout and direct, including direct chassis returns for the frames of VC2 and VC3/4. VC2 is a non-miniature receiver type, which has spacing suitable for 600v. For Top Band, a fairly large value (say 500 $\mu\mu\text{F}$) is convenient, but for 80m. and 40m. this is not necessary, so a component of about 250-300 $\mu\mu\text{F}$ can then be fitted.

Meter Switch

This must be a break-before-make switch. Alternatively, a 3-way 2-pole switch can be used, with the middle way not connected.

When checking grid current, R9 is across the meter. This is necessary to complete this circuit when the meter is switched to anode current, and has no practical effect on readings.

R12 is the meter shunt for 100 mA. This is most easily made by clipping a test-meter, 6v. dry battery, and 2,000 ohm or similar potentiometer in series, and taking the leads to RFC3 and the 300v. HT line. (No



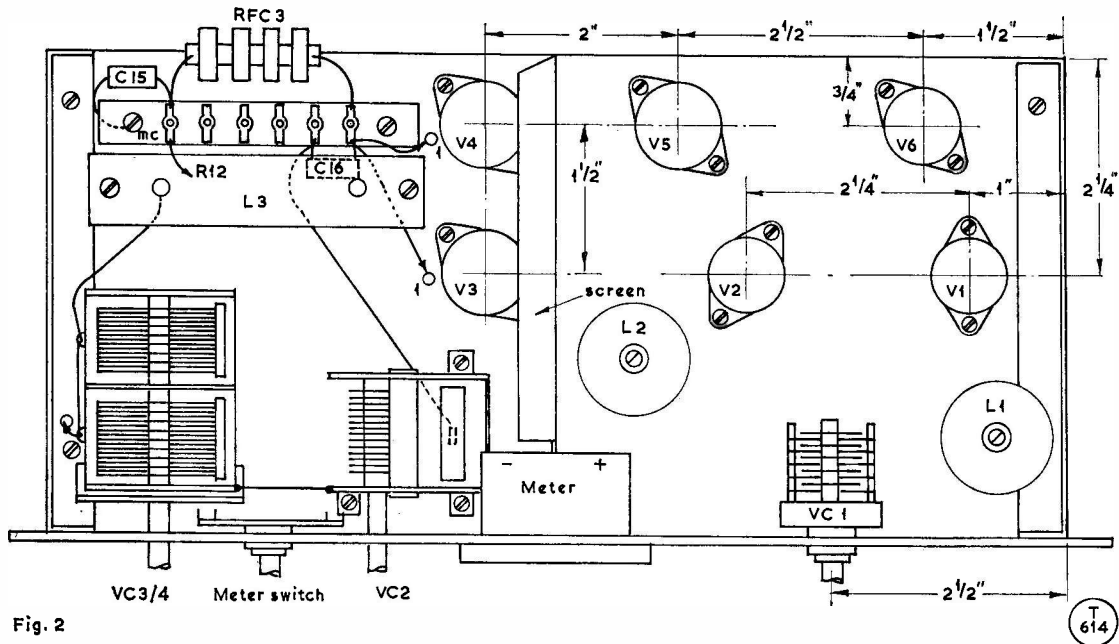


Fig. 2

Fig. 2. Layout on upper side of chassis

heater or HT voltages are present.) A short piece of resistance wire can then be soldered across the tags A-A on the meter switch, and adjusted in length until movement of the pot. knob shows that the meter M is reading 0-100mA and agrees with the test meter. One battery lead is disconnected each time one end of R12 is unsoldered to change the length of wire. The whole procedure should take only a few minutes. An alternative would be two meters, one permanently wired in place of R9, and the second in the R12 position.

Grid Current

When the Tx is first used on a band, set the VFO to about the middle of the band, put HT on V1 and V2 only, and adjust the core of L2 for maximum grid current. This should suit the whole band, control of grid current being by VR1. A suitable grid current is about 2 mA for one 5763, and 4 mA or so for the pair. Measurements of RF output, with changes in grid current, show that the latter is not very critical.

The negative bias applied to the PA is not very important, but some 10v. to 20v. or so will be best. This fixed bias helps to reduce the PA anode current, in the absence of grid drive.

Clamp Adjustment

With the Tx loaded into an aerial or artificial load, slowly rotate VR2 from the end connected to R8, until anode current, shown by the meter M, just begins to fall. With drive removed (key open) anode current should

fall to some 10-20 mA or so. If not, adjust VR2 slightly. The actual PA anode current, in the absence of drive is not critical.

PA Modification

If the Tx is for 160m. only, there is no point in having V4. Should the equipment be for AM nattering only, the fixed bias and V5 may be omitted.

For simplification or experiment, fixed bias and V5 may be omitted and the PA keyed in the cathode circuit. Join 3 and 7 on each holder, and take a 0.01 μ F disc ceramic capacitor directly from here to chassis, so that the key jack can be put in circuit. Other filtering depends somewhat on personal notions. A 470-ohm resistor and another 0.01 μ F capacitor, in series across the jack, should suffice.

It was found that the clamp circuit could not be made to operate in the way wanted without some fixed bias for the PA. So in the absence of any fixed bias, V5 can be left out, and cathode keying of the PA can be adopted. It is in fact possible to key substantially more power than this directly.

(To be concluded)

R.A.E. CLASS—GRANTHAM

At St. Hugh's Evening Institute, Dysart Road, a class for beginners on Mondays at 6.45 p.m., from February 5, with A. Ellis, G3PJR, in charge. Enrolment at the class, or the Institute at any time.

VHF BANDS

A. H. DORMER, G3DAH

DESPITE the abnormally high pressure over the whole of the country since the start of the New Year (around 1040 mB) propagation has been little better than average on the VHF bands. Both 2m. and 70 cm. have exhibited minor lifts, but there has been no prolonged, extended tropo. condition for some time. Noteworthy, however, was the two-metre opening towards the Channel Islands on December 18, with GC8AWE on Alderney at enormous signal strength right up into the North Midlands for long periods, and the lift into N/W France reported by G8BKR (Bristol) who worked FICFO in Caen at 5 & 9 both ways and heard both FIBHL in Calvados and F6CAF in Octeville at good strength. G8GGK also heard EA on this date.

There was a lift in the direction of OZ and DL on December 22, of which the Midlands were able to take more advantage than was the rest of the country. HB9HB was logged by many stations, including GD2HDZ, but this was probably ducting, as there appeared to be little contact with stations in the North and East of France, although G8GPR in Lancs worked F1CCP (Somme) at 5 & 7 both ways. This beacon was also good for about one hour on the afternoon of January 7, during the Two-Metre SSB contest. Two metres and 70 cm. perked up a bit around the New Year, the night of January 2 being particularly good for middle-distance contacts although, almost inevitably, activity on 70 cm. was low.

OSCAR VI

This tantalising transponder continues to transmit tiresomely or, if you prefer, it's a nuisance not knowing when the device will be functional on any particular orbit. Examination of the operational and non-operational pass data reveals no positive pattern in time or space which would enable one to forecast productive orbits and, of course, even if such a pattern were established, it could not take account of shut-down due to supply voltage difficulties or overloading. About the best that can be said is that one morning and one evening pass are likely to be good, the question being —which one? It does seem also that AMSAT are restricting weekday passes in favour of weekend ones, but again, to no positive pattern. They did us proud on Christmas and New Year's Day with the multilingual greetings from the Code-store via the 70 cm. beacon, a particularly pleasant and much appreciated gesture.

Operating techniques have become pretty well established now. QSY on to the frequency of the calling station, send his call, your call, RST and "K" once only and listen for the reply, which is likely to be your call, "R" and a report only, which you acknowledge with "R" and then press on to the next contact. If you can't hear your own signals, you can still call "CQ" and listen on the appropriate frequency with some hope of success.

The Oscar Table herewith shows that in spite of these drawbacks one can work quite a few countries given the patience, 30 certainly and 40 possibly. Several correspondents have remarked on the dearth of GM contacts, and indeed the lists show none at present. There must be some activity from North of the Border. It is unlikely that the latitude has anything to do with it as TF and the Northern VE's are heard regularly. Comment would be welcome.

Extracts From Reports

Interesting to see OT Bob Holmes, G6RH, at the top of this Table. He has been in the vanguard of VHF activity for many years.

G6RH recommends the use of a beam on 29 MHz if space and resources permit. He is convinced that lack of one (he has an inverted

dipole with apex at 30ft.) is the reason why he has not yet made it with W5 and W6 although he has evidence that his signals are getting there. He managed to get into 141 orbits of the first 980 and has made 186 QSO's of which 42 have been with W/VE. Apart from the countries shown in the Table, he has heard CM, KV4, UW6 and UQ2. He has logged W and VE stations some minutes after the EU signals have disappeared and the estimated time of the radio horizon has passed, and he queries whether multi-hop, reflected signals are responsible for this phenomenon and whether the North Magnetic Pole has anything to do with it. Again, comments would be welcome. [over

OSCAR VI TABLE Operating Results

Station	Countries	Prefixes
G6RH	32	DL, DM, EA, EI, F, G, GI, GW, HB, HG, I, LA, LZ, OE, OH, OH0, OK, ON, OX, OZ, PA, SM, SP, SV, TF, UA, UT, UG, VE, W, 4X4, YU. (186)
G3BHW	29	DL, DM, EA, EI, F, G, GI, GW, HB, HG, I, LA, LZ, OE, OH, OK, ON, PA, SM, SP, SV, TF, UA, UG, UR, UT, VE, W, YU. (138)
EI6AS	28	DL, DM, F, G, GI, GW, HB, HG, I, LA, LX, LZ, OE, OH, OH0, OK, ON, OZ, PA, SM, SP, UA, UG, UK, VE, W, YO, YU (256)
G3NHE	28	DL, DM, EA, EI, F, FC, G, GI, GW, HB, HG, I, LA, LZ, OH, OH0, OK, ON, OZ, PA, SM, SP, SV, TF, UA, UR, VE, W. (277)
G3COJ	23	DL, DM, EI, F, FP8, G, GI, GW, HB, HG, I, LA, LZ, OH, OK, PA, SM, SP, SV, UA, UG, VE, W.
G5ZT	16	DL, EI, F, G, GW, HG, I, LA, OH, OK, ON, OZ, SM, SP, UA, W.
G3DAH	12	DL, DM, EA, EI, F, G, GI, LA, OK, SM, SP, W. (26)

It is intended that this Table shall run for the duration of Oscar VI activity. When putting in a claim, please show Countries Worked in alphabetical order, as given here, with total contacts made via Oscar in brackets. To keep the Table up-to-date, claims should be made monthly. It is open to U.K./EI two-metre operators only and at present no award status for working through Oscar VI is contemplated. Contacts via Oscar do not count for VHFCC awards. Claims for entry in this Table should be made to "VHF Bands", SHORT WAVE MAGAZINE, BUCKINGHAM.

G3COJ has virtually abandoned terrestrial QSO's and has had the gear set up, with appropriate modifications and muting, for Oscar reception for the last two months. His 23 countries worked indicate that he has not been wasting his time!

EI6AS in Co. Dublin has now completed 21 Trans-Atlantic QSO's with W1, W2, W3, W4, W8, W9, VE2 and VE3, the latter on SSB. Heard, but not yet worked, are EA, EI, OX, TF and 4X4, but he has worked 28 different prefixes, all with 10m. indoor crossed dipoles which, in spite of some fairly severe electrical QRN, give better results than the outdoor aerial.

G3BHW, in sending in his score, mentions his contacts with DM, so just a reminder that as far as we are concerned DM now counts as a separate country for this Table. In any event, recent political moves have recognised the G.D.R. (DM) as a separate entity with country status.

G3NHE clocks up 28 countries with 277 QSO's, but emphasises that this figure includes many repeat-contacts. When deciding what information should go into the Oscar Table, we did consider showing the total number of *different* stations worked, but the eventual conclusion reached was that *each*

contact is an achievement, and that it should be this figure for which credit is given. Martin goes on to report that the "got-away" which caused him most grief was VE6IP who, when the tape of the pass was replayed, could be heard calling "CQ" for 45 seconds or so right on the edge of the Rx pass-band without registering on Martin's selective eardrums! Discussing signal strength reports 'NHE remarks that, if one is hearing one's own signal well on 10m., then one would expect the station called to receive a similar signal, but this is not always so—there are times when the report is better than expected, the inference being that the distant Rx antenna is probably better than one's own. Further, and far more frequent, is the case where the discrepancy is in the other direction, suggesting that many users of the translator have not yet realised the importance of the *10m. receiving aerial*. a point also mentioned by G6RH. He confirms that the difference between a long wire, a fixed dipole and a rotary dipole (which he now uses) at 35ft., is phenomenal!

Good to hear from G5ZT again, and to know that he is finding *Oscar* interesting even if time-wasting! His 2m. antenna is an 8-ele. tilted at 4° to the horizontal, and the 10m. a vertical dipole. Tx runs 45 watts to a QQV06-40A.

VHF Frequency Allocations

The Ministry of Posts and Telecommunications have now formally published new VHF/UHF frequency regulations effective from January 1, 1973. They are as follows:—

430 - 440 MHz

The allocation 432—440 MHz remains as at present but the sub-band 430—432 MHz is subject to the following limitations:—

(a) Not available for use within the area bounded by 53°N 02°E, 55°N 02°E, 55°N 03°W, 53°N 03°W. (b) Classes of emission A1, A2, A3, F1, F2, F3. (c) Power maximum—10 watts e.r.p. (d) The segment 435—438 MHz is open for Amateur Satellite working on condition that no QRM is caused to other services.

144 - 146 MHz

This band is open for the use of the Amateur Satellite Service on condition that no interference is caused to other services.

The restriction on the use of certain spot aeronautical frequencies in this band remains.

SHF Bands

The 21,000 to 22,000 MHz band is withdrawn and replaced by 24,000—24050 MHz, which may be used by both the Amateur Service and the Amateur Satellite Service. A new band 24,050—24,250 MHz is available to the Amateur Service but *not* to the Amateur Satellite Service, on a secondary basis.

It has been decided that steps should be taken to regulate the health hazard which can exist due to radio frequency radiation and, as a result, no amateur will be allowed to operate on the 24,000—24,250 MHz band without prior permission from the Ministry.

Beacons

GB3SX on 4m. seems to be back again after a period on reduced power. GB3SC on 70 cm. has also had trouble, and at one time was reported to be operating on the driver only! However, it was back at normal level on January 7.

Is nothing *ever* going to be done about GB3VHF? The argument for operating it outside the beacon sub-band agreed at Schevingen was that it was a long-established, and by implication much used, aid to both British and Continental operators. As such, one could reasonably expect it to function continuously

OSCAR VI — Prediction Data

Orbit	Date	Time (GMT)	Position	Direction
1360	Feb. 1	0742	32°E	N/S
1361		0937	03°E	N/S
1362		1132	26°W	N/S
1365		1653	44°E	S/N
1366		1848	16°E	S/N
1367		2043	13°W	S/N
1368		2238	42°W	S/N
1373	Feb. 2	0837	18°E	N/S
1374		1032	10°W	N/S
1375		1227	39°W	N/S
1378		1748	31°E	S/N
1379		1943	02°E	S/N
1380		2138	27°W	S/N
1523	Feb. 14	0806	26°E	N/S
1524		1001	03°W	N/S
1525		1156	32°W	N/S
1528		1717	38°E	S/N
1529		1912	09°E	S/N
1530		2107	19°W	S/N
1535	Feb. 15	0706	41°E	N/S
1536		0901	12°E	N/S
1537		1056	17°W	N/S
1538		1251	45°W	N/S
1541		1812	24°E	S/N
1542		2007	04°W	S/N
1543		2202	33°W	S/N

Notes

(1) Times shown are for crossings at 52°N. (2) Orbits beyond 45° East or West are not included. (3) To calculate later orbits deduct 5 minutes from the crossing times and add 1° East for every 25 orbits.

and impeccably. GB3GEC remains silent.

F3THF came back into full service on November 11. Details are: *QRG*, 144-002 MHz; *QRA* Locator, YI13d, *QRK*, 30 watts, beaming East. Reception reports should go to:—F8SH, 6 Rue de Pont-Hélé, Kervoalan, 22700, Perros-Quirec, France.

The second French 2m. beacon, F7THF, came into full operation in November from a QTH at 1,150m. in *QRA* DH15g. *QRG*, 145-960 MHz; *QRK*, 6 watts. Antennae are omnidirectional. This is a pretty sophisticated device designed to transmit information on a number of local parameters as well as to provide a calibration service for the amateur.

Further information from, and reception reports to: F2XP, Jean-Marie Parisot, 18 Grande Rue, Offemont, 900000, Belfort, France. Reports should preferably refer to signal strengths in dB above noise.

Contests

From all reports the 1973 contest season opened with more of a whimper than a bang since conditions for the first of the 432 MHz Cumulatives on January 4 were pretty poor in most parts of the country, although in the North Midlands the propagation and the higher activity level helped the scores along a bit.

Propagation improved to better than average for the first 2m. SSB contest on Sunday, January 7. Both GD2HDZ and G3BW in Cumberland were being worked in the South; Midlands stations were working both French and Dutch and the lucky ones on the East Coast were also able to QSO the nearer Germans. The eight-hour duration of the contest was well justified as contacts were still being made at approximately the same hourly rate at the end of the event as at the start—very unlike the early, two-hour efforts when, after the first hour or so, one was obliged to sit twiddling one's thumbs having worked all the calls heard.

The startling increase in SSB operation on 2m. in the Midlands is undoubtedly due to the advent of the "Liner-2" equipment introduced by Bill Lowe at the Leicester Show in October. There are over 100 of the sets on the go now and, although the output is only 10



At the recent dinner of the Chester & District Amateur Radio Society Arthur Russell, G8AWS (Ellesmere Port, Ches.) the well-known 70 cm. man with a long record of achievement on that band (standing at right) was presented with the Club's "G3FNV trophy" for the third consecutive year—congratulations!

watts and, as supplied, they have restricted frequency coverage, they are giving a very good account of themselves as regards both range and quality.

Some measure of activity during the contest may be gained from a look at the scores. G4BEL (Cambs.) was the first operator heard exceeding the 100 mark (at 1320z) and he finished up with nearly 150 contacts. G3UBX/P (Much Wenlock, Shrops.) had 138 contacts; G8DNK (Leeds) 103 at 1740z; G3JJI/P (Settle, Yorks.) passed 134 at 1735z and G3YSG/P finished with 156 contacts at 6-55 points per kilometre. Your scribe just managed to scrape home his 100 five minutes before the end of the contest.

Operating was generally pretty good—the absence of carrier and one sideband reduced the QRM considerably within the 100 kHz or so of spread about the calling channel—and exchanges were slick and purposeful. The over-enthusiastic bawler was there, inevitably, but the resultant distortion, flat-topping (and in two cases FM'ing) seemed to be making things more difficult for the perpetrators than for the other contestants who weren't being asked for repeats on every other over!

Forthcoming Events

The 432 MHz cumulatives for February fall on the 5th, 13th and

21st. February 4 sees the 144 MHz Fixed-Station CW event start at 1000z and continue till 1800z. February 18 is the date for the 70 MHz Open; March 3/4 for the 144/432 MHz Open and March 4 for the 144 MHz Fixed. Seems to be a bit of an overlap there, but it will all work out all right.

VHFCC Awards

Nigel Hydes, G8FDC (Darwen, Lancs.) gains Award No. 173 for his 2m. activities. Operation started in August, 1970 with QRP AM/NBFM, replaced in mid-1971 by a Pye Cambridge with 15 watts to a QV03-10. The Rx is a Trio 9R-59DS with a Sentinel dual-gate mosfet converter, 28-30 MHz IF. The original antenna was a 6 ele beam inside the shack, but subsequently this was erected outdoors where it remained until the day of Nigel's application for this Award, on which date it collapsed!

Award No. 174 goes to John Field, G3XTT (Abington Vale, Northampton). He doesn't get much time for operating as he is up at Cambridge but, even so, he made over 270 contacts in six different countries since starting in January, 1970, and can show a QSL return rate of nearly 50% to prove at least half of them, thereby supporting his claim for VHFCC on 2m. Initially, the gear was a home-

THREE BAND ANNUAL VHF TABLE
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Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL points
	Countries	Countries	Countries	Countries	Countries	Countries	
GD2HDZ	34	4	75	16	34	8	171
G5DF	52	6	59	10	33	4	164
G3DAH	34	2	59	17	32	8	152
G3ZMD	37	4	61	13	29	6	150
G3OHH	51	6	57	6	24	2	146
G8CUT	—	—	63	16	35	7	121
G3NHE	—	—	67	17	29	6	119
G2AXI	31	3	48	9	18	3	112
G3YRH	2	1	62	11	24	7	107
G8FUI	—	—	67	11	23	4	105
G8ATS	—	—	49	9	39	6	103
G8CIW	—	—	69	15	10	2	96
G8BXX	—	—	54	7	33	2	96
G3BW	—	—	79	13	—	—	92
G3FJ	12	2	43	6	15	3	81
GW8FKB	—	—	63	14	—	—	77
G8BKR	—	—	49	6	19	2	76
G8AGL	—	—	53	9	9	1	72
G4ALN	—	—	40	6	23	3	72
GM8BDX	—	—	44	12	5	4	65
G8CBU	—	—	41	7	13	2	63
G8ERM	—	—	53	5	—	—	58
G8DWT	—	—	48	5	4	1	58
G3PQF	5	1	42	9	—	—	57
G8DYK	—	—	47	9	—	—	56
G4AVX	—	—	48	8	—	—	56
G4AJE	—	—	44	11	—	—	55
G3EKP	23	6	16	5	2	2	54
G8EMS	—	—	42	4	6	1	53
G3RAF	—	—	46	6	—	—	52
G8COG	—	—	34	5	12	1	52
G3DAO	—	—	39	12	—	—	51
G8FIH	—	—	43	8	—	—	51
G8FKL	—	—	46	5	—	—	51
G8GJV	—	—	37	4	—	—	51
G8FAG	—	—	41	2	—	—	45
G4BKG	—	—	38	6	—	—	44
GM3ZVL	—	—	31	8	—	—	39
F6BQH	—	—	30	9	—	—	39
GW3CBY	3	1	22	5	6	2	39
G4APV	—	—	33	5	—	—	38
G3SMU	5	1	—	—	23	3	32
G8GJN	—	—	26	5	—	—	31
G8BBV	—	—	26	3	—	—	29
GM3ZVB	—	—	24	4	—	—	28
G8BMD	—	—	23	4	—	—	27
G3MEW	—	—	23	4	—	—	27
G8GBH	—	—	23	2	—	—	25
GM3IBU	—	—	21	3	—	—	24
G8FNH	—	—	20	2	—	—	22
GM8DRQ	—	—	19	2	—	—	21
G8BBP	—	—	16	4	—	—	20
G8FVI	—	—	17	2	—	—	19
G4AZK	—	—	14	2	—	—	16
G8GFW	—	—	14	2	—	—	16
GW3FTQ	—	—	13	2	—	—	15
G8GXE	—	—	9	1	—	—	10
G8FSO	—	—	6	3	—	—	9
G8DBX	—	—	6	2	—	—	8
GW8CGH	—	—	6	2	—	—	8

This Table shows the final placings for the year ended December 31, 1972. The new Tables started with effect from January 1, 1973, and claims should be sent in immediately to: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. The new Three-Band Annual Table for 1973 will start in the March issue if by then sufficient claims are received.

built, 15 watt, CW job with a QQV03-10 in the PA, but this was supplanted in September, 1970 by the HW-17A in use today. The converter is a JXK model and the antenna an 8/8 at 25ft. Principal interest is in contest working, largely dictated by the need to concentrate operating into the short periods which can be spent at the home QTH.

For two metres from Winchester, David Bulpett, G8FWB, gains Award No. 175. He runs 12 watts to a QQV03-10, AM or NBFM, and a 6/6 slot at 30ft. Rx is a valve cascode with BF180 pre-amp into a Trio 9R-59DS. The QTH sounds pretty grim with 200ft. hills masking the take-off from North through East to South, but even so, since February, 1972 David has managed nearly 1,000 QSO's with about 300 different stations, with GM as the best DX. He recommends fitting a TAA570 to the Trio for FM reception, and says that with it he can read NBFM down to S2.

Scottish Notes

Sending in his final claim for the Annual VHF Tables, Bill Wright, GM3IBU, reports that he is off to Kirkwall in the Orkneys early in the New Year, but will be QRV on 2m. from there when he gets fixed up in suitable accommodation. He remarks that if his brief showing in the Tables stimulates a few more GM's to enter the lists, it will have served his purpose, particularly as the appearance of some more GM's might also stimulate a little more Northing on the beams to the South of Hadrian's Wall!

Bob Cochrane, GM8DRQ (Hamilton) comes up with the news that many operators in Lanarkshire are using very low power for local contacts—GM5VG, for example, runs 60 mW with a QRO position to give him 120 mW for the DX! This is very much to be recommended for local working in *any* part of the country. Bob himself "runs QRO," about 800 mW of NBFM, to be boosted to 90 watts for the DX awaiting him when he gets the GM4 call through. He has gear for video reception on 70 cm. and a standard 432 MHz converter almost ready to go with the 18-ele. beam to give GM8BDX a contact! He has received pictures and sound from GM6AEG/T in Larkhall to give the

THREE BAND ANNUAL VHF TABLES
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TWO METRES			
Station	Counties	Countries	Total
G3BW	79	13	92
GD2HDZ	75	16	91
G3NHE	67	17	84
G8CIW	69	15	84
G8CUT	63	16	79
G8FUI	67	11	78
GW8FKB	63	14	77
G3DAH	59	17	76
G3ZMD	61	13	74
G3YRH	62	11	73
G5DF	59	10	69
G3OHH	57	6	63
G8AGL	53	9	62
G8BXX	54	7	61
G8ATS	49	9	58
G8ERM	53	5	58
G2AXI	48	9	57
G8DYK	47	9	56
G4AVX	48	8	56
GM8BDX	44	12	56
G8BKR	49	6	55
G4AJE	44	11	55
G8DWT	48	5	53
G3RAF	46	6	52
G3PQF	42	9	51
G3DAO	39	12	51
G8FIH	43	8	51
G8FKL	46	5	51
G3FIJ	43	6	49
G8CBU	41	7	48
G4ALN	40	6	46
G8EMS	42	4	46
G8FAG	41	4	45
G4BKG	38	6	44
G8GJV	37	4	41
G8COG	34	5	39
GM3ZVL	31	8	39
F6BQH	30	9	39
G4APV	33	5	38
G8GJN	26	5	31
G8BBV	26	3	29
GM3ZVB	24	4	28
GW3CBY	22	5	27
G8BMD	23	4	27
G3MEW	23	4	27
G8GBH	23	2	25
GM3IBU	21	3	24
G8FNH	20	2	22
G3EKP	16	5	21
GM8DRQ	19	2	21
G8BBP	16	4	20
G8FVI	17	2	19
G4AZK	14	2	16
G8GFW	14	2	16
GW3FTQ	13	2	15
G8GXE	9	1	10
G8FSO	6	3	9
G8DBX	6	2	8
GW8CGH	6	2	8

SEVENTY CENTIMETRES

Station	Counties	Countries	Total
G8ATS	39	6	45
GD2HDZ	34	8	42
G8CUT	35	7	42
G3DAH	32	8	40
G5DF	33	4	37
G3ZMD	29	6	35
G3NHE	29	6	35
G8BXX	33	2	35
G3YRH	24	7	31
G8FUI	23	4	27
G3OHH	24	2	26
G4ALN	23	3	26
G3SMU	23	3	26
G2AXI	18	3	21
G8BKR	19	2	21
G3FIJ	15	3	18
G8CBU	12	2	15
G8COG	13	1	13
G8CIW	10	2	12
G8AGL	9	1	10
GM8BDX	5	4	9
GW3CBY	6	2	8
G8EMS	6	1	7
G8DWT	4	1	5
G3EKP	2	2	4
G8GBH	1	1	2

latter his one and only contact in three years!

GM3ZVB has now completed the 100 mW two-metre transceiver based on the GM3OXX design and is getting good reports with it. GM3OLK has modified a "Cambridge" for both FM and CW. GM3PQU is now on SSB and GM3BQA should be on that mode shortly. The "Liner-2" is making its mark in Scotland as well as the Midlands it seems!

Writing from the Science Department of the Peebles High School, Bruce McCartney reminds us that the distinguished, Edinburgh, scholastic establishments do not have a monopoly of radio amateur students and staff. He is GM4BDJ, and Dan O'Neill, another member of staff, is GM8FRD. Student GM8FYC is still with them, although both GM8FSP and GM8FWS have departed for Heriot-Watt. The School Club runs a two-watt AM/FM Tx and a dual-gate mosfet converter into the Telford tunable IF—all quite easily portable and ready for use when the next DX-expedition goes out.

News Items

23 centimetres: With a score of 72 in the Annual Tables, G4ALN (Romford, Essex) has certainly not been wasting his substance, but what isn't apparent is that his 23 cm. activities have already brought him 7 counties and two countries since the beginning of October, 1972. His overseas QSO was with PAØHVA, who runs 100 watts out to a 5ft. dish and whose signal report was 5 & 4 (SSB) and who passed Ken 539. The 70 cm. reports at that time were 5 & 9 and 5 & 7 respectively. The Tx at the Romford end runs 4 watts output from a varactor tripler and feeds a 22-ele. Yagi at 42ft. The Rx incorporates a hybrid ring with the 2m. converter as the IF strip. Very nice going. Incidentally, G3LQR worked PAØHVA on 13cm. the same evening.

G8BYV up in Dereham, Norfolk made it on 23 cm. with ON4HN on December 12 and received a report of "15 over 9"! The same night he was taking video from G6AEQ/T and G6NOX/T. He has had his QSL card from OZ9FR to confirm the 23 cm. contact at 660 km., 5 & 7 both ways! Plans are in hand for a converter for 13 cm. to see what can be done on that band.

Four Metres: G3ZOD (Stockport) is now on this band with 20 watts input to a Pye Ranger and a G3OGR converter, which turns out to be a vast improvement over the old RF-27 job. When he gets his beam horizontal instead of vertical he should go places. Another vertical antenna devotee is G4AZS of Shrewsbury, who is further handicapped by the fact that it is in the roof space alongside the water tank.

Two Metres: GW8CGH (Bridgend, Glam.) is getting the 8-ele. Yagi up and with the 200ft. of height his 12 watts should get him some DX.

After 12 years of effort, G3OSS in Finchley, London finally made it with GD on two metres to get his 16th country on that band. Nice going, Angus.

Three-Band Annual Tables

Our Tables this month show the final placings by bands and overall for 1972 and this year it is to GD2HDZ, Arthur Breese in the Isle of Man, that our congratulations must go. He also qualifies for a year's free subscription to SHORT WAVE MAGAZINE. Arthur has been a most consistent, and persistent, performer throughout the year and his success is by no means diminished by his attractive call sign. It must be remembered that for every contact he makes, the chap at the other end makes two, one country and one county—two for the price of one, so to speak!

G8ATS looked a probable winner for the 70 cm. Table from quite early on, but the G5DF/G3OHH position has been a bit of a cliff-hanger for some time. Our congratulations go to them also.

Finally, thanks to all those who have supported this feature throughout the year. If it weren't for you there wouldn't be a Table, so please keep it up again during the coming year. All Tables are now open again. The address for claims is, as usual, "VHF Bands", SHORT WAVE MAGAZINE, BUCKINGHAM, and the 1973 Tables from January 1st will appear next month.

Deadline

Deadline for the next issue is **February 3**. The address for news, views, claims and comment is: "VHF Bands", SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and *vy 73 de G3DAH*. Keep the tap flowing.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for March issue: February 2)

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

LOOKING at the files of Club Secretaries kept in your old conductor's office, it occurs to him that, even for those Clubs who do not make a habit of reporting, it would be no bad thing if *all* Club Secretaries would take the trouble to drop us a line to give the name and address, plus telephone number, for applicants. Quite apart from the mention in these pages, SHORT WAVE MAGAZINE often receives letters from "new chums" or folk who have moved to a different district, asking us to put them in touch with the local Club; it is nice when answering to feel the address we have on file is the *right* one to contact, rather than someone who held the job some years ago and may not even live in the area any more. Admittedly, in most cases we can get round an out-of-date file card from other sources of information, but it often leaves the enquirer with quite a bit of chasing up to do from whatever leads we are able to supply—if he loses interest *en route* the club concerned has lost a, maybe valuable, new member.

Westerly Parts

Looking at this file, it is a pleasure to observe on the top a letter from a GI club, the **Queen's University of Belfast** group, who are back in circulation after some years "in the wilderness." During their move of Hq., all the gear was stolen, and over the past year there have been strenuous efforts to get back on the air, all bands 160 to two metres, saving the 70 MHz segment, plus an AR88 for the SWL element. They foregather on Tuesdays at 2000 and Wednesdays at 1330, at 37 Fitzwilliam Street, Belfast BT9-6AW. What a pity their photographs of the club set-up were not quite suitable for publishing!

On February 13 and 27, the **Reading** group will be in session, in the clubroom of the White Horse, Kidmorend Road, Emmer Green, Reading (says the new Secretary), and visitors will be very welcome, from 7.30, the starting time.

Every Thursday is the arrangement at **Yeovil**, where the venue is at the Youth Centre, 31 The Park; once each month there is usually a formal lecture, a film show or whatever.

A new secretary also takes over for Bristol's **Shirehampton** group, namely G5AQZ—see Panel p.751 for his address—and we are told that the gang can be found at Twyford House every Friday evening; R.A.E. classes are under way, and they hope to be able to run an exam. centre at Hq.

On to **Cornish** where the main meetings are at the SWEB Clubroom, Pool, Camborne, the next one being due on February 1. In addition, there is a **Newquay** section of the club, who get together on alternate Wednesdays at Treviglas School.

Chippenham have Hq. at the High School for Boys, Hardenhuish Lane, Chippenham, where they can be found on Tuesdays in each week.

The gang at **Torbay** have a bumper Christmas session with guests from the Plymouth and Exeter Clubs for a Quiz, which the home team won; sixty members and friends were present. On February 24, they will be turning their attention to Radio Aids to Navigation, at the Hq., Bath Lane, rear of 94 Belgrave Road, Torquay.

The North

First, to introduce a new club; this is at **Denby Dale**, where the venue is the delightfully named Denby Dale Pie Hall. Look for them here on the last Wednesday in every month, says the Hon. Secretary, who warrants the programme through the year will have something of interest for everybody. We wish them every success.

Nottingham, marked by the unmistakable handwriting of the secretary who has been a correspondent for years. Geoff reports a Forum for February 1, followed by a lecture, the title of which will be announced over Radio Nottingham, on the 8th. Then there is an Activity Night on the 15th, and another talk on the 22nd, again to be announced on Radio Nottingham. Hq. is Woodthorpe House (Sherwood Community Centre), Mansfield Road, where they already have a fine rig for the HF bands and a VHF one "in stew."

The lads at **Bury and Rossendale** don't mean to be overlooked, with two successive newsletters and a letter! They congregate at the George Hotel, Market Street, Bury, on the second Tuesday in each month, which gives February 13, this time.

Looking through the programme forecast in the **Derby** Newsletter, one notices the weekly meetings *plus* extra activities of one sort and another, and in addition it seems to be the case that once a month the Ladies are invited to a programme designed to interest both OM and YL. This must be a good idea, and we would be interested to know how much support it gets from the women. For more details, contact G2CVV—see Panel, p.751.

At **Hull** there is a programme of weekly meetings, with the AGM coming on January 29. Then there is

For many years identified with the Silverthorn Radio Club (Chingford, London) and now its president, naturally G2HR (standing) was called upon to address the gathering of 60 members and friends on the occasion of their 21st annual dinner dance.



February 2, when G8EAH talks about a Hair Raising Experience; February 9, when the president of Hull Photographic Society will be showing some of his films; and the 16th, when there is a Quiz. That leaves February 23, for Mr. P. Brumpton of the Yorkshire Electricity Board to come along and talk about Power, Distribution and Protection, to round off the month.

There are two sessions in February at **Northern Heights**; on the first of these, the 14th, there will be either a Ragchew, or, if all goes well with development plans, they may be making a start on Their Project. On the 28th, everyone is invited to bring along their favourite gadget and demonstrate it to the multitude—it doesn't necessarily have to be radio, so long as *everyone* brings something!

A couple of meetings are down for **Glasgow University**, on February 1 and 15. The first one is a visit to the Police communications centre, and for the second they have organised a talk on the vital business of chassis work.

On the second and fourth Wednesdays of each month the Blossoms Hotel, Buxton Road, is the venue for the **Stockport** get-togethers. In addition, February 17 is set aside for the annual dinner-dance at the Ravenoak Hotel.

Middle England

The *Newsletter* sent in by the **Spalding** crowd shows a steady improvement in the style and presentation—somebody is taking a lot of time and trouble over it. The Club will be at home to visitors at the monthly meeting on February 16, at Holland Teachers Centre, Knight Street, Pinchbeck—the evening will be divided between film and slide shows covering various past activities, and a rather important discussion on the Ways and Means involved for their Tulip-Time Rally on May 6. On the 23rd, we gather, a party will be going to the Peterborough Club Junk Sale.

Sad to say, the reason for the **Lincoln** change of

Hq. was the attention of vandals; but, worse, since they have been sharing Hq. with Lincoln Astronomical Society in Westcliffe Street, the attendances seem to have dropped a bit. However, they are not downhearted, and have a full itinerary organised; for example, February 7 features a talk on D/F, followed on the 14th with a project night on building D/F tackle. Then, on the 21st, there is an Open Night, to which, as indeed to all meetings, the lads welcome visitors and ex-members.

The **Church House**, Erdington, Birmingham is the home of the **Slade** chaps. On February 9 they are going out, to visit the Motorway Control Centre, and on the 16th there is an Informal Supper. Then on the 23rd comes the talk by Mr. L. Evans, which he has entitled "With a Camera in the Alps."

It is nice to see that **Wirral** are still going strong, and that the Merseyside societies are working to common ends. They have arranged for G3OKA to come and talk about Sheepskins—awards, to the uninitiated!—on February 7, while on the 21st, Contests and DX-peditionary matters will be the topic.

Now to **Hereford**, and here, despite dismal editorials, we guess that things are not too bad—the members keep on turning up! Look for them on the first and third Fridays in the month, at the County Control, Civil Defence Hq. in Gaol Street.

For the latest information on the **Solihull** goings-on you will have to contact G4ABV—see Panel, p.751. We can tell you however, that the Hq. is at the Manor

CLUB SECRETARIES PLEASE NOTE

Closing dates for this feature for next few issues are, after February 2, Fridays March 9, April 6, May 4 and June 8. Reports received late cannot be written in. Address: "Club Secretary," Short Wave Magazine, Buckingham.

House, High Street, Solihull.

According to the latest information we have, it looks like February 20, if you want to look in at the **Midland** group, who can be found on that evening at the Birmingham and Midland Institute in Margaret Street.

Twice weekly meetings can be enjoyed if you join the **South Manchester** lot, Mondays for the VHF chaps at the Club shack, Greeba, Shady Lane, Manchester 23, or the main meetings on Fridays, 2000 at Sale Moor Community Centre, Norris Road. For the latter, February 2 is a Surplus Equipment Sale—visitors are welcome!—And the 9th the second part of a talk with slides by P. Stewart on Radio Astronomy. Then there is February 16, with a VHF Transverter to be discussed, G3GMT leading, and the 23rd for a talk on Batteries by G3VIW. A good idea, this last, for the battery-makers complain that *everyone* maltreats their products, and their complaint has some truth in it.

Wolverhampton's *Newsletter* gets better each month, and the current issue includes a full list of calls in the Club's "catchment area." Monday evenings are the main ones, each week, but for the beginners a separate Friday date is being run to cover the basics and also to give Morse tuition—we were amused to see that OT's who have lost the knack are also invited! Hq. is at Neachells Cottage, Stockwell End, Tettenhall.

Nationals

Our first in this pile is **British Rail**, whose News Letter, as usual, contains a long screed from WA5VFW, who really should take up writing seriously—he is hilarious at times.

Still no sign of new officers for the **Nigerian** group, whose present officials are making all preparations to put the Club "on ice," as it were, in the hands of the president, until the required effort can be found. It is sad that such a live-wire society should find itself in the position of having lots of members but on-one ready to take on the chores—let us hope somebody turns up soon.

The **BARTG** *Newsletter* carries more than usual information on RTTY contests and such activities, by way of reports on past ones and details of forthcoming efforts; however, as always, it has its fair share of technical articles pitched just at the right level. Anyone who gets ideas about putting a teleprinter on the air *must* think seriously about a subscription.

R.A.I.B.C. must not be forgotten in this section; they can always do with supporters on the one hand, meaning people like you and your scribe, and of course anyone blind or invalid and who is interested as SWL or licensed amateur should be put in touch with G3LWY—at the address in the Panel, opposite.

We have a couple of copies of the **A.R.M.S.** *Mobile News* to hand, covering all sorts of items of interest to the chap who goes in for mobile operating.

The **Wireless Preservation Society** has sent in a reminder of their existence; viewing is entirely free of charge, and at any mutually convenient time. For details contact G3KPO, address as Panel.

The **R.N.A.R.S.** *Newsletter* is one your conductor looks forward to seeing. The latest one has a delightful bit of circuitry on the front cover, warranted to puzzle

any engineer! Once inside, there is news of members, of course, not to mention an admirable collection of funny stories, and some technical articles. Membership now extends to no less than 27 countries.

For Southrons

Those of us in the rest of the country!

A recent AGM saw a reshuffle of officers at **Horsham**, as is reflected in our Panel. It should be an interesting evening on February 6, at the Guide Hall, Denne Road, Horsham, when G3NPF takes for his subject "Building for 23 cms." In addition we notice an informal session, down for February 20, in the Popular Bar of the Star at Roffey.

Bishops Stortford's Secretary got a rocket from the members for not getting them a mention in this piece—the next date they have is on February 19, details still to be finalised, at the British Legion, Windhill, Bishop Stortford.

For **West Kent** there are a couple of dates to recall; February 2, when K. Sheldon covers Aerials and Propagation, and February 16, when there will be a special Sale of Equipment. Both these are at the Arts Centre, Monson Road, Tunbridge Wells.

The most important date of the year for **Dunstable Downs** members comes on February 16, at Chews House, 77 High Street South, Dunstable. And what is so important? The AGM, of course.

If you are interested in Transverters for 144 MHz, make the effort to attend the February 20 get-together of the **Acton, Brentford and Chiswick** chaps, when G3CCD will describe and demonstrate his own solution to the design problems involved.

At **Basingstoke** the booking is for the first and third Saturday in each month, at Chineham House, Popley. The former, for February, is a **Beginners and Natter** night, while the latter is set aside for a showing of the **WIBB** tape-and-slide lecture.

February 1 sees a visit by K.W. Electronics to **Cray Valley** to demonstrate the range of equipment they make. The Natter session follows on February 15. Looking on a little, the impact of the proposed VAT on Amateur Radio has not been much considered in the Clubs, saving at Cray Valley, where on March 1, G3WVP looks into this question. All meetings unless otherwise notified are at the United Reformed Church Hall, Court Road, Eltham, London, S.E.9.

A Special General Meeting on February 12 is considered to be necessary by the **Echelford** group committee, to ask the members to ratify a change in annual subscription. It is hoped to get the business over fairly quickly and follow with a Natter Nite.

For **Southdown** on February 5, the subject will be "Frequency Division Multiplex" with G8CVV doing the explaining at the Victoria Hotel, Latimer Road, Eastbourne.

The **Mid-Sussex** newsletter currently to hand is not very recent, but from it we can deduce that the group can be found at Marle Place, Leylands Road, Burgess Hill, and that they have meetings on alternate Thursdays at the Hq. However, details on the activities are lacking, possibly due to an AGM towards the end of January.

Looking at the **Bedford** menu for February we see a

quick starter on February 1, when G3XKB talks about Receiver Comparisons, followed up by Alan Hawkins on Audio and Quadraphonic Sound. G8BCX picks up Amateur Television Techniques on the 15th, and on the 22nd there is a Forum on Linear Amplifiers, with G8FMG and G3FWA doing the talking. All these dates are being taken at the Dolphin in the Broadway, Bedford.

If you know the Ernest Turner works at Totteridge Avenue, High Wycombe, you know the venue for the Chiltern Club. They will be in session on February 13 for an Informal during which their station G3CAR will

be operated, and on February 28, Bob Tebutt talks about Television and Video Systems.

Our letter from Farnborough covered January, but it does give us an indication of the pattern. They now meet at Further Education Centre, St. John's Road, Cove, Farnborough, where visitors are welcome.

There are a couple of sessions of the Edware group to go on the record. One is on February 8, details of which were still to be finalised at the time of writing, and the other, February 22, informal. Both are at the Watling Community Centre, 145 Orange Hill Road, Edware. (over

Names and Addresses of Club Secretaries reporting in this Issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH
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WEST OF SCOTLAND: M. Parks, 6 Stamperland Hill,
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WORTHING: G. Hooper, 12 Bramble Crescent, Durrington,
Worthing.
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

SHORT CLUB NOTICES

CLUB NAME	HEADQUARTERS LOCATION	MEETING MONTHLY
Border	Tweed View Hotel, Berwick-on-Tweed	February 25
Coventry	Scout Hq., St. Nicholas Street, Radford Road	February 2, 9, 16, 23
Crawley	<i>Not given</i>	<i>Not given</i>
Glenrothes	<i>Not given</i>	February 4
Grafton	Whittington School, Highgate Hill, London, N.19	February 9, 23
Harrogate	<i>Not given</i>	February 19
Harrow	Harrow Sea Cadets Hq., Woodlands Road	February 2, 9, 16, 23
Kingston	37 Brighton Road, Surbiton	February 14
Maidstone YMCA	"Y" Sportcentre, Melrose Close	February 2, 9, 16, 23
Reigate	Nutley Hall, Nutley Lane, Reigate (7th) or Marquis of Granby, Hooley Lane, Redhill (21st)	February 7, 21
Rugby	Lawrence Sherriff Arms, Town Centre	February 27
Saltash	Burraton Toc H	February 2, 16
Solihull	Manor House, High Street	February 20
Stevenage	Hawker Siddeley Dynamics, Gunnels Wood Road	February 1, 15
West of Scotland	81 Virginia Street, Glasgow, G.2	February 2, 7, 9, 14, 16, 21, 23, 28
Worthing	Rose Wilmott Centre, Littlehampton Road	February 6, 13, 20, 27

N.B.—In each case the Secretary's name and address appears in the Panel on p.751.

Now to **Medway**, who advise us that they get together every Friday at the Aurora Hotel, Gillingham, from 1930 to 2200 clock. All interested are welcome, and indeed invited to come along.

A single sheet of *Newsletter*, without aspirations to be what it is not, with all the essential details on the top of the page, signals the monthly piece from **Sutton and Cheam**—we wish more newsletters could be so informative! They have their Hq. at "The Harrow" in Cheam, on the third Tuesday in every month; this means February 20, for a Construction Contest.

Our copy of the **Dartford Heath D/F Club Compass Points**, carries a rather difficult Christmas Quiz, and a more than usually amusing yarn, as well as the vital statistics. On February 2 there is a Club Night, detail not specified, and on the 16th comes a talk on Theatrical Production. Both, as normal are at the Scout House, Broomhill Road, Dartford.

The AGM of the **Brighton Technical College** gang is on February 5, at Richmond Terrace, Brighton BN1-2SZ; it is followed on February 19, by a session of "Ask the Experts" in which the junior members will have an

opportunity to have answers to their questions from a panel of technically-able types.

Another Annual General Meeting comes up for mention at **Crystal Palace**, on Saturday February 17 in fact, at Emmanuel Church Hall, Barry Road, London, S.E.22. It hardly needs us to rub in the fact that this is the most important session of the year for any club.

Having so often in these pages griped about Club Secretaries and Newsletters failing to give us the information on the correct month to be of use, your scribe was rather pleased to have a member of the **Southgate** group in the office when he came to their offering, as it covers November and December's meetings! However, we happen to know that the date is always the second Thursday in the month, and the Hq. at the Civil Defence Hut opposite Arnos Grove station on the Piccadilly Line.

It is unusual for the **Verulam Newsletters** to get out of phase with us in the information they give, but it happened this time, mainly due to the full coverage of the AGM. However we know it is the third Wednesday in each month, and we have it that the venue is changed; from now until May 1973 meetings will be held in the Market Hall, St. Albans. This is on the west side of the Market Place, about 100 yards north of the usual Town Hall place. All members and intending members or visitors to please make a note accordingly.

Sign-Off

That's it again, including all the copy sent in during December by mistake(!) as well as the January offerings. For the February mail, covering the *March* doings, the deadline is very tight at **February 2**, latest, addressed as always to "Club Secretary," **SHORT WAVE MAGAZINE, BUCKINGHAM**. Till then, cheerio.

Editorial Note: Closing dates for this feature for the next few months are: **March 9, April 6 and May 4**.

ANOTHER BLOW FOR FREEDOM AND PROGRESS

It is reported that all amateur licences have been cancelled (not just suspended) in the Black African republic of Zaire, 9Q—formerly the Republic of the Congo and before that the Belgian Congo. According to the latest *Call Book* there are (or were) more than 160 9Q5's licensed in Zaire—needless to say, nearly all with European names, and generally pretty active.

Thus is another blow struck for "freedom in Africa", which will find wide support at the United Nations (by the representatives of Black Africa). Of course, in contrast to this, there are no prohibitions at all on AT-stations in what are categorised by the Screaming Left as the "backward countries" of South Africa, Rhodesia and Angola. Even Fidel Castro allows nearly 500 radio amateurs to operate without let or hindrance from his tightly-controlled Island of Cuba. Probably he has grasped that Amateur Radio encourages knowledge and experience of electronics and radio communication, urgently needed by all such emergent countries—a point that has evidently eluded Gen. Mobutu Soko, President of Zaire, and his Minister of Communications, M. Busu Nyoka.

R. A. E. QUESTIONS ANSWERED

THE MAY 1972 EXAMINATION

The next City & Guilds Examination for Radio Amateurs—now subject No. 765 in the C. & G. syllabus—comes up in May. As in previous years, we give here a set of “model answers” to the 1972 Paper—noting that for completeness we deal with all ten questions, though in the Exam. itself only eight need be answered, the two in Part I being compulsory. What the Examiner expects is that candidates should show by their answers that they understand the questions and could expand on them in detail if necessary. In other words, long and detailed explanations are not usually required. Formulae must of course be correctly stated and worked. To pass the R.A.E. involves getting at least 50% of the marks in both Parts, and there are grades of “distinction” and “credit”, though for the issue of an AT-station licence all that is needed is a pass. A certificate is awarded to all successful candidates, showing the grade achieved. Possession of this certificate is essential for the

granting of a U.K. amateur transmitting licence—it is also accepted in the same way in many other countries in which an examination pass is required for an AT-station licence. The pass-rate on the Paper discussed here was 61%, an improvement on recent years. The next Examination in Subject No. 765 is on May 10—but note that applications to sit must be in before the end of February; your Course Instructor will have details—Editor.

THE duration of the examination is 3 hours. It is divided into two parts, and failure in either part results in failure of the examination as a whole. The maximum mark for each question is shown.

Both questions in Part I must be answered. Only six of the eight questions in Part II are to be answered.

The answers given here are not exhaustive of the subjects raised by the questions, but are typical of the kind of answer which can be expected from a candidate who has made reasonable preparation for the examination.

PART I

Q.1. (a) State the three purposes for which an amateur sound station may be used.

(b) What types of (i) messages, and (ii) signals may be sent and received?

(c) What precautions concerning aerials should be observed when operating a station from a public electricity supply?

(d) What precautions must be observed when siting transmitting aerials in the vicinity of airfields, power lines and television receiving aerials? (15 marks)

Answer (1)

(a) 1. For sending to and receiving from other licensed amateur stations messages and signals for self-training in communication by wireless.

2. As part of self-training in communication by wireless during disaster relief conducted by the British Red Cross Society, St. John Ambulance Brigade, or any Police force in the U.K., or in exercises relating to such operations. For sending to other licensed amateurs

messages requested by the society, brigade or Police force mentioned, and receiving from other licensed amateurs messages which the society, brigade or Police force have requested shall be sent.

3. To receive transmissions in the Standard Frequency Service.

(b) (i) Those in plain language about matters of a personal nature in which the licensee or person with whom he is in contact has been directly concerned (but not business affairs).

(ii) Those which are part of or relate to such messages, and are not in secret code or cypher.

(c) No direct connection must be made between the public electricity supply and the aerial.

(d) If the station is within half a mile of the airfield boundary a mast or aerial must not be over 50 feet high above ground. An aerial crossing above or liable to fall or be blown on to any overhead power line, electric lighting or tramway wires, or power apparatus, must be guarded to the reasonable satisfaction of the owner of the line or apparatus concerned. The aerial should be as far as possible from any TV aerial. It may not be practicable to use an indoor aerial for transmitting, in view of possible close coupling to electricity supply wiring, or existing aerials.

Q.2 (a) (i) What is meant by overmodulation of the output from an amplitude modulated transmitter?

(ii) What are the undesirable effects arising from over-modulation?

(d) Describe, with the aid of diagrams, a method of monitoring an amplitude modulated transmitter so as to ensure that over-modulation does not occur and explain how the monitoring system functions. (15 marks)

Answer (2)

(a) (i) Overmodulation of an AM transmitter is modulation exceeding that which should correctly be used. Downward modulation cannot go beyond 100%. Attempting to go beyond this is overmodulation and the carrier is interrupted, or broken.

(ii) With overmodulation, the radiated signal no longer reproduces the original modulation, or AF signal, accurately, so that distortion is caused. Cut-off or distortion of the carrier produces new frequencies or harmonics of the modulating frequency, termed splatter. These new frequencies widen the channel required for the transmission, thereby causing interference to other transmissions.

(b) An oscilloscope provides an excellent means of

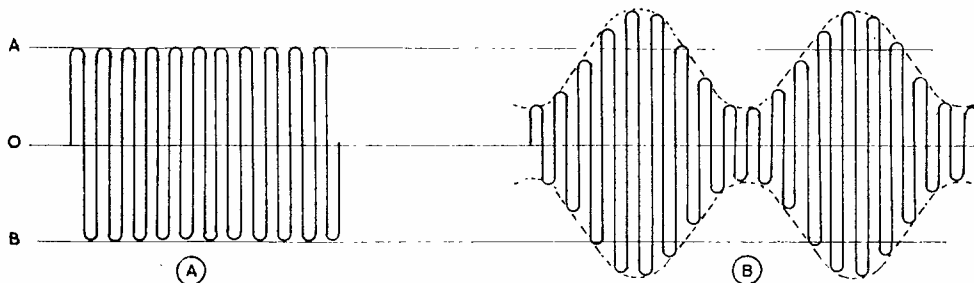
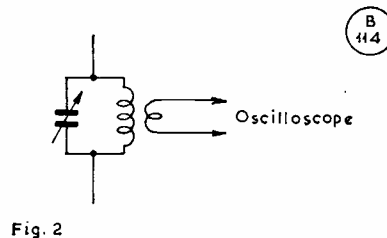
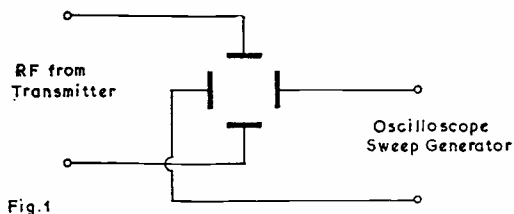


Fig. 3

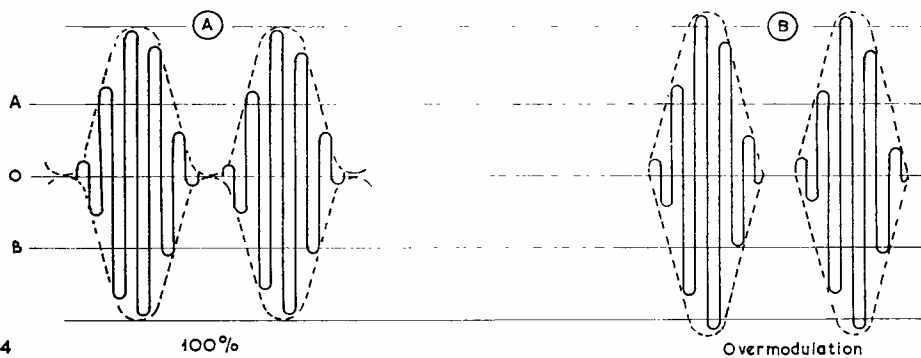


Fig. 4

100%

Overmodulation

TO ANSWER Q2

monitoring the amplitude modulated transmitter. One way of using it is shown in Fig. 1. The horizontal plates are operated from the 'scope sweep circuit, sweep frequency being adjusted to secure a satisfactory display when modulation is present. The vertical plates receive RF from the transmitter output circuit. One way of arranging this is shown in Fig. 2. The loop can be near the transmitter PA tank coil, or near the aerial tuner coil. Coupling to the loop, or the vertical sensitivity of the 'scope, is adjusted so that the unmodulated signal

occupies a suitable height on the 'scope, such as A-B, Fig. 3A. This is the carrier amplitude with no modulation.

With correct modulation by a sine wave identical increases and dips are present, as in Fig. 3B. When the increases are twice the original carrier height, and the dips reach the zero line, modulation is 100%, Fig. 4A. With voice modulation, a rapidly changing pattern arises, but breaks in the carrier due to overmodulation can be seen, Fig. 4B.

The 'scope is displaying the instantaneous envelope

of the modulated carrier, and allowing it to be compared with the unmodulated carrier.

Breaks in the carrier at the zero line shown could be present, due to overmodulation, while the upward peaks are not reaching twice the unmodulated carrier height, and this effect is due to wrong adjustment or design of the transmitter.

PART II

Q.3 (a) Describe the principle of operation of a semi-conductor device suitable for use as an amplifier at audio or high frequencies.

(b) Sketch typical characteristic curves for a transistor operating in the common emitter mode and describe, with the aid of a circuit diagram, how these curves can be plotted.
(10 marks)

Answer (3)

(a) Fig. 5 represents a p.n.p. germanium junction transistor. In the p.n.p. transistor the emitter is P type, the base N type, and the collector P type material. The P type material has a predominance of positive "holes" or positive carriers. The N type material has a majority of negative electrons as carriers.

These negative electrons and positive holes can move and are the current carriers of the device. Should a negative electron fill a positive hole the charges neutralise each other as they are equal.

With the p.n.p. transistor, the collector is connected to a negative voltage. The base normally receives a small negative bias with respect to the emitter.

When the base is quite negative relative to the emitter, there are numerous free positive holes at the emitter to move across to the base, as with a junction diode receiving forward bias. The positive hole charges go to the negatively charged collector, and a large current passes through the transistor.

When the base has little negative charge, only a few hole charges go to the base and collector. So collector current is small. In this way base bias controls collector current.

The emitter current is the base and collector currents added together, but most of the emitter current is to the collector.

(b) The graph in Fig. 6 shows the relationship between base and collector currents. Base current is in micro-amperes and collector current in milliamperes. In the circuit, M1 shows base current and M2 shows collector current. VR allows base bias and thus base current to be adjusted (taking care to keep within the ratings of the device). The graph shows how collector current rises with base current, e.g. collector current is $7\frac{1}{2}$ mA with $50 \mu\text{A}$ base current, but has risen to over 15 mA with $100 \mu\text{A}$ base current. In these tests the collector voltage will remain substantially unchanged.

The graph in Fig. 7 shows the relationship between collector current and collector voltage, with the base current being held at $100 \mu\text{A}$. M1 allows reading of base current, adjusted by VR1. M2 shows the collector current. M3 shows collector voltage, adjusted by VR2.

Except for very low voltages, the collector current

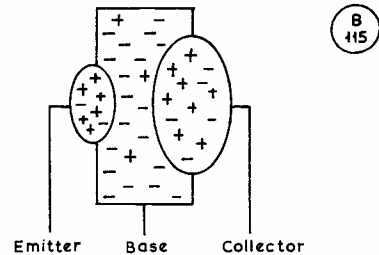


Fig. 5

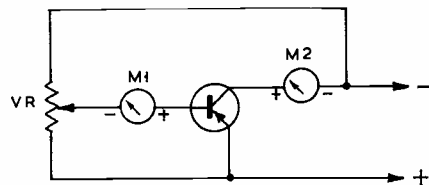
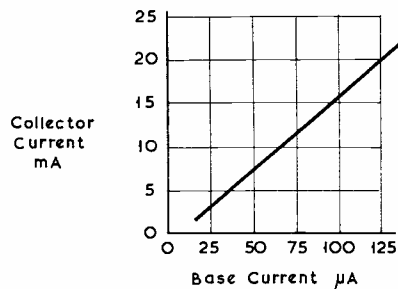


Fig. 6

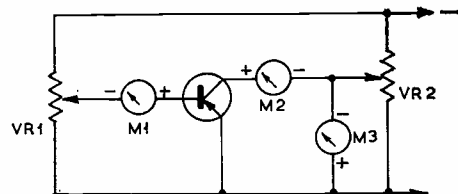
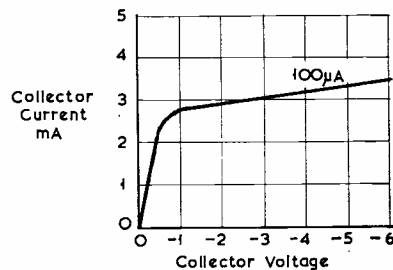


Fig 7

TO ANSWER Q.3

B
415

does not change much for substantial changes in collector voltage. So the transistor has a high output resistance. If graphs are drawn for other values of base current, these resemble the shape of Fig. 7.

Q.4. (a) Describe the charge and discharge of the capacitor in the circuit (Fig. 8) when the switch is first moved to contact A for long enough for the capacitor to become charged and is then moved to contact B.

(b) What factors determine
(i) the capacitance of a capacitor,
(ii) the maximum voltage to which it can be charged?
(10 marks)

Answer (4)

(a) When the switch is moved to A current flows to the capacitor through resistor R and the meter. The flow of current is limited by the value of R. Initially, the flow of current would be large, and the current flow falls as the voltage across the capacitor rises more nearly to that of the battery. The way in which the capacitor charges is shown in Fig. 9. Eventually the flow of current to the capacitor becomes negligible, and the voltage across its terminals is effectively that of the battery.

When the switch is moved to B the capacitor is discharged through R and the meter. At the moment contact is made, the discharge is rapid, but current grows less as the capacitor charge falls. Current is limited by the value of R in a similar manner to when charging. Eventually, current falls to a very low level and the capacitor is discharged. Fig. 9 shows the way in which the capacitor discharges.

(b) (i) The capacitance of a capacitor is determined by the area of overlap of the plates, by the number of plates or overlaps, by the distance between the plates, and by the dielectric constant of the material between the plates. The dielectric constant of the material between the plates, which is the insulator or dielectric in an air-spaced capacitor, is 1. Other insulators, such as paper, mica, and ceramic materials which are commonly used as dielectric have much larger values than 1, so a larger capacitance is obtained than if air were the dielectric.

The capacitance of a capacitor can be calculated from the following, where K is the dielectric constant of the air or material between the plates, A is the area of one plate (or the area of the part of the plate which overlaps the other plate) in square centimetres, and D is the distance between the plates in centimetres. The value is in pF.

$$0.0885 \frac{K A}{D}$$

D

(ii) In the circuit, the maximum voltage to which the capacitor can be charged is that of the battery.

When capacitors, the maximum voltage to which they can be charged is the voltage at which they will break down or flash over. This depends on the distance between the plates, and the kind of dielectric between the plates. With a given dielectric (as example, air) increasing the insulator thickness or distance between the plates increases the maximum voltage to which the capacitor could be charged before breaking down.

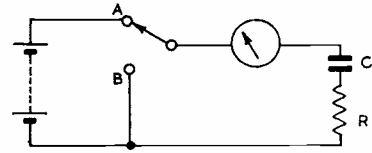


Fig.8 (As given in Question Paper).

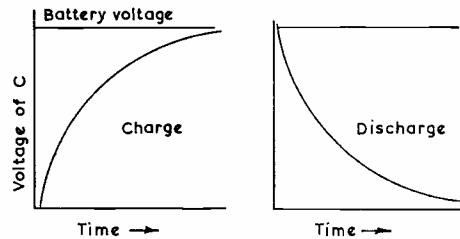


Fig.9



TO ANSWER Q4

Q.5 The tuned anode circuit or tank circuit of a transmitter power amplifier consists of a capacitor of 100 pF connected in parallel with an inductor of 100 μH. The RF resistance of the circuit is 20 ohms.

(a) To what frequency is the circuit tuned and what is the dynamic resistance of the circuit?
(b) What causes the "dip" in anode current as the circuit is tuned to resonance? (10 marks)

Answer (5)

(a) Resonant frequency = $\frac{1}{2\pi\sqrt{LC}}$ for values in Hertz, Henrys and Farads.

Or $\frac{10^6}{2\pi\sqrt{LC}}$ for values in kHz, μH and pF.

$$\frac{10^6}{2 \times 3.14\sqrt{100 \times 100}} = \frac{1,000,000}{6.28\sqrt{100 \times 100}} = \frac{1,000,000}{6.28 \times 100} = \frac{1,000,000}{628} = 1592 \text{ kHz}$$

Ans. 1592 kHz

Dynamic resistance at resonance can be expected to be very high.

Dynamic resistance = $\frac{L}{CR}$ for values in Henrys, Farads and Ohms.

$$100\mu\text{H} = 100 \times 10^{-6} \text{ H.}$$

$$100\text{pF} = 100 \times 10^{-12} \text{ F.}$$

$$\frac{100 \times 10^{-6}}{100 \times 10^{-12} \times 20} = \frac{100}{100 \times 10^{-6} \times 20} = \frac{1}{10^{-5} \times 2}$$

$$= \frac{1}{2 \times 10^{-5}} = \frac{10^5}{2}$$

Ans. 50,000 ohms

Alternatively:

(Note: Only one method of working is of course required.)

$$100\mu\text{H} = 0.0001 \text{ H.}$$

$$100\text{pF} = 0.000,000,000,1 \text{ F.}$$

$$\frac{0.0001}{0.000,000,000,1 \times 20} = \frac{1}{0.000,001 \times 20} = \frac{1}{0.0002}$$

$$= \frac{1}{2 \times 10^{-4}} = \frac{10^4}{2}$$

Ans. 50,000 ohms.

Alternatively:

$$100\mu\text{H} = \frac{1}{10,000} \text{ H.}$$

$$100\text{pF} = \frac{1}{10,000,000,000} \text{ F.}$$

$$\frac{1}{10,000,000,000} \times 20 = \frac{20}{10,000,000,000}$$

$$\frac{1}{10,000} \div \frac{20}{10,000,000,000} = \frac{10,000 \times 10,000,000,000}{10,000 \times 20}$$

$$= \frac{10,000,000,000}{200,000} = \frac{10,000,000,000}{2 \times 10^5} = \frac{10,000,000,000}{2} \times 10^{-5}$$

$$= 50,000,000,000 \times 10^{-5} = 50,000$$

Ans. 50,000 ohms.

(b) At resonance, the dynamic resistance of the parallel tuned tank is at maximum, and current drawn from the circuit supplying it is a minimum. RF supplied to the tank is derived from the amplifier anode circuit, and thus from the anode HT supply. So HT current dips on the tank being tuned to resonance.

Q.6. (a) What is the function of the detector state in a radio receiver?

(b) Describe, with the aid of waveform diagrams, the operation of a detector when receiving

(i) amplitude modulated telephone (AM)

(ii) continuous wave telegraphy (CW)

Why is a heterodyne oscillation necessary in the latter case? (10 marks)

Answer (6)

(a) The detector stage is used to recover the modulation which was given by the transmitter. It is also called a demodulator for this reason.

(b) (i) Fig. 10 shows the operation of a diode detector when receiving AM. A is the modulated carrier. Rectification by the diode leaves here only the positive part of the modulated carrier, B. A reservoir capacitance

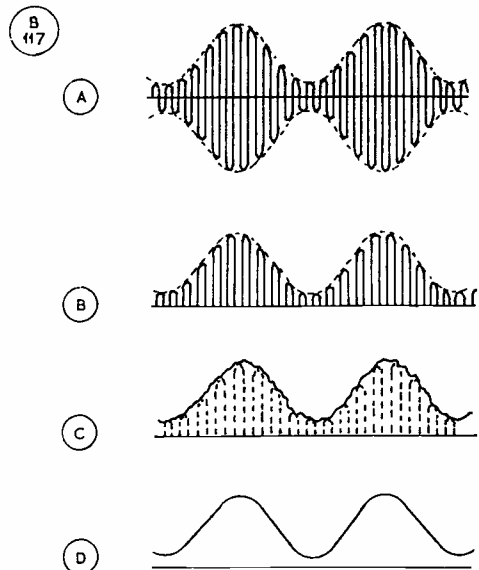


Fig. 10

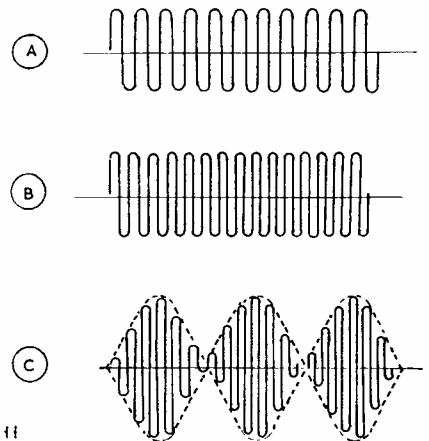


Fig. 11

TO ANSWER Q.6.

smooths out the waveform to resemble C. Further smoothing results in the original AF modulating waveform, D.

(ii) In Fig. 11, A is the received CW signal, in itself inaudible. B is the output of the heterodyne oscillator, of different frequency. The combination of these two waves of slightly different frequency results in a wave envelope like that at C. The pulsation in amplitude of this is at a frequency corresponding to the difference in the frequencies at A and B. The shape of C depends on the relative amplitudes of carrier and heterodyne.

Assuming A is 470 kHz from the intermediate frequency amplifier of the receiver, and B is 471 kHz from the heterodyne oscillator, these produce a difference

tone of 1 kHz, or 1000 cycles (Hz). The heterodyne could equally well be at 469 kHz to produce a tone of 1 kHz, or at some other frequency to generate a heterodyne of a different frequency. An envelope or other detector follows to provide an audio frequency signal to pass to an AF amplifier.

Q.7. (a) Explain what is meant by "Class-C" operation of an amplifier valve.

(b) Draw the circuit diagram of a valve amplifier, operating at radio frequencies in the Class-C condition, including

(i) meters to check the RF drive to the stage, the anode current and the HT voltage, and

(ii) details of the various power supplies. (10 marks)

Answer (7)

(a) Class-C operation means that the operating angle is less than 180 degrees. If it were 180°, the amplifier would be operating for one half of the wave, being cut off by the high bias present for the other half of the wave. A Class-C amplifier often has an operating angle of 120-160°. This may typically require high anode voltage, high bias (beyond cut-off, as mentioned) and

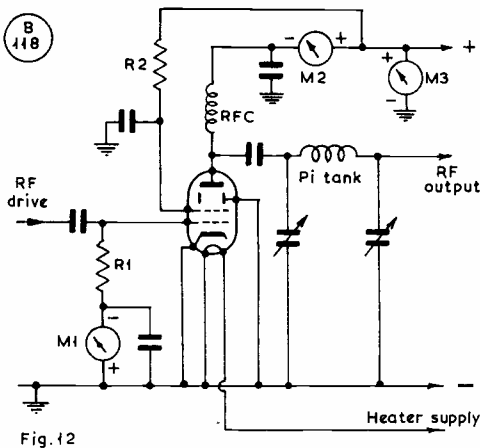


Fig. 12

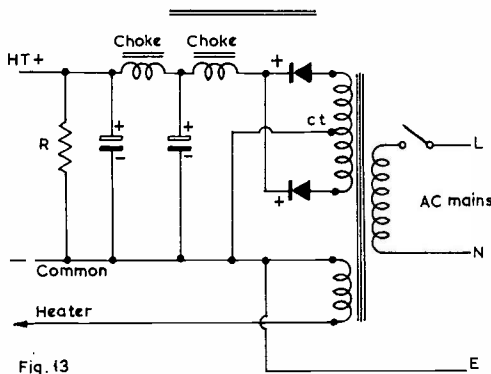


Fig. 13

TO ANSWER Q.7.

appreciable grid driving power.

(b) (i) In Fig. 12, meter M1 shows RF drive because grid rectification produced DC grid current through the grid resistor R1. Here, the voltage developed across this resistor is the grid bias of the amplifier. Drive is adjusted to obtain the correct grid current, which with a suitably designed amplifier corresponds to correct bias and RF drive conditions. M2 shows anode current. M3 across the supply shows the HF voltage for the amplifier.

(ii) *Heater Current:* This would generally be from the low-voltage secondary of a mains transformer. This component would probably have additional windings for other supplies. (The heater may receive AC or DC. The latter would be so if circumstances require a battery supply here).

Grid Bias: In the circuit, the required negative bias is obtained by grid rectification, as already mentioned. The actual bias voltage will depend on the value of the grid resistor R1 and the current flowing through it: $V = I \times R$.

Screen Grid Voltage: This is derived from the HT through the series resistor R2, which is of such a value as to give a suitable SG voltage at normal screen-grid current.

HT Supply: This must be smooth DC and can be derived from a mains transformer with HT winding. Fig. 13 shows a typical supply having choke input, full-wave rectification, and adequate smoothing. The bleeder resistor R helps stabilise the voltage if there are changes in the current drawn.

Q.8. (a) Draw polar diagrams of the following aerials in the horizontal plane:

- (i) a horizontal half wave dipole,
- (ii) a vertical half wave dipole,
- (iii) a dipole, reflector and director array of the type commonly used on high or very high frequencies.

(b) Briefly describe how the directional effects are achieved on one of the above aerials. (10 marks)

Answer (8)

(a) Fig. 14 shows polar diagrams in the horizontal plane.

(i) The horizontal dipole has some directivity with best radiation at right angles to its length,

(ii) The vertical dipole gives similar results to all points of the compass so can be called non-directional,

(iii) The array gives best results in the forward direction. An actual aerial of this type would be expected to be less perfect than shown, having small backward and side lobes.

(b) The horizontal half-wave dipole. At the distance, and at right angles to the aerial, radiation from all parts of the aerial intensify each other, because their phase on arrival at the far point tends to be the same. As the angle is changed, this becomes less and less so, until in line with the aerial signal strength at a distance is minimum. On this bearing, the phase of radiation from the various portions of the aerial, as received at the far point, is such as to cause cancelling out and loss of signal strength.

(Note: The question calls for one brief explanation of directivity, but (ii) and (iii) are included here for completeness.)

The vertical half-wave dipole: Since this is vertical it presents the same aspect when seen from any point of the compass, and so its radiation, or reception, characteristics are the same at all bearings. It gives no gain in any direction.

The beam array: With the array, radiation from the parasitic elements (the reflector and director) are in such a phase that they add to the radiation in the forward, or wanted, direction. This effect depends on the director and reflector having suitable lengths, and on their spacing from the driven or dipole element. The parasitic elements are excited by the power of the driven dipole. With the usual closely-spaced elements, the parasitic elements tuned to a lower frequency (e.g., that is longer) acts as reflector by reducing field strength this way and intensifying it the other way. The parasitic element tuned to a higher frequency (shorter) helps concentrate the field its way, or direct it that way, so is called a director.

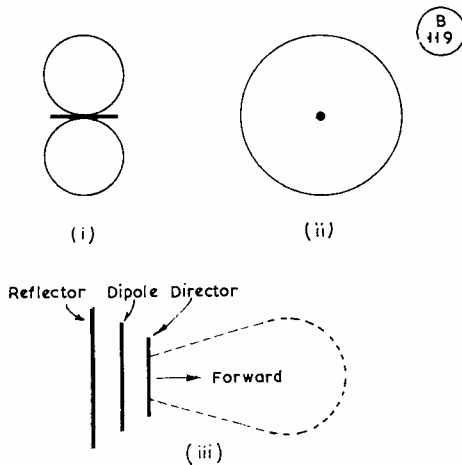


Fig. 14

TO ANSWER Q.8

Q.9. The HF propagation predictions for September 1971 forecast that for communication between the United Kingdom and South Africa the 14 MHz band would prove most usable by night and the 21 MHz band by day. Explain why this is so. (10 marks)

Answer (9)

High frequency waves can be reflected and refracted by ionospheric conditions. If this were not so sky waves would pass out into space. Waves are also reflected by the earth's surface. The signal may be received after being reflected from an ionised layer, or after being reflected more than once by such a layer and the earth. Long distance HF communication is by such means.

The ionisation of these layers depends on sunlight and other factors and varies with the time of day, season

and sunspot cycle.

The D-layer at about 30-50 miles is ionised by sunlight and ionisation disappears at darkness. This layer has no great effect on waves of 14 MHz and higher frequency.

The E-layer is at about 65-75 miles. Ionisation of it is high at noon, falling as sunlight is reduced, and is minimum at around midnight.

The F-layer is at about 150-250 miles up and can divide into F1 and F2 layers. Ionisation is maximum when the sun is high in the sky, falls slowly but remains to a substantial extent through the night, being lowest before sunrise, and increasing quite rapidly thereafter.

Waves are bent or reflected most when ionisation is greatest. Bending will be decreased as frequency is increased, until the maximum usable frequency is reached. Higher-frequency waves will not be reflected. Best long-distance signals will be those which leave the transmitting aerial at a low angle to earth and are just sufficiently bent or reflected to return to earth at a considerable distance.

Absorption or loss of signal is less as frequency is raised. There will thus be a band of best usable frequencies for given conditions. Frequencies higher than this will be insufficiently bent and will pass into space; lower frequencies will suffer too much absorption.

In the forecast, 14 MHz signals will be favourably reflected by the high layer described by night. During daylight, the changed conditions described will favour 21 MHz signals.

Q.10. (a) (i) Explain why ammeters and voltmeters designed for use on direct current cannot be used for measuring alternating current,

(ii) Explain why meters for use on AC power supplies at 50 Hz cannot be used with any accuracy at audio and radio frequencies.

(b) With a circuit diagram show how a DC meter can be adapted for AC measurements,

(c) State one type of meter than can be used at radio frequencies. (10 marks)

Answer (10)

(a) (i) DC ammeters and voltmeters often use a moving coil which is situated in the field of a permanent magnet. Current reaches the coil through hairsprings and its partial rotation moves an attached pointer over a scale. Movement is caused by interaction between the permanent magnet field of steady polarity and that produced by current in the coil, therefore a flow of current in one direction is required in the coil and it cannot work from AC.

(ii) Where the meter is a moving-coil type with a rectifier, the rectifier is generally quite unsuitable for high frequencies, and particularly radio frequencies, though adequate for 50 Hz. Where an AC meter is of other type, such as moving-iron, the character of the coil and magnetic parts make these increasingly unsuitable as the frequency is raised.

(b) A moving coil meter is commonly used for AC measurements by adding a rectifier. Fig. 15 is one circuit. A resistor R would give a wanted AC voltage range.

(c) A thermocouple or thermo-ammeter can be used

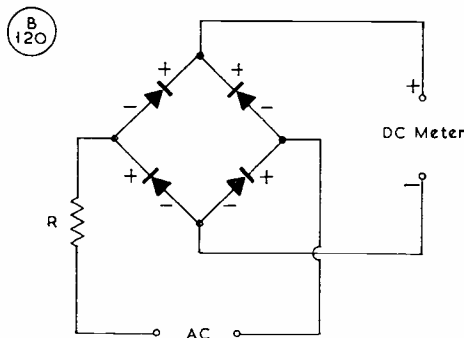


Fig. 15

TO ANSWER Q.10

at RF. The thermocouple has a small element which is heated by the RF current passing through it. Heat is transferred to a junction of dissimilar metals, or thermocouple. This heating causes a small direct current to be produced in the thermocouple, which is connected to a moving coil instrument. The latter can thus be calibrated in terms of RF current.

Notes for Candidates (Useful Reading List)

For those concerned, copies of the R.A.E. Questions Papers for the years 1970-'71-'72 are available as one set, with the syllabus for Subject 765, at 25p post free, from the Sales Section, City & Guilds of London Institute, 76 Portland Place, London, W1N 4AA, quoting "Subject No. 765." Also obtainable, free of charge, is the Post Office pamphlet *How to Become a Radio Amateur*, covering the conditions for the issue of a U.K. amateur licence; you can get it from the Ministry of Posts & Telecommunications, Radio Regulatory Division, Amateur Licensing Dept., Waterloo Bridge House, Waterloo Road, London, SE1 8UA.

Following is a suggested list of books, obtainable from us, and suitable for R.A.E. study and reading: *Amateur Radio* (£1.60); *Guide to Amateur Radio* (50p); *Radio Amateur Examination Manual* (89p); *Amateur Radio Techniques* (£1.80); *ARRL Antenna Handbook* (£1.40) and for a standard text on the principles and practice of Amateur Radio generally, the *Radio Communication Handbook* (£4.10).

This list constitutes a library covering the immediate reading requirements of anyone aspiring to an amateur transmitting licence and also embraces the practical work involved in getting a modern AT-station on the air, with a lot of useful reference data to keep any licensed amateur interested and occupied for a long time to come. All titles are latest editions of books of proven worth. Prices quoted

are post free, from stock for immediate delivery (normally by return) and orders with remittance should be sent to: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H-0HF.

SPECIALLY ON THE AIR

This heading covers those amateur-station activities involving a public appearance or demonstration of Amateur Radio, for which the Ministry will issue a special "for duration only" callsign, with a named licensed amateur as being responsible for the operation of the station. Such special-activity stations as are notified to us will be publicised in this space.

GB3STF, May 12-13: From the Grammar School, Priory Road, Spalding, Lincs., by the Spalding & District Amateur Radio Society, running CW/SSB on all bands 10-160m. (and AM on two metres), all contacts to be confirmed by special QSL card—Details from R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs.

GB2BWS, May 30-June 2: For the Bath & West Show, from the Shepton Mallet, Somerset, showground. Loan of equipment and operating assistance are solicited, conferring free admission for car and/or caravan. Anyone who can help is asked to get in touch with R. B. Holman, G2DYM, The Old Saw Mills, White Ball, Wellington, Somerset.

GB2GB, August: Station to be operated from Brunel's old steamship *Great Britain*, now dry-docked at Bristol, for the City's charter anniversary celebrations. GB2GB will be available for operation by visiting licensed amateurs during the entire month. Contacts will be QSL'd by special card. Information from G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol.

MOBILE RALLY DATES FIXED

We have been given dates in respect of the following fixtures:

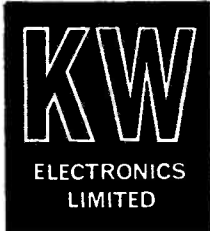
April 1st: White Rose Rally, Leeds.

May 6: Tulip-Time Rally, Spalding, Lincs.

May 13: South Leicestershire Mobile Rally, Hinckley, Leics.

August 26: Town & Country Festival Rally, National Agricultural Centre, Kenilworth, Warwickshire.

Further details will be published as received and we shall be starting the regular "Mobile Scene" feature with the April issue of *SHORT WAVE MAGAZINE*. Rally organisers are asked to let us have what they want published as soon as practicable, with the name, callsign and QTH of the responsible contact-man for the event. Address to "Mobile Scene", *SHORT WAVE MAGAZINE*, BUCKINGHAM, closing dates for the next few months being February 6, March 13, April 10, May 8 and June 12, for "Mobile Scene" material.



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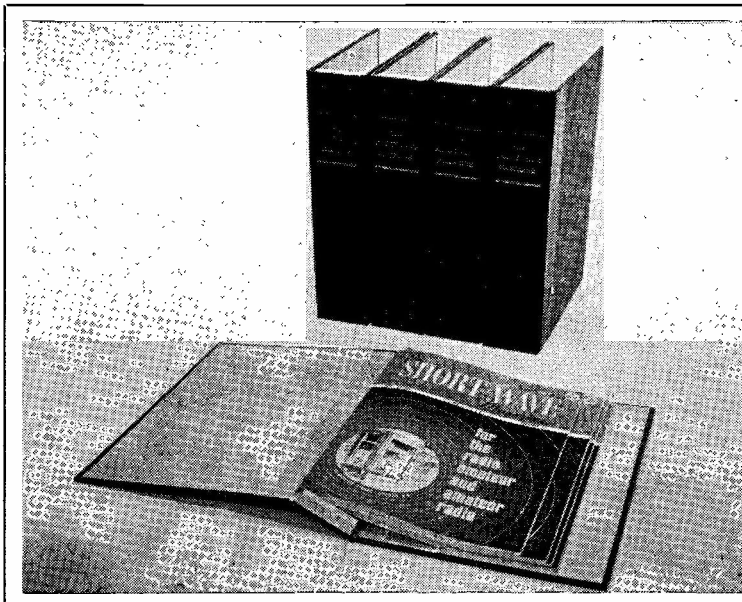
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WANTED: R.C.A. AR-8516L in mint condition. **SELLING: AR88D**, reconditioned.—Chisholm, 141 Stanmore Road, Glasgow S.2.

SELLING: Tech 15 GDO, £9; Sanwa UD-50 multi-meter, £5. Both little used and in original packing with instructions.—Wilkinson, 104 Falkland Road, Greatfield Estate, Hull, Yorks. (Tel: 0482 791168).

FOR SALE: Eddystone EC-10 Mk. I receiver, hardly used, £25.—Ring Fiske, Romford 62697 after 6 p.m.

SHACK CLEARANCE: Pair 9 MHz xtal filters with one pair carrier xtals, £10; pair 6146B's, £2; pair new 813's with bases, £4; Japanese 3½in. by 3in. meters, each at £1: 500 mA, 2-off 100 mA, 50 mA. S-meter; 2000v./500 mA PSU components for 813 linear, silicon rectifiers, The Lot £10; 3-BPI scope tube with PSU and case, £1.—Hamer, 7 Arundel Road, Cheylesmore, Coventry. (Tel: Coventry 86650 office hours).

WANTED: Two-metre T.W. Communicator—Mannion, G3XFO, 23 Marston Road, Thornhill, Southampton. (Tel: 04218 3851).

WANTED: Racal RA-17 or R.C.A. AR8516, must be in mint condition; state history and price required, please. All letters answered.—115 Haynes Road, Emerson Park, Hornchurch (43676), Essex. RM11 2HX.

WANTED: Radio transmitter, output approx. 75-100 watts, AM/CW, 240v. mains input, with VFO and/or xtal, coverage approx. 1.56 to 8.50 MHz, similar to Marconi "Oceanspan." For use at licensed SCC W/T station.—W/T Officer, Unit 73, SCC, 189 Moston Lane East., Manchester, M10 0QJ. (Tel: 061-681 3415).

FOR SALE: Trio TX-599 transmitter, £150; JR-599 receiver, £150. The Pair with matching cables. £300 or near offer. Yaesu FR-DX400 super de luxe receiver, £145. All in new condition.—Montgomery, 23 Larkham Lane, Plympton, Plymouth. (Tel: 0752 37003).

SELLING: Courier Tx/Rx, FM, working on 145.8 MHz, £18; R.209 Rx with spares, £10; Compact 160m. Tx, 8 watts, £6; BRT-156 FM Tx/Rx with control box and mic., bargain £3; also 3.3 MHz xtal for 160m. convertor, 50p; 19 Set and VHF control box, with mic. etc., £7. Would exchange any of this for two-metre gear.—Ring Wearing, GM9GIQ. Tel: 041-884 4932.

SALE: Pye PTC-704 2m. base Tx, good working order, £18. Buyer collects.—Ring Graves, G4BPM. Mundford 265 (Norfolk).

WANTED: Collins 490 T/1 antenna tuning unit, or 618 series aircraft transceiver, 115v./400 Hz. All letters answered.—Reekie, G3GSN, The Skerries, Bury Ring, Stafford.

SELLING Receivers: Eddystone 770R VHF; Eddystone EA-12; Racal RA-17; R.1155; also AN/URT-33, £8.50. Converter, 36-100 MHz; TS-382 audio oscillator, £25. Silicon rectifiers 1250v./1½A, 10p each; s.a.e. please.—Wright, 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

SELLING: FT-75 with DC/PSU, £100.—Elsworthy, 2A Steele House, High Street, Dovercourt, Essex.

WANTED: Hallcrafters S.36A or similar receiver, coverage 28 to 140 MHz, AM/CW/FM. Must be in good condition.—Ring Adam, 021-706 1667 (Solihull).

SALE: Lafayette HA-350 amateur band receiver, coverage 10-80 metres, with matching speaker and built-in 100 kHz crystal calibrator, in excellent condition, £40.—Smith, G3ZQC, 161 Sandy Lane, Fair Oak, Eastleigh, Hants. S05 7GF, or ring Wyvern 367.

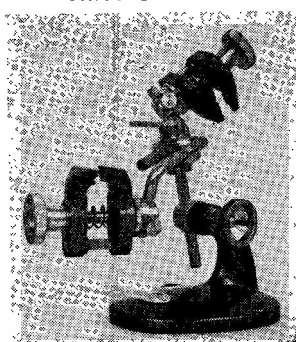
FOR SALE: Maker's manuals for AR88, BRT-400, CR-100/8, at £1.20. BS coilpack for National HRO, 7-14 MHz, £2. **WANTED:** Heathkit DX-100. (Bucks.)—Box No. 5125, Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H 0HF.

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WANTED: G.E.C. radio receiver Type R.C. 411/R, for Cash or Part-Exchange my R.C. 410/R.—Fletcher, 62 Moorbridge Lane, Stapleford, Nottingham, NG9 8GU.

SALE: Gonsett G.76 Transceiver, coverage 6m. to 80m. amateur bands, Tx runs 100 watts, Rx has noise limiter, crystal calibrator, resettable dial, size 12 x 5 x 10in., with mobile and mains PSU's, price £35 or near offer.—Giddings, G3XLB, QTHR or ring 051-36 71968.

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SALE: Eddystone Model 680X communications receiver, in grey colour, with mounting blocks and original matching speaker and manual, £80 or near offer. Ring 01-590 9366 (evenings) or write—Box No. 5124, Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H-0HF.

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SELLING: Eddystone 770R receiver, at £125 or near. Also Mullard LI01 double-beam oscilloscope, £25.—Ring Scholey, 021-744 8106 (South Birmingham).

SALE: Tape recorder, little used, two-track three-speed, three motor deck, mixing facilities, £10. Would EXCHANGE for two-metre gear, or W-H-Y?—Stampton, 88 Wilberforce Way, Gravesend (63284), Kent.

FOR SALE: Heathkit Mohican receiver, GC-1U, good condition and performance, £15.—Wenman, 32 Cecil Road, Gravesend, Kent.

SELLING: Cossor CC.701 12.5 kHz spacing six-channel mobile Tx/Rx, all transistor, 5w. AM output on 172 MHz, good condition, with full service manual, £48 o.v.n.o. or possible Part-Exchange for good R.1475 Rx, AR88D, Lafayette HE-80 or Trio 9R-59DS. Selling Unica UR-1A transistor receiver, coverage 550 kHz to 30 MHz, £16 or very near offer. Buyers collect.—Blackmur, G8FHN, QTHR or ring Medway 63365.

FOR SALE: Barlow-Wadley XCR-30, Mk. II, £85.—Ring Cannon, G8DFU, 01-703 9351 (London).

SELLING: Frontier Electronics FE-1200 transceiver, coverage 80-10m., 180 watts p.e.p., 2/6146B's in PA, internal PSU, very good condition, £120; KW-103 SWR and p.e.p. meter, £10; 14-AVQ vertical trap, £12.50 or The Lot for £135. Transistor 2m. Tx, with 3 xtals, mains/12v. supply, p.t.t. mic., aerial relay, 1 watt output, £20; 2m. FET converter, IF 16-18 MHz, £7.50. **WANTED:** A/TV gear, particularly Plumbicon(s) with scan coils, and monitors.—Taylor, G3YJM, QTHR. (Tel: Preston 36279, evenings).

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SALE: Hamgear PM11A preselector, as new, £5 (to caller).—Shamer, 26 Old Barrack Yard, Knightsbridge, London, SW1X 7ND.

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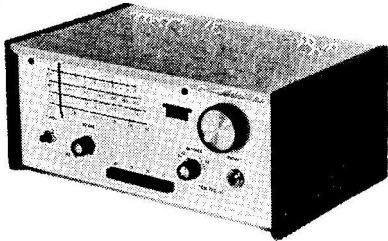
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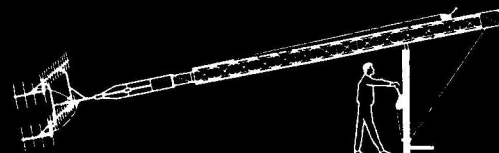
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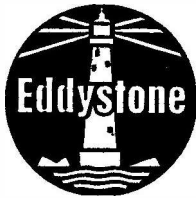
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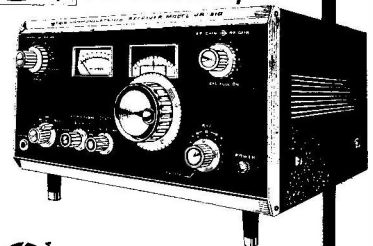


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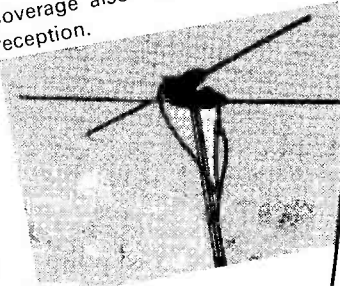
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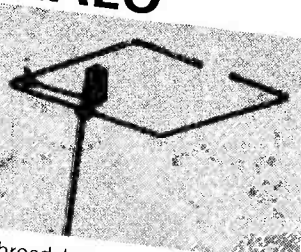
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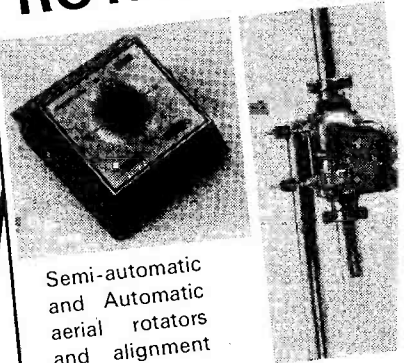
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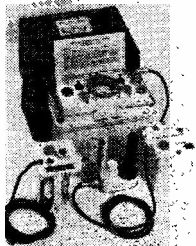
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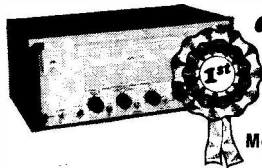
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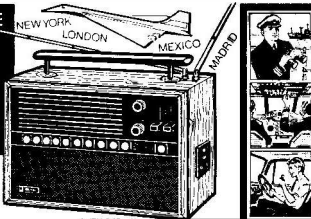
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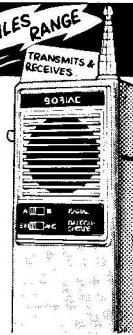
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