

The SHORT WAVE Magazine

VOL. XXV

FEBRUARY, 1968

NUMBER 12

NO PRICE INCREASE ON ANY KW EQUIPMENT



KW 201 Amateur Bands
Communications Receiver

The KW201 is now being manufactured with 2 detectors (i) product detector for SSB and CW (ii) diode detector for AM. The KW201 has been specifically designed for optimum performance on SSB. 11 ranges give coverage 1.8 mc/s. to 30 mc/s. A mechanical filter gives an IF selectivity of 3.1 kc/s. at 6 dB, and 6 kc/s. at 60 dB. A "Q" multiplier is available giving a variable range of 3.1 kc/s. to 200 cycles selectivity.

£105

BASIC PRICE

additional extras if required

100 kc/s Crystal Calibrator £6.00
'Q' Multiplier £8.10.00



KW Vespa MkII

TRANSMITTER

£128

Transmitter for all H.F. Bands. 220 watts PEP, SSB, AM, CW. Now in full production, complete with psu.

We also stock imported equipment. Exclusive U.K. agents for DAVCO, Hammarlund, Hy-gain, Drake, CDR and Kokusai.

Agents for Collins, Sommerkamp, Swan, Mosley, National, Galaxy, etc. Microphones, coaxial cable and all your amateur radio equipment.



KW1000

LINEAR AMPLIFIER

£128

1200 watts PEP complete with built-in psu and SWR indicator.



KW2000A

Deliveries from stock.

inclusive £220

SSB TRANSCEIVER or £182 (transceiver only)

The finest value available, with no extras to buy. 180 watt PEP operation on all amateur bands 10-160 metres, complete with AC psu, VOX control, crystal calibrator, Independent receiver tuning, Upper/lower sideband tuning, Top band included, Automatic linearity control or transmit. Special attention to TVI proofing.

KW
ELECTRONICS
LIMITED

KW ELECTRONICS LTD.

I HEATH STREET, DARTFORD, KENT. Telephone: Dartford 25574
Cables: KAYDUBLEW Dartford.

Write for our list of KW Tested, "Trade-in," equipment

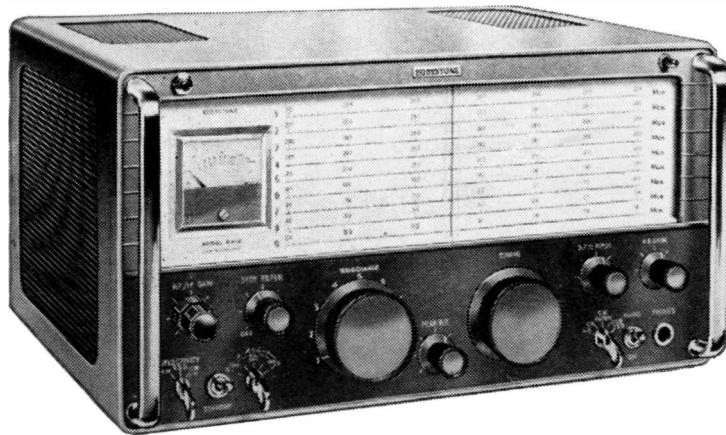
KW
ELECTRONICS
LIMITED



Eddystone

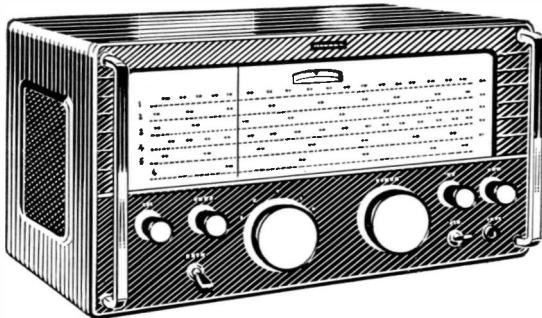
Amateur communications receivers

EA12



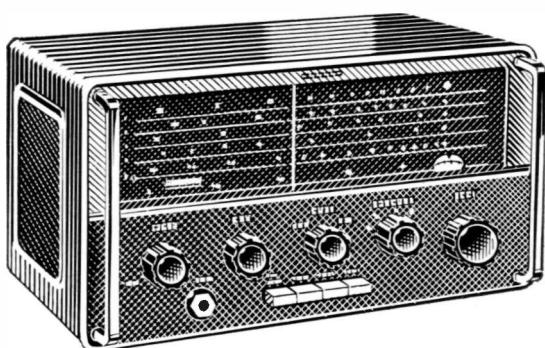
An amateur bands double-conversion superheterodyne receiver, for a.m., c.w., and s.s.b. reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

Primary features. Crystal-controlled 1st oscillator, 2nd oscillator with continuously variable selectivity to 50 Hz, muting switched or by external relay, twin noise limiters, for a.m./c.w., and s.s.b., short-term drift better than 20 Hz and less than 100 Hz in any one hour, 'S' meter calibrated in nine levels of 6 dB and dB levels beyond 'S9', two a.g.c. time constants, deep slot filter, independent r.f., i.f., and audio gain controls with outputs for f.s.k and panoramic adaptor. £185.



840C A.C. or D.C. communications receiver

An 8-valve receiver with gap-free coverage from 500 kHz to 30 MHz metres providing excellent reception of broadcast programmes and all major s.w. channels including marine and international distress frequencies. The famous Eddystone extended band spread and logging scale is an essential feature. Suitable for a wide range of a.c. and d.c. voltages. Fully tropicalized. £66.



EC10 communications receiver

The fully transistorized EC10 communications receiver, supreme in its class, covers both medium-wave broadcasting and all shortwave service to 30 MHz. Incorporating the famous Eddystone tuning drive, with logging scale and auxiliary vernier, shortwave reception is particularly simple. Battery operated or from optional a.c. mains unit. £53.

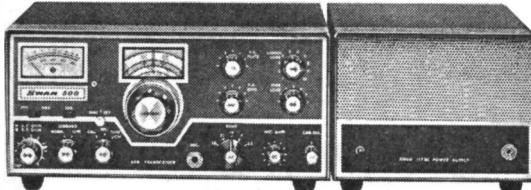
**Comprehensive information from your Eddystone distributor or: Eddystone Radio Limited,
Eddystone Works, Alvechurch Road, Birmingham 31. Telephone: Priory 2231. Telex: 33708**

THE MOST RELIABLE SERIES OF TRANSCEIVERS EVER OFFERED

SWAN

ASK THE AMATEUR WHO OWNS ONE

Transmitter power : 480 watts SSB PEP input, 360 watts CW input, 125 watts AM input • Two 6HFS P.A. tubes • Frequency range : 3.6-4.0 mc, 7.0-7.5 mc, 13.85-14.35 mc, 21.0-21.5 mc, 28.0-29.7 mc • Extended frequency coverage provides for operation with external crystal oscillator • High frequency crystal lattice filter common to transmit and receive circuits : 2.7 kc bandwidth • Overall audio bandpass essentially flat from 300 to 3000 cycles • Sideband suppression : 50 dB • Carrier suppression 60 dB • Third order distortion : 30 dB • Selectable upper and lower sideband • Output circuit : wide range Pi coupler, coarse and fine adjustment • Transmitter ALC with audio compression • Grid block CW keying, offset frequency •



5 BANDS — 480 WATTS HOME STATION — PORTABLE — MOBILE

LATEST BROCHURES ON REQUEST SEE THEM AT YOUR

Appointed Stockists

Main Agent — PETER SEYMOUR LTD.
410, Beverley Road, Hull.

LONDON and the S.E. RADIO SHACK
182, Broadhurst Gardens, London, N.W.6.

Midland Area GEORGE FRANCIS
93 Baldertongate, Newark.

S.W. Area SWANCO PRODUCTS
247 Humber Avenue, Coventry.

Scotland L. HARDIE
542 George Street, Aberdeen.

Transistorised VFO, Temperature and voltage stabilized • Precision dual-ratio tuning • Receiver sensitivity better than 5 μ V for 10 dB signal-plus-noise to noise ratio • Amplified AGC system. S-meter functions automatically when receiving • Automatic noise limiter • 100 kc crystal calibrator • External VFO available for separate frequency control • Factory installed accessory socket for addition of model 410 external VFO • Panel controls : receiver A.F. gain, receiver R.F. gain, function switch, ANL switch, PTT-VOX selector, mic, jack, band selector, mic. gain, carrier balance, P.A. plate, P.A. grid, P.A. load, coarse and fine Dial set • 5½in. high, 13in. wide, 11in. deep, 15 lbs. weight. £283 complete with power unit.

Due to devaluation we have had the somewhat unpleasant task of having to increase the prices of our American Swan equipment, but by bearing a considerable amount of the increase ourselves the average rise will be in the region of 6 per cent. The new price of the 350 with Power Unit is £265, and the latest model 500 with Power Unit, £299.

ALL ITEMS IN STOCK AT THE TIME OF GOING TO PRESS

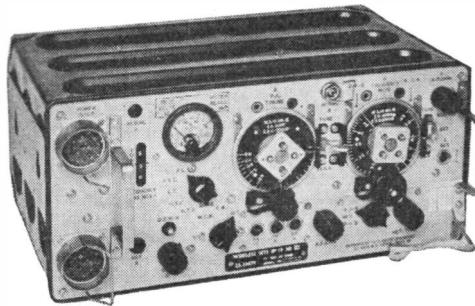
	£ s. d.		£ s. d.
HALLCRAFTERS SXIII. Full coverage, all bands 80-10 Mtrs., selectable side bands, 100 kc/s. Calibrator variable selectivity with "T" notch, filter, etc. Outstanding condition	85 0 0	DENTSU. Fully automatic all transistor electronic keyer, mains or battery input, 2-60 w.p.m.	16 10 0
MARCONI "ATALANTA" high grade marine receiver, ten bands covering 15 kc/s.-28 mc/s. without gaps, dual conversion, separate calibrated bandspread, vernier tuning with Kilocycle accuracy, mechanical filter built-in calibrator, etc., etc.	125 0 0	ZENITH Transoceanic 1000D. As new	75 0 0
AMECO. All transistor receiver, 540 kc/s.-30 mc/s. with separate electrical bandspread, B.F.O., etc. Brand new	95 0 0	RACAL RA17. Mint condition	245 0 0
HAMMARLUND SP600. Cabinet model, full reconditioned, 550 kc/s.-54 mc/s. Twelve months guarantee	39 0 0	TRIO JR55DE. 550 kc/s.-30 mc/s. Immediate delivery	36 15 0
SR550. Top band to 6 metres, dual conversion, product detector, etc.	95 0 0	NATIONAL NC109. 550 kc/s.-40 mc/s. Product detector, crystal calibrator, etc.	55 0 0
CODAR. £28 mobile receiver, solid state, covers top band and 80, excellent performance	50 0 0	WINDSOR 170A. VTVM	7 10 0
SEMI AUTOMATIC Bug Key. Microvolt meter, type TM3A, 15 microvolts to 500 volts in 16 ranges	15 10 0	MULTIBAND DIPOLE TRAP SETS, with full instructions fully encapsulated	per pair 2 10 0
LEVELL transistor A.C. Microvolt meter, type TM3A, 15 microvolts to 500 volts in 16 ranges	4 12 6	EAGLE. Fully transistorised G.D.O.'s 435 kc/s.-220 mc/s. ...	12 10 0
VOLSTATOR V.H.F. SKYMASTER. Covers long, medium and 108-138 mc/s. The best aircraft band portable in the U.K. (including carriage)	35 0 0	TRIO JR500 SE. crystal controlled Osc. tunable IF system, full coverage 80-10 metres. Amateur bands only. Two mechanical filters, transistorised VFO, etc.	61 19 0
MONARCH, Model HAM-I. 540 kc/s.-30 mc/s., built-in telescopic aerial, "S" meter. Brand new	24 10 0	LAFAYETTE HA500. 80-6 metres. Amateur bands only. Dual conversion, etc.	44 2 0
MARCONI TF 1153 Oscilloscope, cost £250 new ...	15 15 0	HA-700. 550 kc/s.-30 mc/s., mechanical filter product detector, "S" meter, etc.	New 37 16 0
EDDYSTONE 940. 480 kc/s.-32 mc/s., mint condition	49 0 0	SOMMERKAMP FL200B. 240w. P.E.P.	New 125 0 0
	95 0 0	EDDYSTONE 680X. 480 kc/s.-30 mc/s.	New 145 0 0
	95 0 0	EDDYSTONE 770U/2. 150-500 mc/s. AM/FM, work reconditioned at a cost of £90. Brand new condition	175 0 0
	95 0 0	THE NEW DRAKE 2C and TR4 is in stock along with the fabulous SWAN 500 and is available for your inspection	
	95 0 0	EAGLE DE-LUXE SWR INDICATORS reads forward and reflected power directly calibrated in SWR up to 10-1 plus direct reading RF wattmeter 0-15w. FSD, 2-200 mc/s.	9 19 6

FULL H.P. FACILITIES ON EQUIPMENT OVER £35

25% DEPOSIT, UP TO 24 MONTHS TO PAY. LET US KNOW YOUR REQUIREMENTS

PETER SEYMOUR LIMITED
410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone : 41938 (43353 after 7.30)

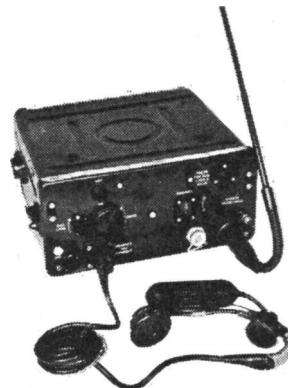


FAMOUS ARMY SHORT-WAVE TRANSRECEIVER MK.III

This set is made up of three separate units (1) a two valve amplifier using a 6V6 output valve; (2) (some only, not built in the very latest models) a V.H.F. transceiver covering 229-241 Mc/s, using 4 valves; (3) the main shortwave transmitter/receiver covering, in two switched bands, just below 2 Mc/s., 4½ Mc/s., and 4½ Mc/s.-8 Mc/s. (approx. 160-375 metres) using 9 valves. For R.T., C.W. and M.C.W. The receiver is superheterodyne having 1 R.F. stage, frequency changer, 2 I.F. (465 Kc/s.) signal detector, A.V.C. and output stage. A B.F.O. included for C.W. or single side-band reception. T.X. output valve 807 other valves octal bases. Many extras, e.g. netting switch, quick flick dial settings, squelch, etc. Power requirements L.T. 12 volts, H.T. receiver 275 volts D.C., H.T. transmitter 500 volts D.C., size approx. 17½ x 7½ x 11 ins. Every set supplied in new or as new condition in carton with book including circuits, only £4 10s. 0d., or Grade 2 slightly used 50s., or Grade 3 used but complete 35s., carriage all 15s. 12 VOLT D.C. power unit (used) good condition 40s., carriage 5s. WE MAKE A MAINS 200/250 VOLT POWER UNIT in louvred metal case to plug direct into set power socket to run (1) receiver, 70s., post 5s.; (2) TX and RX, £6 10s. 0d., post 7s. 6d. A charge of 10s. to unpack and test the receiver of these sets is made only if requested. Headphones and mike new boxed, 15s., post 2/6.

V.H.F. TRANSRECEIVER MK.1/1

This is a modern self contained tunable V.H.F. low powered frequency modulated transceiver for R.T. communication up to 8-10 miles. Made for the Ministry of Supply at an extremely high cost by well known British makers, using 15 midget B.G. 7 valves, receiver incorporating R.F. amplifier, Double superhet and A.V.C. Slow motion tuning with the dial calibrated in 41 channels of 200 KHz. apart. The frequency covered is 39 Mc/s.-49 Mc/s. Also has built-in crystal calibrator which gives pipe to coincide with marks on the tuning dial. Power required L.T. 44 volts, H.T. 150 volts tapped at 90 volts for receiver. Every set supplied complete with valves and crystals. New in carton, complete with adjustable whip aerial, and circuit. Price £4 10s. 0d. carriage 10s.



JOHN'S RADIO

(Dept. F)

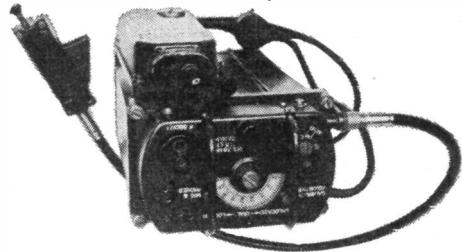
OLD CO-OP, WHITEHALL ROAD,
DRIGHLINGTON, BRADFORD

Telephone : DRIGHLINGTON 732

FEW ONLY LEFT

WALKIE-TALKIE MK III and CRYSTAL CALIBRATOR No. 9

This set is housed in a waterproof diecast aluminium case made by Murphy Radio for the Govt. having only reliability and quality in mind. Range 7-3—9 Mc/s. also on side of set is crystal calibrator No. 9 which gives points on marks provided on the tuning dial. Set uses a total of 5 valves; power required L.T. 4 volts D.C. H.T. 100-175 volts D.C. Sets supplied in NEW or as new condition, boxed, only 37/6, carriage 7/6.



GO MOSLEY BRITISH AND BEST



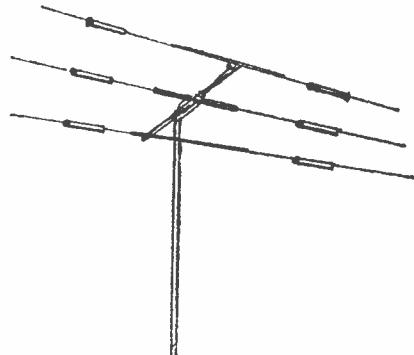
SOME ANTENNA PRICES

Elan. 2 band 3 elements	...	...	£23	0	0
TA-33 Jr. 3 band 3 elements	...	...	£27	5	0
TA-32 Jr. 3 band 2 elements	...	...	£19	5	0
TA-31 Jr. 3 band dipole	...	...	£11	11	0
V-3 Jr. 3 band vertical	...	...	£8	5	0
A-310. 10 metre 3 elements	...	...	£18	3	0
A-315. 15 metre 3 elements	...	...	£19	16	0
A-203-C. 20 metre 3 elements	...	...	£46	5	0
V-4-6. 4 band vertical	...	...	£15	10	0
TD-3 Jr. 3 band trap dipole	...	...	£6	15	0
RV-4. 4 band vertical	...	...	£16	10	0
TA-36. 3 band 6 elements	...	...	£60	0	0
MP-33. 3 band 3 elements	...	...	£32	17	0
A-92-S. 9 elements 2 metre	...	...	£8	0	0
Classic-33. 3 bands 3 elements	...	...	£50	0	0
RD-5. SWL amateur bands	...	...	£7	15	0
SWL-7. SWL broadcast bands	...	...	£7	15	0
RV-4RK. Roof mount for RV-4	...	...	£9	18	0
D-4BCa. Base loading coil for V-4-6 for 80 metres	...	...	£9	5	0
TA-33 Snr. 3 bands 3 elements	...	...	£47	15	0
Lancer Mobile. 10-80 metres	...	...	£35	0	0
V-4-8. 40 and 80 metre vertical	...	...	£46	15	0
TW-3X Jr. 20, 40 and 80 metre vertical	...	...	£8	0	0
VTD-3 Jr. 3 band vertical for difficult loca- tions	...	...	£9	18	0

Carriage and Insurance extra.

V-3 Jr.

Mosley Electronics Ltd. 40, Valley Road, New Costessey, Norwich, Norfolk Nor. 26K



TA-33 Jr.

FOR ALL ANTENNA DETAILS :

Send for complete Catalogue, containing full details of Antennas and other technical information. 28 pages 1/6.

We sell direct or through our distributors :
Southern Area : K.W. Electronics Ltd.
Midland Area : Swanco Products Ltd.

Telephone: Costessey 2861, orders only

Radio Shack Ltd



London's Amateur Radio Stockists

Just around the corner from West Hampstead Underground Station

OMEGA-T SYSTEMS

New and unique piece of test equipment :
MODEL TE 7-01 Antenna Noise Bridge

Features:

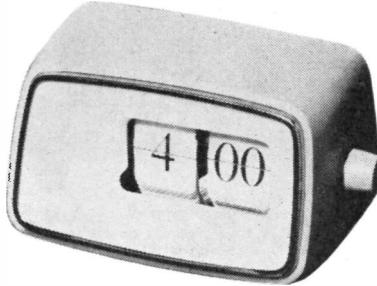
- ★ Test antenna for both frequency and resonance.
- ★ Replace VSWR bridges or other antenna test equipment.
- ★ Optimum performance through alignment and test of mobile or fixed station antennas.
- ★ Test beams, whips, dipole, quads or complete antenna tuner systems.
- ★ For use over entire range 1/100 Mhz.

Price : £13 0s. 0d.

Have you read the articles in CQ 73 & QST describing its merits ?

Hy-gain Antennas — Drake — Swan — KW —
Hallicrafters — Trio

DIGITAL CLOCKS



This illustration clearly demonstrates the attractive design, unrivalled clarity and compact size of the 24 hour Copal Digital Clock, Model 201, £12 5s. 0d. Also available in 12 hour Model at the same price, and a 24 hour Wall Clock at £16 10s. 0d.

RADIO SHACK LTD.

182 BROADHURST GARDENS, LONDON, N.W.6.

Just around the corner from West Hampstead Underground Station

Telephone: 01-624 7174

Lasky's Radio

NOW AVAILABLE FOR THE FIRST TIME IN GREAT BRITAIN TWO NEW TRIO COMMUNICATIONS RECEIVERS

These receivers offer the Ham enthusiast high quality and the latest design developments at a realistic price

MODEL JR-500SE

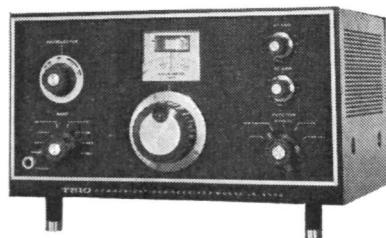
This high performance receiver is made especially to cover the amateur bands and utilises a crystal controlled double heterodyne circuit for extra sensitivity and stability. Brief spec.: Covers all the amateur bands in 7 separate ranges between 3.5 and 29.7 Mc/s. Circuit uses 7 valves, 2 transistors and 5 diodes plus 8 crystals ; output 8 and 500 ohm and 500 ohm phone jack. Special features: Crystal controlled oscillator • Variable BFO • VFO • AVC • ANL • S meter • SSB-CW • Stand-by switch • special double gear dial drive with direct reading down to 1 kHz • Remote control socket for connection to a transmitter. Audio output 1 watt. For use on 115/250 V A.C. Mains. Superb modern styling and control layout—finished in dark grey. Cabinet size 7 x 13 x 10in. Weight 18 lbs. Fully guaranteed, comp. with instruction manual and service data.

LASKY'S PRICE 59 Gns. Carriage and Packing 12/6.

MODEL 9R-59DE

Brief spec.: 4 band receiver covering 550 Kc/s to 30 Mc/s continuous and electrical band spread on 10, 15, 20, 40 and 80 metres. 8 valve plus 7 diode circuit. 4/8 ohm output and phone jack. Special features: SSB-CW • ANL • Variable BFO • S meter • Sep. band spread dial • IF frequency 455 Kc/s • audio output 1.5 W • Variable RF and AF gain controls. For use on 115/250 V A.C. Mains. Beautifully designed control layout finished in light grey with dark grey case, size : 7 x 15 x 10in. Weight 19 lbs. Fully guaranteed, comp. with instruction manual and service data.

LASKY'S PRICE 35 Gns. Carriage and Packing 12/6.



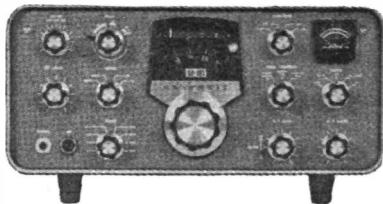
207 EDGWARE ROAD, LONDON, W.2 Tel. 01-723 3271
33 TOTTENHAM CT. RD., LONDON, W.1 Tel. 01-636 2605
The above branches open all day Saturday. Early closing Thursday.

Mail Orders and correspondence to 3-15 Cavell Street, Tower Hamlets, London, E.1. Tel. 01-790 4821/2

152/3 FLEET STREET, LONDON, E.C.4 Tel. FLE 2833

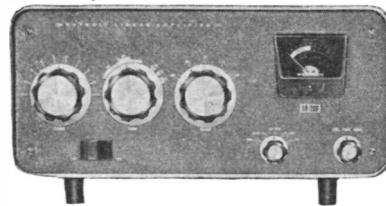
Open all day Thursday. Early closing Saturday.

HEATHKIT — The World's Largest THE FAMOUS HEATHKIT SB-SERIES



SB-101 80 Through 10 Metre SSB Transceiver . . . 180 watts PEP SSB, 170 watts CW (the practical power level for fixed/mobile operation). Features USB/LSB on all bands, PTT & VOX. CW sidetone, and more. Unmatched engineering and design.

Kit SB-101, 23 lbs., £185.12.0 Assembled £225.12.0



SB-200 KW SSB Linear Amplifier . . . 1200 watts PEP input SSB, 1000 watts CW on 80 through 10 metres. Built-in antenna relay, SWR meter, and power supply. Can be driven by most popular SSB transmitters (100 watts nominal output).

Kit SB-200, 41 lbs., £120.18.0 Assembled £145.18.0



SB-610E Signal Monitor Scope . . . operates with transmitters on 160 through 6 metres at power levels from 15 watts through 1 kw. Shows transmitted envelope. Operates with receiver IF's up to 6 Mc/s. showing received signal waveforms. Spots over-modulation, etc.

Kit SB-610E, 14 lbs., £41.14.0 Assembled £51.14.0



SB-620 "SCANALYZER" Radio Spectrum Monitor and Analyzer. New narrow sweep widths with crystal filter for single channel analysis. 10 Kc/s., 50 Kc/s. Variable width to 500 Kc/s. Styled as SB series.

Kit SB-620 £64.13.0 Assembled £77.3.0

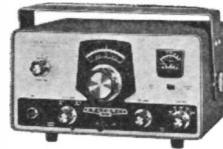


HP-13 Mobile and HP-23 Fixed Power Supplies . . . For the "Simple Banders" and SB-100. Provide all necessary operating voltages with excellent dynamic regulation.

Kit HP-13, 7 lbs., £37.2.0 (+ earth available) Assembled £44.2.0

Kit HP-23E, 19 lbs., £30.18.0 Assembled £36.8.0

MODELS
HW-12A
(80m.)



HW-32A
(20m.)

HW-12 and HW-32A Filter-Type SSB Transceivers . . . 200 watts PEP input TX. 1µV sensitivity RX. PC Board. Pre-aligned circuits. Power required : 800v. D.C. at 250 mA., 250v. D.C. at 100 mA. —125v. D.C. at 5 mA. 12v. A.C. or D.C. at 3.75A.

Kit, either model, £60.3.0 Assembled £74.13.0

GH-12 Push Talk Microphone Assembled £4.3.0



DX-100U Transmitter . . . 120 watts CW, 100 watts Phone. Built-in VFO and all power supplies. Band coverage : 160, 80, 40, 20, 15 and 10 metres.

Kit DX-100U £81.10.0 Assembled £106.15.0

DX-40U Low-priced Transmitter . . . 75 watts CW, 60 watts peak. Controlled carrier Phone, 80-10 metres.

Kit DX-40U £29.19.0 Assembled £41.8.0



RG-1 High Sensitivity General Coverage Receiver . . . High performance at lowest cost. Covers 600 Kc/s. to 1.5 Mc/s., 1.7 Mc/s. to 32 Mc/s. Full specifications available.

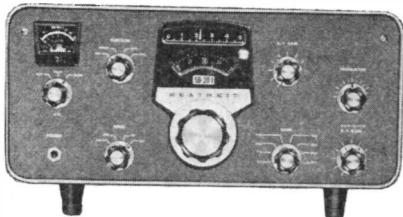
Kit RG-1, 18 lbs., £39.16.0 Assembled £53

RA-1 Amateur Bands Receiver . . . Covers 10-160m. Half-lattice crystal filter at 1.6 Mc/s. Switched USB and LSB for SSB. Provision for fixed, portable or mobile uses.

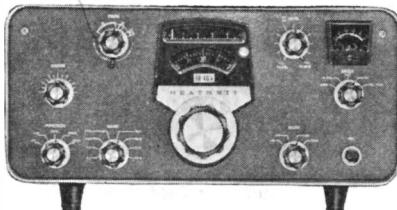
Kit RA-1 £39.6.6 Assembled £52.10.0

Selection of Amateur Radio Equipment

THE ULTIMATE IN VALUE AND PERFORMANCE



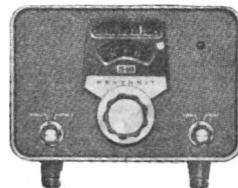
SB-301E Amateur Band Receiver . . . SSB, AM, CW and RTTY reception on 80 through 10 metres + 15 MHz WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.
Kit SB-301E, 23 lbs. (less speaker) £140. 12. 0 Assembled £170. 12. 0



SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-401-I crystal pack for independent operation.
Kit SB-401E, 34 lbs., £157. 10. 0 Assembled £192. 10. 0
SBA-401-I crystal pack, 1 lb., £17. 3. 0



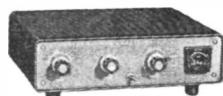
HW-30 2 Metre Transceiver . . . For fixed, portable, or mobile. Ideal for local and RAEN purposes. Input 5 watt. CC. Tunable regenerative RX. Size 9½" w. x 8½" h. x 6" deep. (For 230v. operation if required).
Kit HW-30, 6½ lbs., £26. 8. 0 Assembled £36. 8. 0
Kit GP-11 (Power supply 6 or 12v. D.C.) £10. 13 Assembled £13. 13



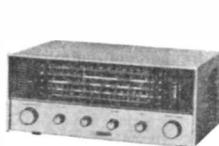
SB-640 External LMO for SB-101 . . . Provides Linear Master Oscillator frequency control or either of two crystal controlled frequencies for a total of five frequency control options. Power supplied from SB-101 Trans.
Kit SB-640, 9 lbs., £51. 6. 0 Assembled £56. 6. 0



HA-14 The World's Smallest Kilowatt Linear . . . 80-10m. Only 3½ x 12½" x 10" deep.
Kit HA-14 £55. 13. 0 Assembled £67. 13. 0



HD-10 All Solid-State Electronic Keyer . . . 15 to 60 w.p.m. with 10 to 20 w.p.m. slow speed option.
Kit HD-10, 6 lbs., £23. 12. 0 Assembled £30. 12. 0



GR-64E Short Wave Receiver . . . Covers 1 Mc. to 30 Mc/s., plus 550 Kc/s. to 1620 Kc/s. AM band. Many special features for such a modest price. For 115, 230v. 50/60 c/s. A.C. mains operation.
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Writing this at Christmas, it seems like a good idea to gaze into my crystal filter (crystal balls are out for '68) and see what the next 12 months will bring. Provided you lads continue to squander your hard-earned bread on the crummy old junk I peddle, thus pandering to my insatiable greed, I will undoubtedly grow a bit fatter and a bit richer. The latter pleases me no end. One thing for sure, I'll continue to expand my stocks of stuff which I consider good value for money—new stuff in the pipeline include a low priced SSB ham-band Rx, a medium priced SSB Rx and matching Tx, a high-priced but tip top transistor hambooster, sundry new and cheap xtal filters, reasonably priced converters for 20, 15, 10 and 2m., a very nice stand mike with built-in transistor audio amplifier and PTT—the perfect answer for the man who wants to use a quality mike with a rig which requires a fairly high audio input. All kinds of stuff about which I am haggling over prices with the manufacturers. As soon as I start getting these juicy things in quantity, I'll give you a yell. Also, I have some 100 kc/s. xtals coming, they may be here when you read this. These are of current manufacture (not surplus) to military spec. and so are a bit more expensive, but worth it. In the usual HCB/U case which fits the HA350, FR-100-B, RAI calibrator, etc., and cost £2 each. Incidentally, because these are to military spec. they are classed as "Strategic War Material"—you've no idea of the fun and games I've had getting the necessary import licence etc.! Sorry, you U.A.'s, I'm not allowed to flog you a 100 kc/s. xtal!! Nothing in the Regulations to say I can't flog you a complete xtal calibrator, but a 100 kc/s. xtal, niet. Marvellous, isn't it? Anyway, lets start flogging. At the time of writing I have the following at pre-devaluation prices :—

3 only National 200's, complete with p.s.u. kit at £185 each. This is National's latest 80-10 200W. p.e.p. AM/CW/SSB rig.

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3 only Paros 3 band transceivers, 80, 40 and 20. 80W. p.e.p. AM/CW/SSB transceiver. These are very nice rigs indeed—no optional extras whatsoever. Complete with xtal calibrator, VOX, transceive vernier, adjustable noise limiter, etc. I honestly think that these are exceptional value at £120 complete. A cracking good Rx and a stable nice sounding Tx.

3 only FL-1000 Sommerkamp kilowatt linears at £90 each. Other imported new stuff, unfortunately, has gone up in price :—

Sommerkamp—The new FT-150 transceiver is a real top notch effort—technically improved and now covering all of 10m., it really is a beautiful little rig. With both D.C. and A.C. power supplies built-in it is equally at home mobile or fixed station. As it is transistor except for driver and PA, battery drain is only 14 amps. peak for 150W. p.e.p. Even at the increased price of £215 it is still incredible value for money.

Sommerkamp 500 Line—The latest stuff is the new FR-500, FL-500 and FT-500. Some of you had a sneak preview of the FT-500 at the Exhibition and it certainly looks a winner. To be quite honest, as I write this, I haven't got any in stock and so can't say too much about them. However, the Rx's were expected by January 1st and the Tx's and transceivers by the time you read this. The FR-500 Rx is similar in design to the famous FR-100-B, but covers top band, has a tip top mechanical 500 filter for CW as well as the usual SSB and AM filters, has a 100/25 kc calibrator, and a very good notch filter. Regrettably higher in price than the FR-100-B, but considerably more sophisticated. The FL-500 Tx is actually pretty much the same as the FL-200-B—rather prettier styling. It is not, as was at first thought, a half kilowatt effort, but is the same as the FL-200-B—same PA in fact. Sorry about this, but there again, most people find the FL-200-B sufficient to work anywhere they want, so I guess the new FL-500 will prove as popular. The FT-500 is still a bit of an unknown quantity. I believe it will be a world beater, but I'll tell you more about it when I get further details. Price not yet fixed as I'm still weeping bitter tears on the shoulder of Mr. Sommerkamp—"You want to ruin us both already? Take a leetle cut in profit and I'll do the same—that way we sell more and get even richer!" Maybe I'll win the battle—in which case the price will be a touch under £250 maybe I'll lose, so a touch over £250.

SECOND-HAND :

RX's : HA350, £60 ; SX110, £40 ; 75A2, £120 ; 75A4, £250 ; HRO's from £22 10s.; APR4, £50 ; AR77E, £30 ; HR22, £80 ; 640, £18 ; KW77, £70 ; Marconi CR150/2, £35.

TX's : DX40U, £20 ; LG50, £25 ; LG300 r.f. bit, £20 ; LG300 complete with mod. and p.s.u., £30 ; Labgear topbooster, £18 ; B2, £12 ; Panda Cub, £25.

Sundries : 'Scopes : CR52 brand new, £22 10s.; Dartronics, £20 ; Heathkit 10-12U, £30 ; Laboratory audio oscillator, a thing of beauty, £25 ; Marconi TFI100 VTVM, £25 ; Marconi TF390G, 16-150 mc/s., £20. 10m. Walkie Talkies—ready set up on 28-5 mc/s., £12 10s. per pair. R.F. output meters (the meter is worth the price), £2 10s. Power Units, 234A for 1132 or 1392 sets. Al bench supply giving 300 or 250V. D.C. and 6-3v. A.C., 30/- carriage paid. Tuning unit 4218 containing amongst other things no less than 3 rotary inductors, 30/- carriage paid. Boom Mikes—at last a comfortable effort. Nice padded low impedance earphone and a nice high output, high impedance mike. Really excellent and only £3.

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73,

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SHORT WAVE MAGAZINE

(GB3SWM)

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FEBRUARY, 1968

No. 292

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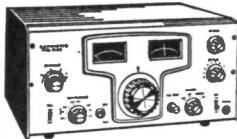
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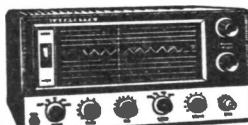


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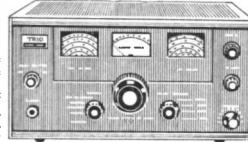
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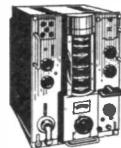
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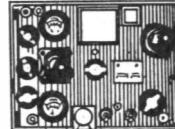
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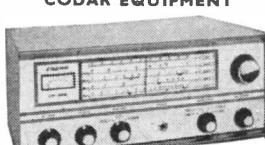
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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT WAVE Magazine

EDITORIAL

Adjustment

It is with regret that we are finding it necessary to make a small increase in the price of SHORT WAVE MAGAZINE—to 4s. on the cover with effect from the forthcoming (March) issue, which starts a new volume. The direct-subscriber rate, also from the appearance of the next issue, will become 45s. for a year, with the dollar subscription remaining at \$6.00. Existing subscriptions are not affected till they fall due for renewal.

Since last we had to make a small price increase—four years ago, in March 1964—there has been a steady rise in costs and expenses of every kind—notably paper, production, distribution and postages. While over these past four years we have been able to absorb the successive advances in our costs, there comes a point when it is no longer economically possible to do so, particularly when there are further increases in prospect.

To mitigate this 6d. price rise as far as possible, we shall from time to time be running an extra 8-page section of text—as we have done on occasion during recent months.

Finally, on the current theme of “Backing Britain,” we of this MAGAZINE have been doing it consistently, in every possibly way, for about the last 20 years, including working a week well over what is generally regarded as the norm for these days. When it comes to “Backing Britain”—a term which by its implication of the opposite must be offensive to a great many Britons—we do not need to be told by anybody what we ought to be doing. And, certainly, trying to run a business, this or any other, uneconomically would not be helping Britain in any way at all.

*Austin Fosgh,
G6FO.*

WORLD-WIDE COMMUNICATION

TOP BAND TRANSMITTER- RECEIVER FOR A MOBILE “MINI”

FITTING A BASIC DESIGN TO A STANDARD CAR— FULL CONSTRUCTIONAL DETAILS

F. HARRISON,
B.Sc., C.Eng., A.M.I.Mech.E. (G3SFL)

THIS design came to be the result of an attempt to fit a simple Top Band Transmitter-Receiver into the “Mini,” as unobtrusively as possible and without affecting the safety, ease of access, or comfort of driver or passenger—quite a tall order, you might think.

Although the “Mini” has adequate pockets and shelves for the carriage of parcels and oddments, for one reason or another, none of these were thought to be suitable for a mobile installation. After some study it became apparent that the most suitable place was beneath the parcel shelf immediately to the right of the steering column. Provided that the height was kept to around 4in. this did not interfere with leg room, and it was suitably situated for access to the controls.

Experiments with a cardboard box mock-up gave the maximum practicable width and depth and allowed the visibility and accessibility of the controls to be checked. It was found necessary to tilt the unit to enable the front panel to be seen at a glance from the driving position. This was done in preference to tilting only the front panel, which would have complicated the construction.

Since the equipment was primarily intended only for lunch-time QSO's and local contacts during the daily 40 min. journey home, the design was kept as simple as possible. Top Band was chosen as being by far the most popular for mobile working in the area (Co. Durham) and single-band operation for simplicity and because of space restrictions.

Both Transmitter and Receiver use conventional and unsophisticated circuitry, and alignment can be accomplished without the aid of any test equipment.

A number of less common features are included to make operation more convenient. Construction should be within the capabilities of a relative beginner provided a few basic tools are available.

General Construction

The method of construction is given in some detail as this at least may be claimed to be somewhat original. The finished article has adequate mechanical strength, is tailor-made to requirements, and serves its purpose well.

The integral case-chassis techniques is used to give a robust unit which is not difficult to produce to a non-standard size, and which has a pleasing finished appearance. It will also be found very convenient to work on

during assembly and wiring-up, as it can readily be stood on any of its surfaces (with the possible exception of the front panel). This approach is used by the writer for all appropriate constructional projects and has been found to be relatively cheap compared with the cost of commercial cabinets.

Fig. 1 is a dimensioned drawing and Fig. 2 a partly dimensioned exploded view showing the metalwork. The basic material, other than 16g. sheet aluminium, is $\frac{1}{2}$ in. x $\frac{1}{2}$ in. x $\frac{1}{2}$ in. aluminium angle, which can be obtained at most D-I-Y shops at about 8d. per ft. Something like 6ft. will be required.

If this angle has not been used before, you would be well advised to practice on a short scrap length to ensure that the top frame, with its mitred corners, can be produced without undue wastage. The problem is not only to make the mitre neatly, but to make the frame accurately to the required outside dimensions. (The need for practice was certainly true in the writer's case.) Fig. 3 shows a simple test piece which should help to overcome this difficulty, and give practice in forming the corners.

Using say 6in. cut from the 6ft. length mentioned previously, scribe two lines on the inside faces of the angle at some convenient distance apart, say 3in., near the centre of the piece. A steel rule with a square end can be used as a guide. These lines will be *inside* the corners of the finished bends.

The triangles to be removed to make the mitres are then scribed as shown and cut out, preferably using a *Junior* hacksaw because of its relatively fine blade. This is best done in a vice because the angle is rather awkward to hold, but it can be done on the edge of a table if the angle is supported on the corner of a wooden batten. Keep the edge of the cut on the scribed line, or allow a little to be removed later with a smooth file.

Check that in fact a right-angle has been cut out and correct if necessary with the file. The strip is weak in this condition with the flange cut away, and care must be taken not to bend it prior to checking the angle. It is a help in the subsequent bending operation to relieve the corner with a small round file ($\frac{1}{8}$ in. diameter or smaller), but this is not essential. Alternatively, a small hole could be drilled in the corner prior to cutting.

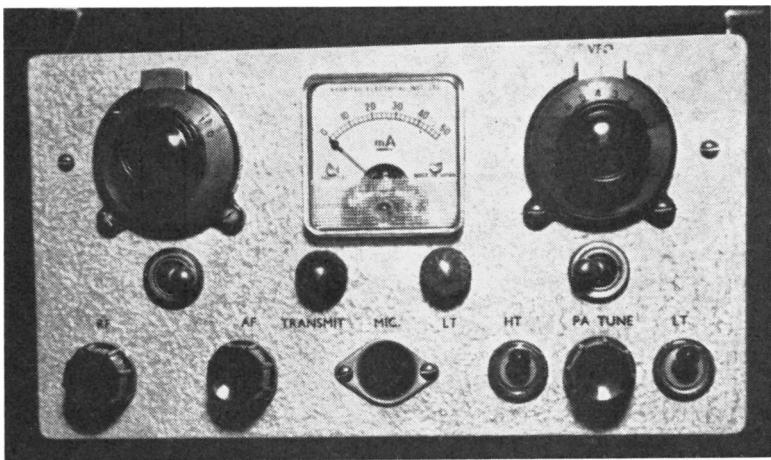
The two bends may then be made using a block of wood as a guide, as shown. It may be necessary to square up the corner by lightly hammering, with a piece of wood interposed between hammer and angle to prevent marking. Alternatively, the line scribed on the inside of the bend could be heavily scored to give a smaller bending radius.

Finally, measure the width outside the two parallel sides of the finished test piece. This will probably be about $3\frac{1}{8}$ in. but is dependent upon the bending method. Some quick mental arithmetic will then tell you what size to mark out your frame to give the required outside size, provided that you use the same bending method.

This technique can equally well be applied to chassis which have to be made to an accurate outside dimension to suit finished frames, and may save some valuable material which might otherwise be wasted.

The top frame can now be made with some degree of

General panel appearance of the G3SFL/M transmitter-receiver for the 160m. band.



confidence. Allow a little extra length at the butt joint, as this can easily be removed when the frame is bent to its final rectangular shape.

The chassis is bent up from 16g. sheet aluminium; the corners do not need any reinforcement other than that provided by the uprights. 6BA countersunk screws, $\frac{1}{4}$ in. long are used to attach the frame, uprights and runners to the chassis, front and rear panels. This gives a flat surface on which to fix the covers, which can be of expanded aluminium, perforated zinc, or even tinplate suitably ventilated, by self-tapping screws.

The unit is held under the parcel shelf by self-tapping screws. The holes for these in the left hand bracket may be made into open-ended slots to facilitate removal and replacement of the unit, as the screws are awkward to fit because of the steering column. They need then only be loosened.

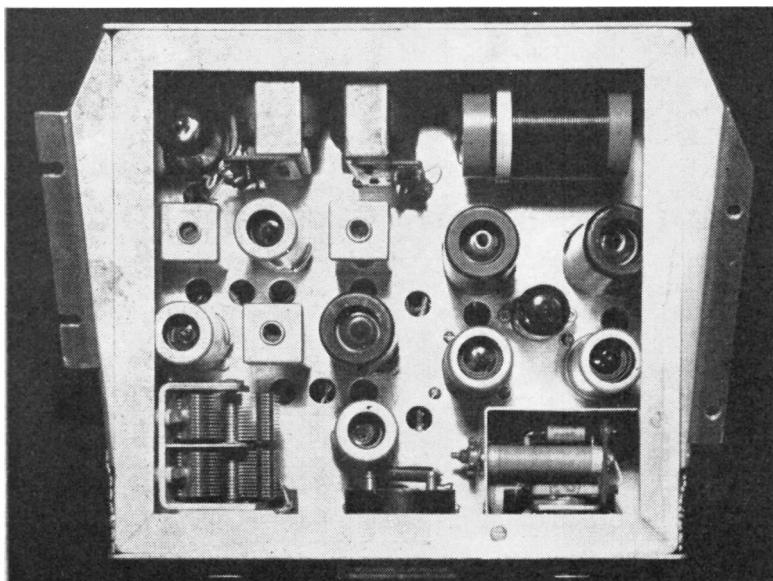
The front panel projects about 1in. beyond the front

of the parcel shelf when installed.

Panel and Chassis Layout

The front panel layout, shown in Fig. 4, is reasonably symmetrical, and if suitably finished presents quite a pleasing appearance. The receiver controls, VC1, VC2, SW1, VR1 and VR2 are grouped to the left of the PA current meter, which is centrally situated. The transmitter controls VC3, SW2 and VC4, together with SW4 and SW5, are to the right. The two indicator lamps LP1 and LP2, and SK3, are below the meter. For operation in the dark the lamps could well be above the meter and would illuminate it in addition to the dials. The rear panel carries SK1 and SK2 above chassis, and SK4 below chassis. It is also used to mount L5, L6, T1 and T2 on the reverse side.

As it turns out, the chassis is split more or less evenly between Transmitter and Receiver. The layout shown in



Upper view with cover removed, showing layout and construction.

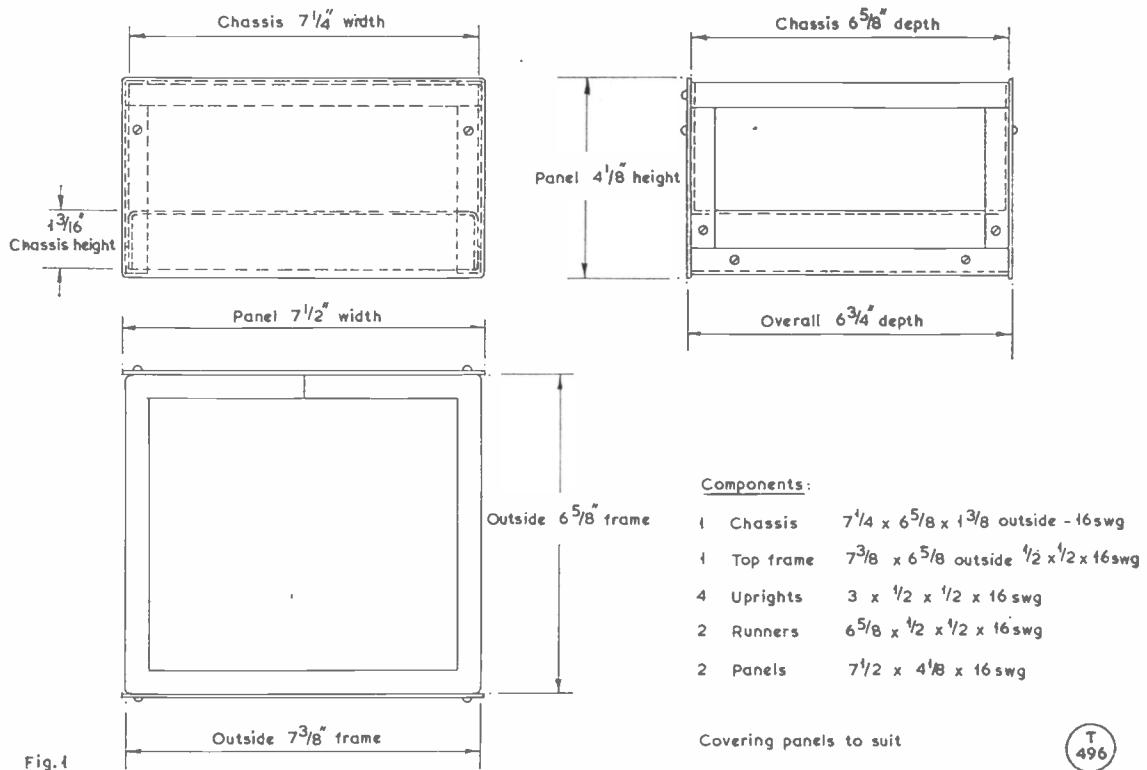
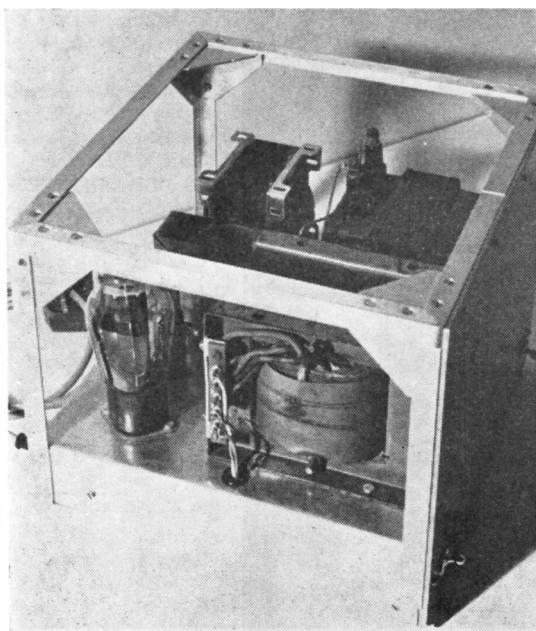


Fig. 1. General mechanical design for the G3SFL/M rig.



Example of integrated case-chassis construction, as applied to the PSU for the G3SFL/M Tx/Rx. The weight of the unit is about 30 lbs., and it can be lifted by holding the centre of any one of the three open sides of the top frame.

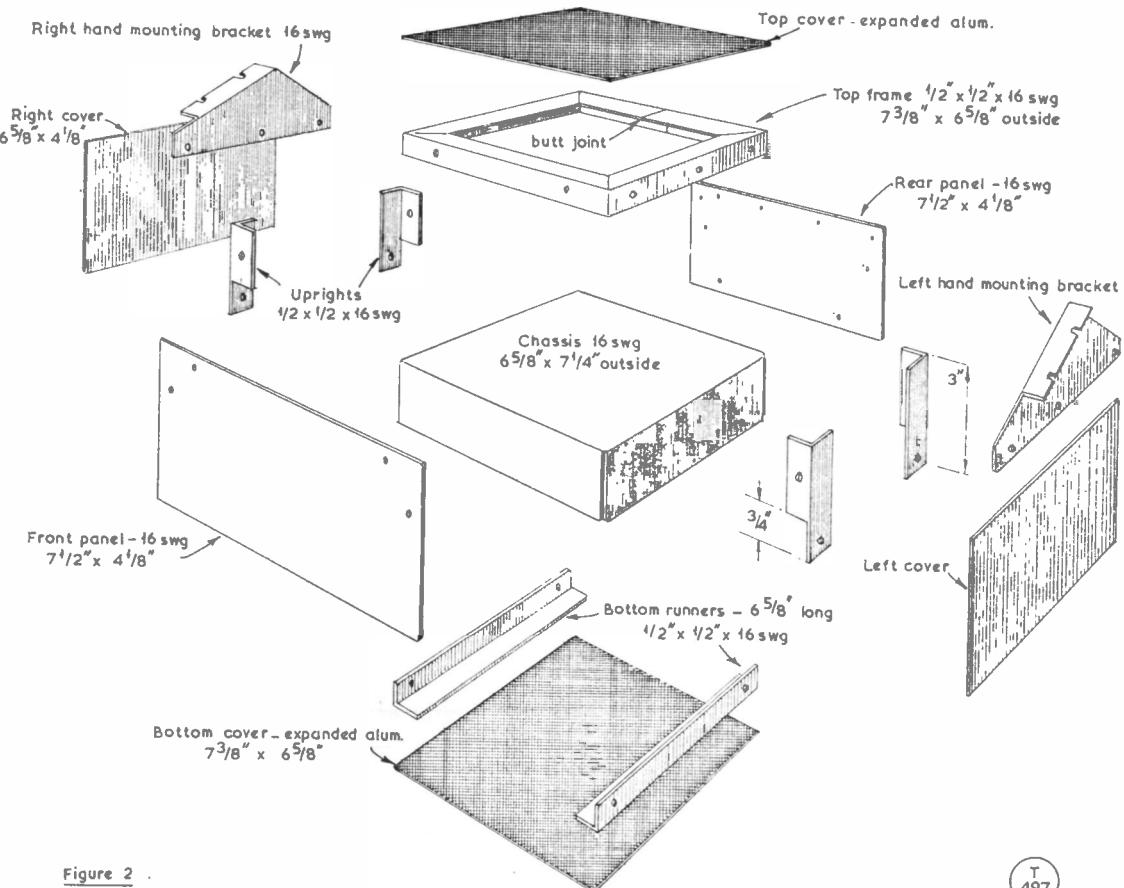
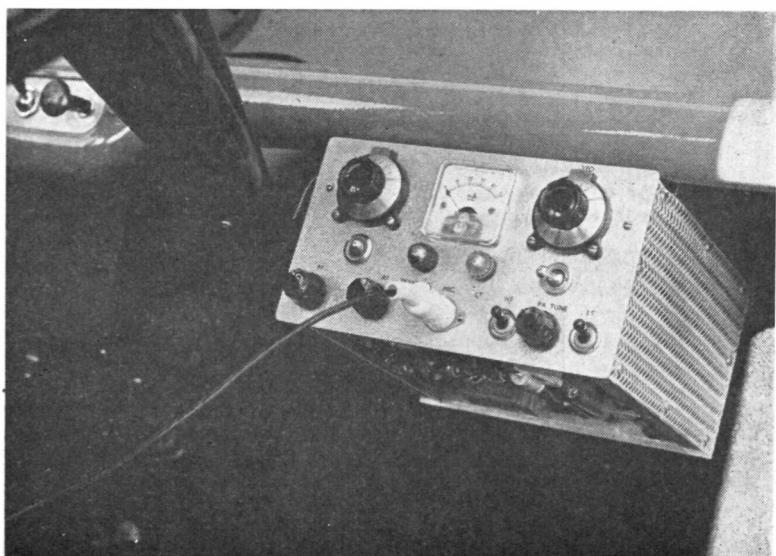


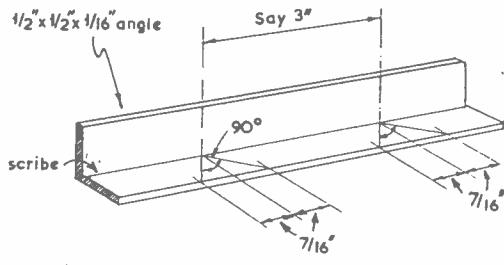
Figure 2

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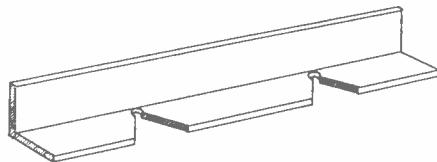
Fig. 2. Some main constructional details — see text.

General view of the mobile Tx/Rx for Top Band as installed in a BMC-Mini.





A. Lines scribed on inside faces



B. Triangles cut out and corners relieved.

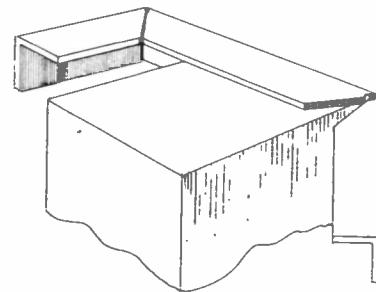
C. Bevels made around wooden block
Figure 3T
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Fig. 3. Experimental constructional pieces, as suggested in text.

Fig. 4. General front-panel layout—compare with photograph p.741.

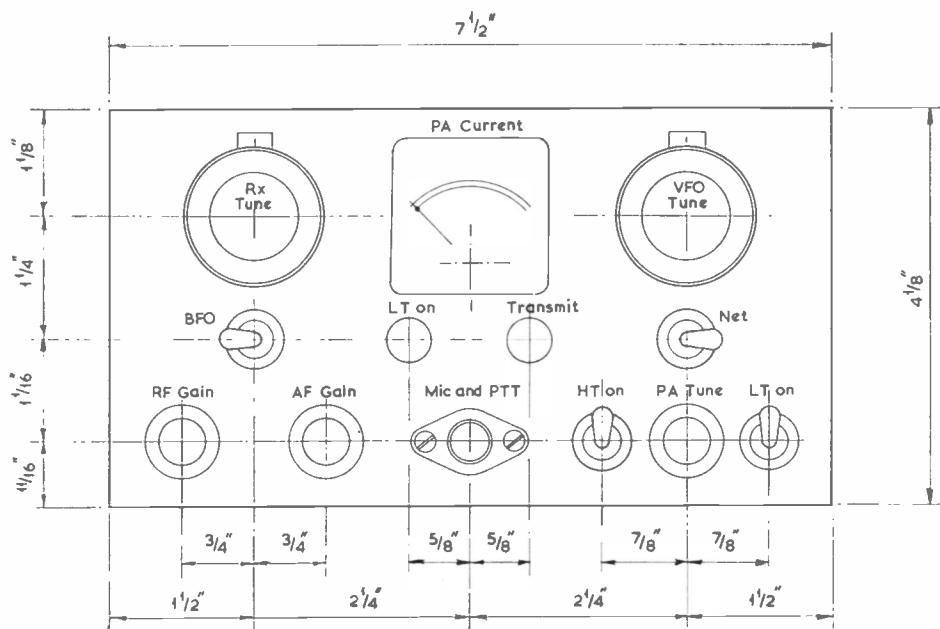


Fig. 4: FRONT PANEL LAYOUT

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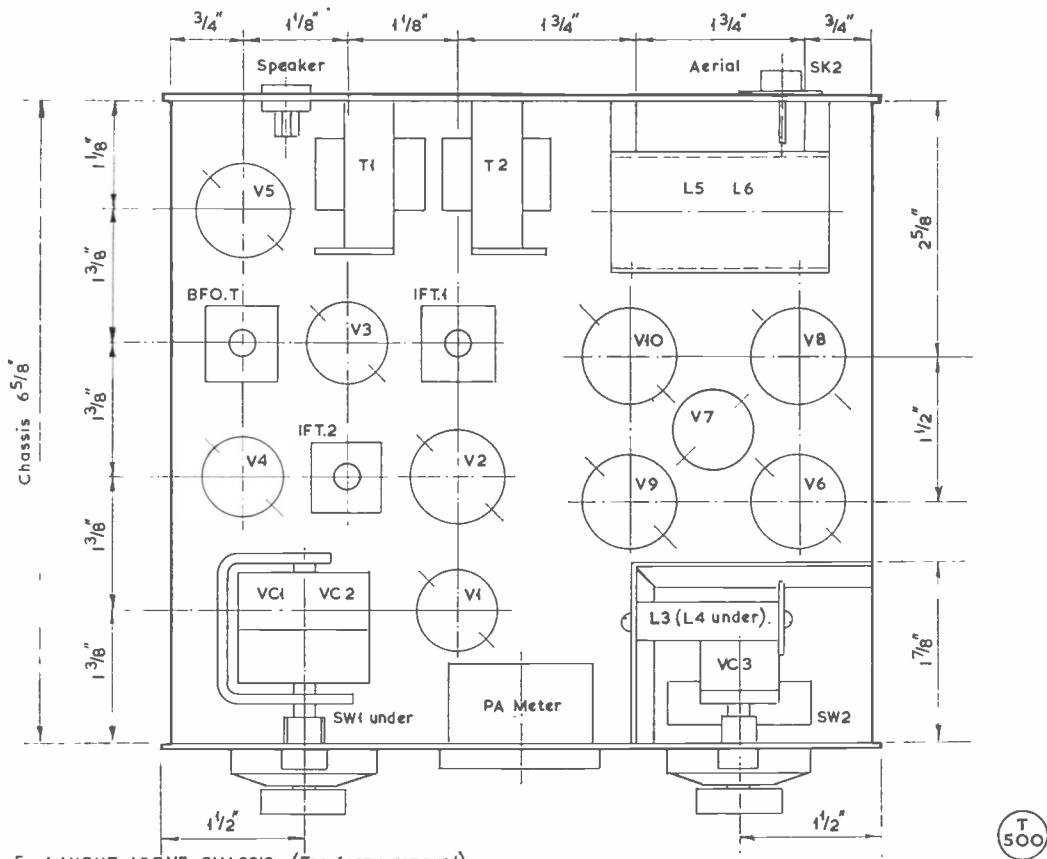


Fig. 5: LAYOUT ABOVE CHASSIS (Top frame removed).

Fig. 5. The layout above chassis—and see Fig. 6, p.744.

Figs. 5 and 6, and visible in the photograph, was arrived at after much shuffling about of the components to give reasonably short wiring runs. Fig. 7 is a side view of the Transmitter unit showing the general construction and the positioning of the major components.

The two lower bolts on each dial are used to attach the respective capacitor mounting brackets, whilst the upper bolt passes through the front of the top frame, securing it to the front panel. The coupling between capacitor and dial is rigid, clearance holes for the capacitor mounting and the flexibility of the brackets facilitating correct alignment.

Transmitter Section

This is shown in Fig. 8, and involves 4 valves plus a voltage stabiliser in a conventional 6-stage circuit. The heaters are returned to earth through PL3-SK3, and thus are only energised with PL3 in position—acting as a standby switch, in addition to carrying the mic. and press-to-talk connections. The stabiliser was found to be necessary because of the large difference in HT volts resulting from variations in the LT supply causing frequency shift. Its base is mounted on $\frac{1}{2}$ in. pillars above

the chassis between the Transmitter valves (see photograph).

The L4-C37 combination in the anode of the pentode section of V6, resonant at about 1950 kc, was found necessary to give sufficient grid drive to the PA. The test point above R35 is useful in this connection.

In the original, T2 was about the same physical size as T1, and had two windings of 1 : 1 ratio, and about 500 ohms DC resistance. These were connected to give one centre-tapped winding.

A midget multi-ratio output transformer is obtainable, rated at 2-3 watts, which is of similar size to T1. This can be centre-tapped and would probably be suitable.

Receiver Section

This is given at Fig. 9 and is a conventional 5-valve superhet using readily available commercial coils and covering about 1.7 to 3.5 mc. It has one RF stage and one IF stage, and a BFO to facilitate netting, but lacks refinements such as a noise limiter, which some may consider essential for mobile operation.

One interesting feature, for which no novelty is claimed, is the use of the transmitter PA tuned circuit as

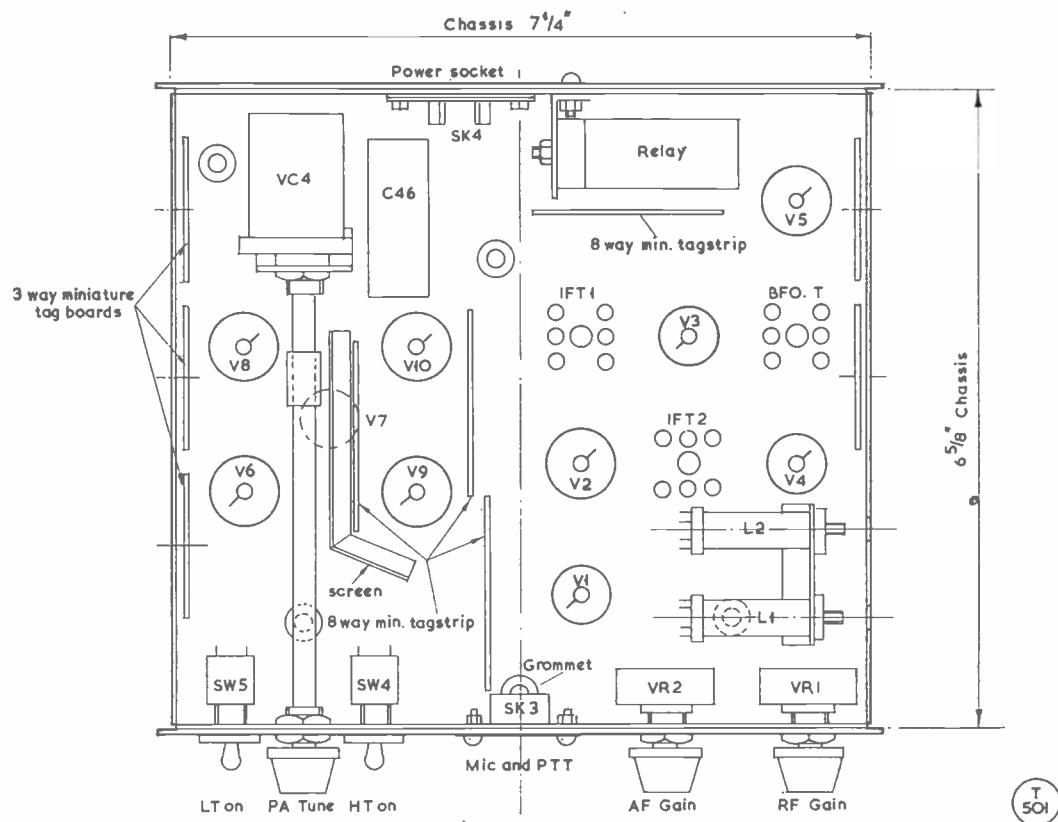


Fig. 6 : LAYOUT BELOW CHASSIS (runners removed).

Fig. 6 (Above) the under-chassis layout. Fig. 10. (below)
Heater connections and control circuitry.

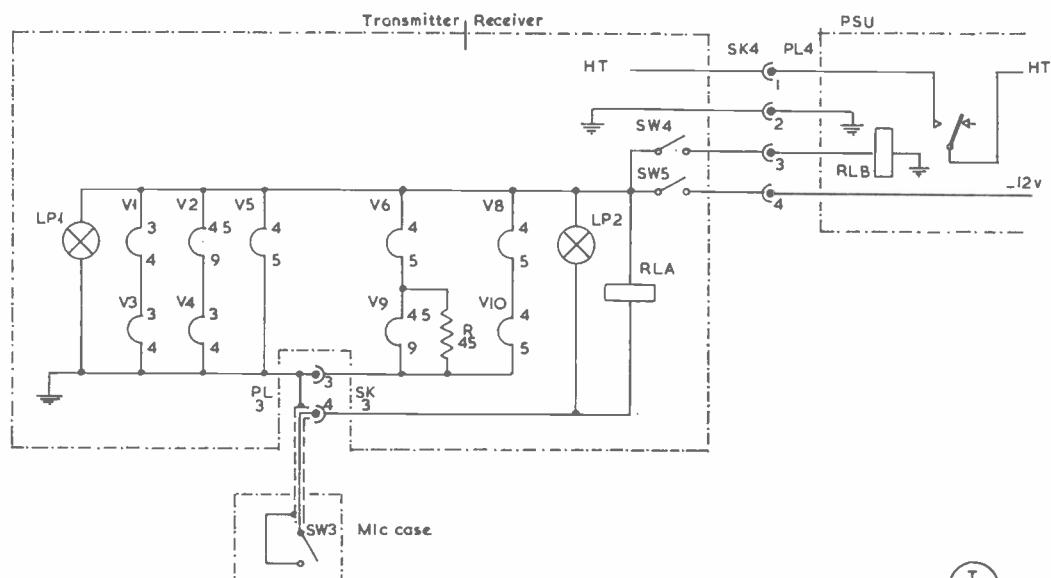


Fig. 10 HEATERS AND CONTROL CIRCUIT

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the tuned grid circuit of the RF stage. This permits the use of a 2-gang tuning condenser with a consequent space and cost saving. It also simplifies PA tuning, since if a signal is peaked with VC4 on "receive," the PA circuit will be resonant for "transmit," and *vice versa*. Of course, there is still the limitation of the narrow bandwidth of the loaded whip.

There is a loss of sensitivity outside the tuning range of VC4, but this is no drawback since the band is adequately covered. Trimmers were found to be unnecessary on VC1 and VC2 as tracking was satisfactory over the small tuning range used.

Valves specified were chosen simply because of their availability at the time and obviously they could be improved upon, but their performance is adequate.

Figs. 5 and 6 give a guide to the positioning of the major components. In general, resistor and capacitors are wired between the valve bases and tag strips. Although L1 and L2 were used without their screening cans to save space, no trouble was experienced due to coupling.

The audio output transformer should be the midget type, about 1½ in. wide, 2½ in. long, and 1½ in. high. A larger component could be mounted separately with the loudspeaker, but this entails HT connections on the rear panel involving a more complicated socket. The speaker can be mounted on a bracket under the parcel shelf to the right of the main unit, or elsewhere, depending on its size.

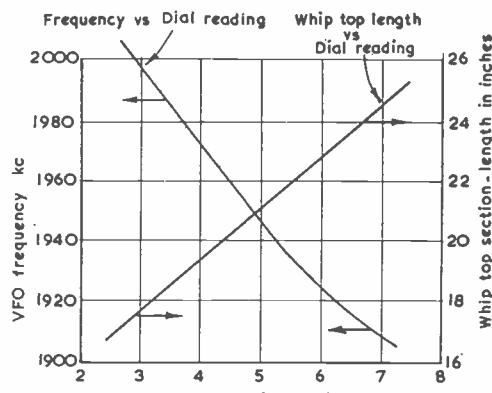


Fig. 11.

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Fig. 11. Calibration curves obtained on the G3SFL/M equipment—see text.

Alignment of the Receiver is not described, as this is covered adequately in a large number of radio publications. It was carried out by the writer—in the dark, by torchlight using only a trimming tool—with no previous experience of superhet alignment.

[over]

Fig. 7. Some further constructional details.

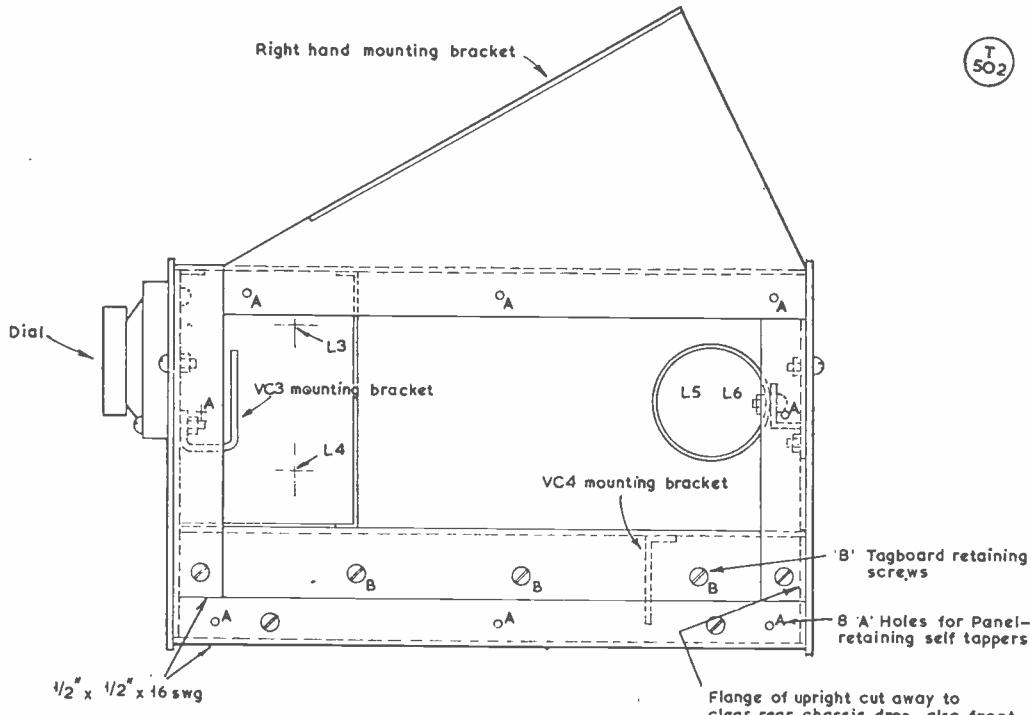


Fig. 7: ELEVATION ON TRANSMITTER SIDE — side panel removed

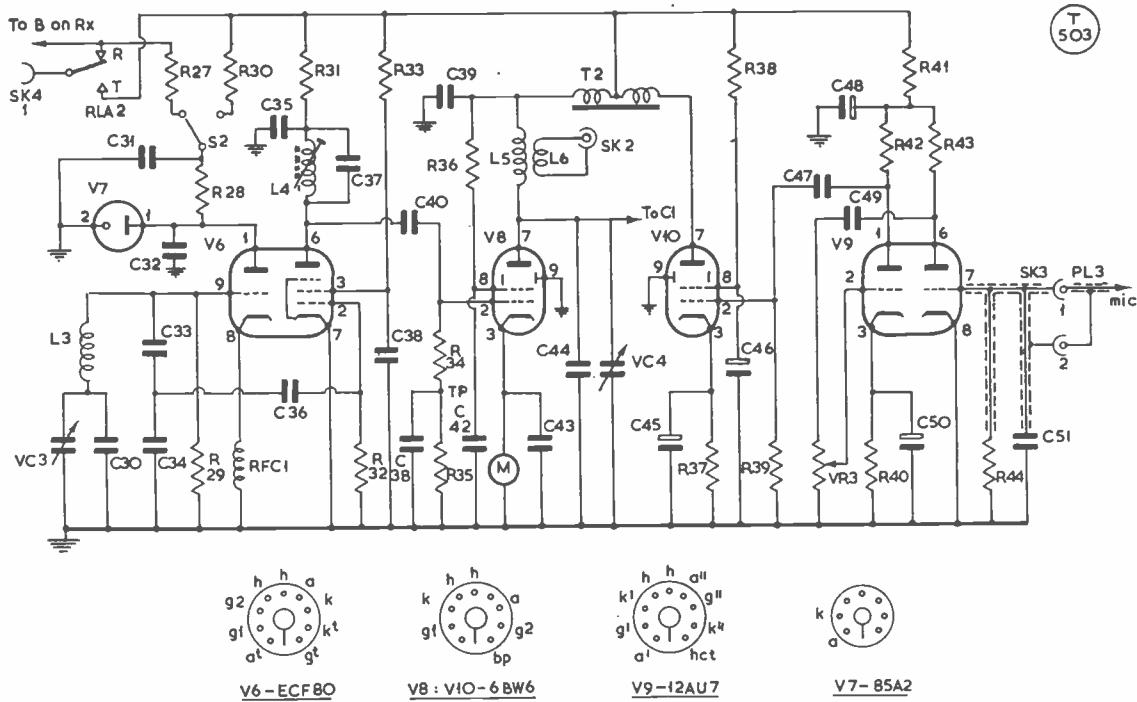


Fig. 8 TRANSMITTER SECTION

Table of Values

Transmitter/Receiver sections, G3SFL/M, Figs. 8 and 9

C1, C17 = 22 $\mu\mu$ F tub. cer.	R3, R13 = 68 ohms	SK4 = Battery socket 4-way	V1, V3 = EF92, W77, 9D6, etc.
C2, C3,	R4, R8, = 2,200 ohms	PL3 = Recorder con. plug 5-way	V2 = 12AH8, 20D3
C4, C5,	R6 = 33,000 ohms	PL4 = 6 Battery plug 4-way	V4 = 6AT6, EBC90, DH77, etc.
C6, C8,	R7 = 220 ohms	T1 = Output transformer 40 : 1 ratio	V5 = PCL83
C13, C14,	R10 = 27,000 ohms	T2 = Modulation trans-former (text)	V6 = ECF80
C15, C19,	R15, R16,		V7 = 85A2
C22, C31,	R21, R39 = 470,000 ohms		V8, V10 = 6BW6
C32, C35,	R18 = 270,000 ohms		V9 = ECC82, 12AU7
C38, C39,	R19 = 3,900 ohms		
C41, C47,	R20, R43 = 220,000 ohms		
C49 = .01 μ F disc. cer.	R23, R37 = 330 ohms		
C7, C9,	R27, R30,		
C16, C26 = .1 μ F	R36 = 10,000 ohms		
C10, C12,	R28, R35 = 1,000 ohms		
C18, C20,	R31 = 4,700 ohms		
C27, C28,	R34, R38 = 15,000 ohms		
C36, C40,	R40 = 1,500 ohms		
C51 = 100 μ F tub. cer.	R41, R42 = 100,000 ohms		
C11, C33,	R44 = 2.2 megohms		
C34 = 1,000 μ F silver mica	R45 = 47 ohms		
C21, C24,	RV1 = 10,000 ohms lin.		
C45, C50 = 25 μ F 25v. elect.	RV2 = 500,000 ohms log.		
C25 = 4.7 μ F tub. cer.	RV3 = 500,000 ohms log.		
C29 = 140 μ F silver mica	VC1, VC2 = 365 $\mu\mu$ F twin gang. var.		
C30 = 2 \times 39 $\mu\mu$ F in par., N750K.	VC3 = 50 μ F var.	L1 — Denco soil Range 3 "yellow."	
C37 = 120 μ F tub. cer.	VC4 = 150 μ F var.	L2 — Denco coil Range 3, "red."	
C42, C43 = .003 μ F tub. cer.	RFC1 = 2.5 mH choke	L3 — 40g. DSC would to 1 $\frac{1}{2}$ in. length on $\frac{1}{2}$ in. diam. former.	
C44 = 68 $\mu\mu$ F silver mica	SW1, SW4,	L4 — Denco coil Range 2 "blue."	
C46 = 8 μ F 350v. elect.	SW5 = SPST, toggle	L5 — 46 turns 22g. enam. on 1 $\frac{1}{2}$ in. diam. former.	
C48 = 4 μ F 350v. elect.	SW2 = SP change-over	L6 — 4-turn link on earthy end L5.	
R1, R5, R11 = 1 meghomh	SW3 = SP, push-to-make	IFT1, IFT2 — Denco Type IFT/II, 465 kc.	
R2, R9, R12, R17,	SK1 = Sub-min. Jack socket	BFOT — Denco Type BFO/2, 465 kc.	
R24, R25, R26, R29,	SK2 = Coax socket	Miscellaneous: Two Model T.501 dials, 1 $\frac{1}{2}$ in. dia. One 0-50 mA meter. DPCO relay, 12v. activation. Lamp-holders, tag boards and tag strips.	
R32, R33 = 47,000 ohms	SK3 = Recorder con. socket 5-way		

TABLE OF COIL DATA

- L1 — Denco soil Range 3 "yellow."
 L2 — Denco coil Range 3, "red."
 L3 — 40g. DSC would to 1 $\frac{1}{2}$ in. length on $\frac{1}{2}$ in. diam. former.
 L4 — Denco coil Range 2 "blue."
 L5 — 46 turns 22g. enam. on 1 $\frac{1}{2}$ in. diam. former.
 L6 — 4-turn link on earthy end L5.
 IFT1, IFT2 — Denco Type IFT/II, 465 kc.
 BFOT — Denco Type BFO/2, 465 kc.
 Miscellaneous: Two Model T.501 dials, 1 $\frac{1}{2}$ in. dia. One 0-50 mA meter. DPCO relay, 12v. activation. Lamp-holders, tag boards and tag strips.

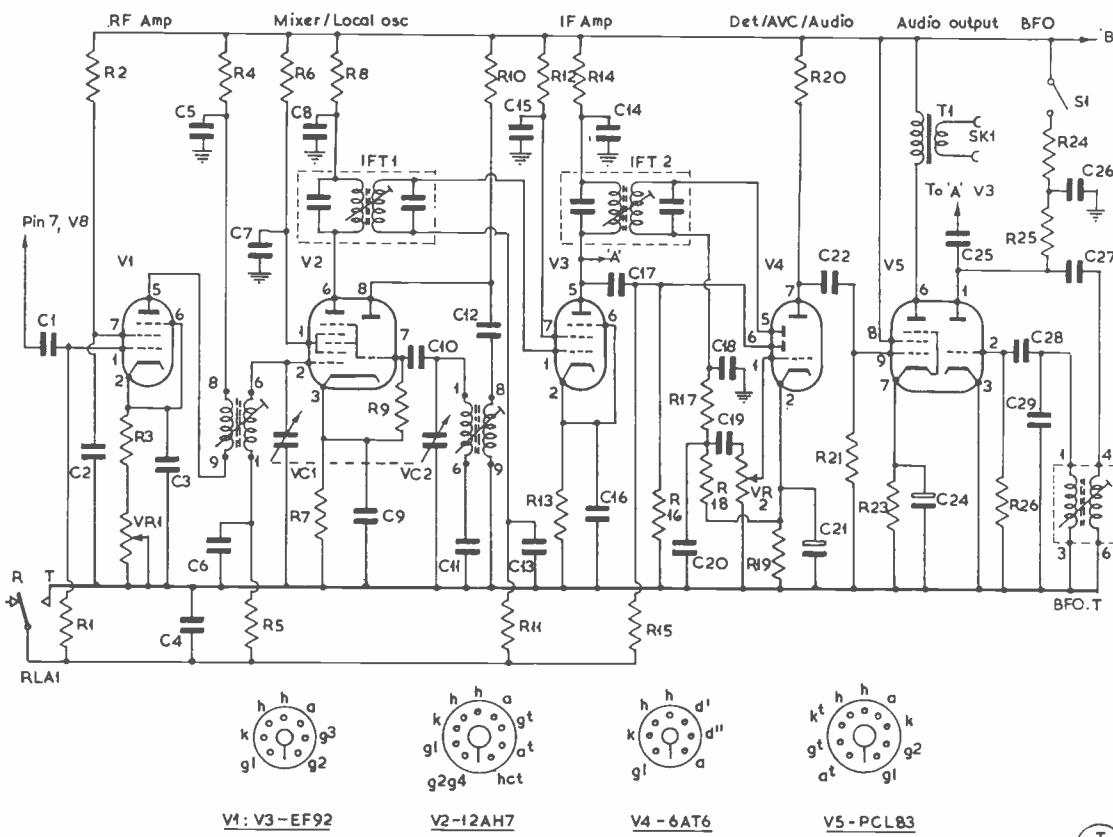


Fig. 9 RECEIVER SECTION

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504Fig. 9. The transmitter and receiver sections of the G3SFL mobile Tx/Rx
(to be read from the left of p.746).

Power Supply Unit

A transistorised PSU (ex-mobile commercial equipment in kit form and currently available) was used on the original. HT requirements are about 56 mA on "receive" and 90 mA or so on "transmit," at a nominal 270 volts, *i.e.* within the capability of a 30 watt unit. Primary power requirements are about 3 amps. on "receive," 3.7 amps. on "standby," and 4.5 amps. on "transmit," at a nominal 12 volts.

The PSU is mounted under the parcel shelf at the passenger's side and is fed from a connection provided for auxiliary equipment on terminal 2 of the Mini's fuse unit. It also has internal LT and HT fuses. LT feed to the inverter is switched by a relay in the PSU energised by SW4. This helps to prevent the inverter being run without load, which may cause damage, although bleeder resistors are also included for added safety.

Aerial

A suitable base-loaded whip was described in the June 1963 issue of SHORT WAVE MAGAZINE. It is in character with the rest of the equipment, being neat and as unobtrusive as a loaded whip can be. For those

who do not have access to this article some details of the writer's whip are given here.

It is basically a 2-section, collapsible car aerial (obtainable at Woolworths) with a loading coil inserted near the base. The coil former is a 12in. length of $\frac{1}{4}$ in. o.d. BP tube. The end plugs which attach it to the aerial were turned from *Tufnol*, but hardwood or plastics tubing would be suitable.

The former is wound with 28g. enamelled wire for about 10 $\frac{1}{2}$ in. and the end connections made to 6 BA screws passing through clearance holes in the former and end plug and tapping holes in the aerial.

The original mounting for the aerial was modified to enable it to be easily removed from the car wing when not in use. The end fittings differ somewhat on the aerials as purchased and some other modification may be necessary.

The aerial should be brought to resonance at the desired part of the band with the top section not fully extended, in order to allow some LF coverage. This can be accomplished with a GDO coupled to a link winding at the base of the whip, or directly using the Transmitter and adjusting the top section for maximum anode

current at resonance.

A useful piece of auxiliary equipment is a thin wooden lath which is calibrated to enable the top section to be set to the correct length for a given VFO setting. This makes it unnecessary to jump in and out of the car repeatedly to make adjustments by trial and error. For the writer's installation, as described and illustrated here,

a calibration graph for VFO dial setting in terms of frequency and whip top-section length is shown at Fig. 11.

Some useful practical information on design and resonating techniques for /M antennae on Top Band appeared in the May, 1967, issue of SHORT WAVE MAGAZINE.

COMBINATION AERIAL TUNER UNIT

PROVIDING ALSO DUMMY
LOAD AND SWITCHING FOR
MULTI-AERIAL AND
TRANSMITTER INSTALLATIONS

D. BYRNE (G3KPO)

HOW does the average radio-amateur who has two or three different transmitters, several aerials, an ATU, RF-ammeter, and perhaps a dummy-load, set about connecting all these various things together?

As like as not by means of odd lengths of coax, crocodile clips, or even—dare it be mentioned—with bits of twisted flex! Now this rather haywire (!) method of connection is obviously untidy, takes time and trouble, and is potentially dangerous. It is also so easy to make a wrong connection, and literally get one's fingers burnt.

Such hazards (and the untidiness) can be entirely eliminated by using the little box of tricks shown here, which combines a built-in aerial tuning unit capable of matching the *pi*-output of the transmitter into any random-length end-fed aerial, also a dummy-load, an

RF ammeter, two bulbs for modulation checking, a lightning arrester and a static discharger.

The two switches enable instantaneous selection of any number of transmitters to be fed into the dummy load or one of the bulbs, or alternatively to any number of aerials. One merely has to turn a knob in order to connect virtually "anything to anything," thus entirely eliminating the problem of juggling with coax plugs and sockets, croc. clips or bits of twisted wire! All is safely screened and earthed, so there is no danger of getting an RF burn. And no puzzling why the transmitter will not "load-up" properly . . .

The best layout principles are embodied in this compact unit, which has the inputs from the transmitters on the left-hand side, next to the switches, to keep leads short; the meter is at the centre, tuning knob on the right of the panel, and output coax sockets to the various aerials on the right-hand side of the cabinet. The dummy loads and high-impedance output insulator are on top, with the latter at the back—to bring it near the end-fed aerial lead-in and incidentally keep it well out of the reach of straying fingers. (You can get a kick from this terminal—even on Top Band!)

The Rotary Coil

This particular "magic box" is built around the ATU for the Canadian Marconi 52 Set, consisting as it does of a massive rotary-roller type of tuning coil, complete with vernier counter dial reading up to 1326. Thus, resetting to any particular reading is child's play. As supplied, the cabinet is of somewhat roughly finished wood, which is vastly improved by a rubdown with sandpaper and a coat of paint. But the front panel—bare apart from the counter dial and tuning knob—is sprayed grey, and takes transfers quite well to give it that "professional touch."

There is just—and only just—room inside the cabinet to mount the two switches (taken from an old TU unit) and the home-made lightning arrester and static discharger. However, both the tuning condenser and the dummy loads have to be mounted externally—on top, of course.

Now, although the ATU for the 52 Set is still obtainable on the surplus market at a quite reasonable price, it is rather scarce. No need to worry, as practically any rotary coil of reasonable size will suit—one of from 30 to 40 turns, two to four inches in diameter, for instance, will prove satisfactory. Failing that, why not wind your own low-loss coil and make taps every few turns, shorting out the turns by means of a 12-way Yaxley switch? A different approach, but the same thing in the end. (See Fig. 2.)

The tuning condenser can be of any medium capacity

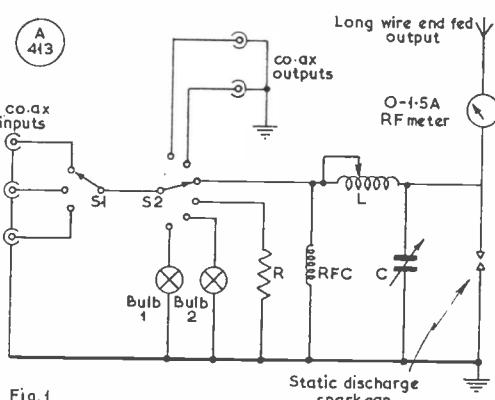


Fig. 1

Fig. 1. Circuit diagram of the unit. S1 is the input selector switch and S2 the output. R is 80-ohm high-wattage carbon, L a rotary-roller type tuner (see text) and C is 200 $\mu\mu$ F, wide-spaced.



General appearance of the completed Unit, after G3KPO.

of from 100 to 300 $\mu\mu F$ providing it is wide-spaced—in fact, the spacing should be as wide as that of the tuning condenser in the transmitter, otherwise it may spark across on modulation peaks. Those from the TU unit or Command transmitter really cannot be bettered for this purpose.

Dummy Load

The dummy load is an 80-ohm high-current carbon resistor ten inches long and an inch in diameter, mounted on three-inch standoff insulators for cooling purposes; it dissipates over 100 watts without any signs of cooking, but has a tendency to increase in resistance as it warms up. This particular type has been obtainable on the surplus market, but again, appears to have disappeared.... No worry, use a string of smaller resistances in series-parallel to total approximately 72 ohms. They must all be carbon, of course, but can be "over-run" considerably, as one does not use a dummy load for more than a few minutes at a time. In any case, you can switch off smartly when you smell cooking.

The bulbholders should really be of the old-fashioned

pot type, but modern bakelite ones work OK—even up to 30 mc. The cabinet is of dry wood, but even so the high-impedance output should be fed through a high-voltage porcelain "feed-through" insulator, as there can be quite a lot of high-Z RF at this point—note that it is mounted behind the dummy load, to keep it well out of

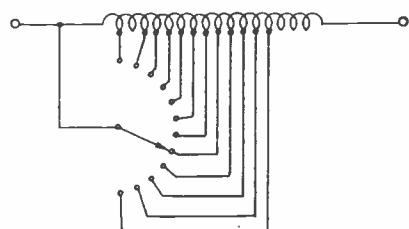


Fig. 2

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Fig. 2. A simple alternative to the rotary-roller type of inductance—a tapped coil with a low-loss 12-way switch to short out unwanted turns.

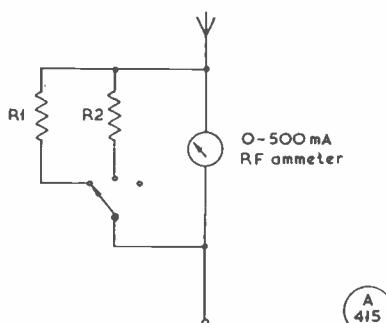


Fig. 3

Fig. 3. An aerial RF ammeter can be shunted if the range is not right for some bands, depending on aerial impedance and therefore current. R₁, R₂ can be made from fire-element wire.

harms way and as near the aerial lead connector as possible.

While the actual RF meter shown in the picture is of the hot-wire variety, scaled to 1.5 amp, a thermo-coupled type would prove more useful as its action is not so sluggish. The indicated current varies quite considerably from band to band, so that an 0.5 amp instrument would certainly make it easier to read small changes on some of the bands. However, in this case, a meter switch would have to be added in order to shunt parallel resistances across the meter when the current was high. (See Fig. 3.)

Construction

All internal wiring should be as direct as possible, using short lengths of coax cable, and not forgetting to earth *both* ends of the outer sheathing. Metalwork must be bonded together with copper-strip or braid, not wire, and the actual unit bonded with the same strip both to the transmitters and the station earthing point. Do *not* rely on the outer casing of the coax cable for earthing purposes, as this will very likely result in you getting a nasty RF kick every time you touch the handle of the rotary-coil or any of the switches!

Suitable braiding for earthing purposes can easily be acquired by peeling the outer sheathing from junk coax cable, and then flattening between the fingers. Alternatively, copper draught-excluder strip, as used on door and windows, comes in quite handy for this purpose.

If TVI is a problem in your particular area and you find it desirable to use a low-pass filter, or perhaps you have a much-prized SWR bridge or coax send-receive relay, then these should be placed as shown in Fig. 4. Our box of tricks is always placed next to the aerial, obviously!

It is absolutely imperative that a direct connection be made to a good earth, as with some lengths of end-fed aerials there will be quite heavy RF currents flowing in the earth lead. A long copper spike immediately below the shack window is ideal if the ground is kept permanently moist, and an old copper water tank buried deep is even better. But beware of connecting to indoor copper water pipes—authorities are going over to plastic! And never use the mains wiring earth, if only for the reason that it's too noisy.

Mode of Operation

Plug in the outputs from your different transmitters via the coax sockets on the left-hand side. You can build in as many or as few as you wish, but it might be useful to have a spare one for future expansion.

Do the same with the aerials, using the coax sockets on the right-hand side for low-impedance centre-fed dipoles, quarter-wave Marconi, or ground-plane, and the high-impedance stand-off insulator as the take-off point for your multi-band end-fed long-wire.

Switch the input knob to the transmitter you will be using, and the output switch to either low-impedance aerial (when the RF will be fed straight through the unit), or to the 80-ohm dummy load.

Tune and load-up the transmitter in the normal way until the anode current of the PA reaches its usual value. Then cut the transmitter and switch from dummy load to the long-wire aerial via the ATU, after first seeing that the coil is completely out of circuit, i.e., counter at zero. Switch on the Tx again, and keeping the aerial loading condenser at half-mesh, wind away at the roller-coaster coil until the aerial current meter reads maximum and the meters on the transmitter read normal, as when feeding into the dummy load.

The condenser can be used for final trimming, to get the RF meter to give its maximum value, but when correct, the tuning should be very broad so that considerable movement of the control will be needed to produce any significant change in meter reading.

This is the condition of highest efficiency when the coil itself consumes a negligible amount of power—all the RF is going into the aerial, as it should do when everything is well with any ATU instead of being dissipated round the tank circuit.

The roller-coil will match any random-length end-fed aerial into the low-impedance output circuit of any transmitter, be it a *pi* stage or link coupled. But remember that the actual amount of inductance required in series

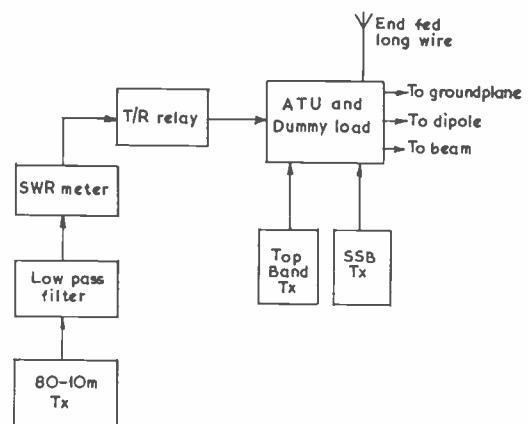


Fig. 4

A
416

Fig. 4. The order in which the items should be inter-connected to make full use of the ATU assembly described in the article.

with the aerial will vary greatly from band to band. If the aerial happens to be about half a wavelength long on one particular band, then it will present a very high impedance (several thousand ohms) to the ATU, and so quite a lot of coil will have to be in circuit in order to step-down this high-impedance to the low-impedance of the transmitter *pi*-tank. On the other hand, if the aerial is a quarter-wavelength long—or a multiple of quarter-waves—then it will have a low impedance, and so little if any inductance will be required for matching purposes. Intermediate lengths of aerial will therefore want medium amounts of coil in circuit.

Operation is very quick after the first tuning-up procedure, for once the correct settings have been obtained, the figures shown on the vernier tabulator can be jotted down, and used in future for re-setting to the exact number shown on the digital counter. One does not have to use the dummy load at all after the initial tune-up!

Another great advantage of the roller-coaster type of ATU inductance is that there are no separate plug-in coils to change each time you go from one band to another, no tappings to adjust, and no croc-clips to alter—all one does is to wind away on the single tuning knob until the correct number is dialled on the counter, or the RF ammeter reads maximum. The 52 Set ATU front-panel even has a small pad for jotting down the counter readings—everything provided except the pencil!

Point for Beginners

Some newcomers to Amateur Radio may wonder why it is really necessary to use an ATU at all when the *pi*-coupling of modern transmitters is considered capable of feeding into practically any type of aerial, irrespective of its actual impedance. This is correct up to a point, but only up to a point, the important thing to remember being that the *pi*-output stage only exhibits its excellent qualities of reducing the higher harmonics and thus TVI when it is fed into a *low* impedance. In fact, if a low-pass filter is used, this will be found to be specifically designed to work at low impedance, 50 or 72 ohms.

The Lamp Loads

Why two electric light bulbs? These have two separate uses. The first one is when adjusting transmitters of widely different power outputs—say, a five-watt Top Band rig and a 150-watt all-band job, or even an SSB linear. So, simply by moving the output switch, one can choose a ten-watt night-light bulb or a 100-watt.

In general, bulbs do not make ideal dummy loads because they exhibit both inductance and capacity (a dummy load should have neither!) and also have a resistance which varies tremendously according to whether the filament is hot or cold. However, they do make extremely useful practical output indicators when making adjustments to a transmitter, particularly in regard to depth of modulation. The advocated 22.6 per cent rise in aerial current when an AM transmitted is modulated 100 per cent can be roughly judged by watching the filament brighten as you speak into the mike. Downward modulation (perhaps due to incorrect matching of the mod. transformer or lack of grid drive), is immediately apparent out of the corner of the eye—without even

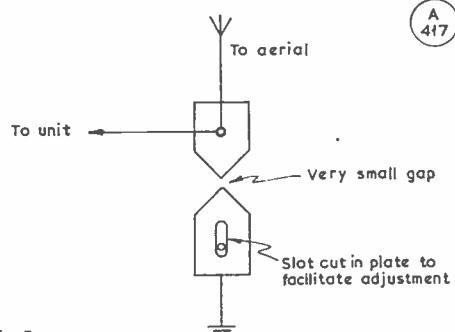


Fig. 5

Fig. 5. Construction of a simple but effective static-discharge gap—see text.

having to watch a meter.

The second use of these two bulbs is for actual measurement of RF power output and the efficiency of the PA stage. For this purpose, two identical bulbs are used, one being wired to the mains supply. The transmitter is then fed to the other, and when both glow with the same brightness, obviously they are consuming the same wattage. A piece of groundglass placed in front of them makes it easier to balance the two, but this is not too difficult as they are. As a practical example, if two 75-watt bulbs are used and glow with the same effect, then the actual RF output of the transmitter can be taken as 75 watts. If the DC input to the PA is 100 watts, then the efficiency is 75 per cent. This will be quite easy to obtain on 80 metres, but watch how the efficiency goes down as the frequency rises—you will be lucky to get 50 per cent efficiency on 28 mc!

Protection

Finally, provision should be made for keeping the long-wire aerial at earth potential from the DC point of view, so that it will form a quite efficient lightning arrester.

An RF choke placed on the input side of the rollertuner will only have low voltages developed across it—low-impedance, hence low-voltage—but it will effectively earth the aerial, as well as acting as a "short-circuit" to the HT should the RF by-pass condenser in the transmitter break down. The fuse will blow, and save the HT going on to the aerial.

A static discharger should also be provided between the high-Z output terminal and chassis. This can be easily fabricated out of two pieces of thin copper, cut to points with tin snips, as in Fig. 5. Keep the gap as small as possible, but not so small that it sparks over when keying! At a pinch, use a clean sparking plug as a static discharger, but be sure it is really clean inside. A new one is best. In thundery weather, the static will discharge continuously across the gap, instead of building up on the aerial until there is an almighty crack across an insulator—or worse still, across your transmitter condenser. Of course, beams and dipoles are automatically earthed by means of their outer coax casing—or should be if left plugged into this unit.

THE NEW EDDYSTONE 990R VHF RECEIVER

GENERAL DESCRIPTION, AND SOME PRINCIPAL DETAILS

ONE of the most versatile and compact professional VHF receivers ever designed by Eddystone Radio Limited is designated the 990R. It is completely solid state (using 39 transistors and 14 diodes) and big sales are expected for applications such as interference and noise measurement and detection, as well as normal communications work on land and sea. The 990R can be operated directly from a battery supply. Thus, it can be used in a wide variety of portable roles, including road vehicles, small or large boats, and even light aircraft, without any additional facilities apart from an aerial. (A mains power unit forms an integral part of the receiver.)

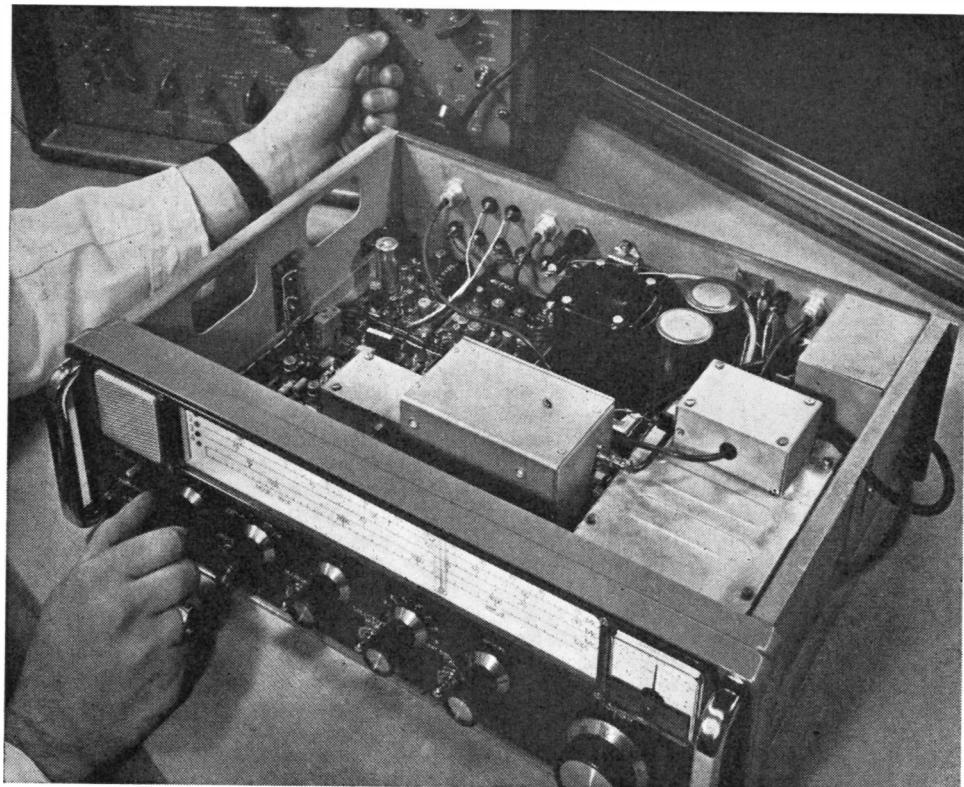
The complete tuning range of the 990R is 27-240 mc, covered in four switched bands. The local oscillator arrangement provides for free running throughout the range of the receiver or permits up to eight crystal

controlled channels to be selected. The flexibility is further increased by the provision of a socket for an external synthesiser. Filters are included giving bandwidths of 30 kc and 200 kc, although other bandwidths can be provided. The 990R is designed to be operated with the Eddystone Panoramic Display Unit (Type EP17R) if required, to provide an analytical display of all signals received over a given section of the frequency spectrum. An internal crystal calibrator gives reference points at 10 mc intervals. It has a tuning meter, also a muting system which silences the receiver in the absence of a signal; this reduces operator fatigue on long listening watches.

The 990R is arranged as a superhet together with a number of additional circuits, of a high degree of technical elegance. Printed wiring techniques are employed extensively and high-grade components are used throughout. Special attention has been paid to the layout to allow easy servicing.

RF Section

This employs a high-gain RF amplifier, a low noise mixer and a comprehensive local oscillator system with a total of five transistors. An associated circuit is the crystal calibrator which involves two transistors. The whole section is sub-divided into three parts.



The new Eddystone 990R is claimed to be one of the most versatile and compact VHF (27 to 240 mc coverage) receivers ever designed. It is completely solid-state, suitable for mobile, portable or fixed-station operation in a variety of applications over the metre bands and, though a mains PSU is built in, it can be run directly from a battery supply if required.

The five stages of the local oscillator provide for continuous tuning over the whole range, spot frequency working on up to eight switch-selected crystal-controlled channels, or continuous coverage using external synthesized drive equipment when high-stability operation with flexibility of frequency selection are required. The method of oscillator control is selected by a system switch which also serves as "crystal-selector." Local oscillator injection is always higher in frequency than the received signal frequency, the IF being 10.7 mc.

The IF section has four amplifier stages and detection for AM/FM/CW and video reception. Two IF bandwidths are available, selected by a panel control.

Circuitry associated with the IF section includes the AGC system, muting circuits and video amplifiers.

AGC Circuits and Gain Controls

Separate manual gain controls and AGC are provided for the RF stage (together with the IF pre-amplifier) and the IF stages. The desired mode of operation is selected by the "Manual/AGC Switch" which routes the base returns of the various stages to the appropriate parts of the circuit.

A sensitive graduated microammeter is fitted for relative carrier level measurement and is also usable as a

tuning indicator, and is scaled in arbitrary divisions (0-10). The muting suppresses noise voltage at the output of the FM discriminator (in the absence of a signal). Circuit constants are chosen to give maximum amplification at frequencies above the speech and music range.

Two transistors form a low-level audio amplifier for connection to 600-ohm line circuits. Gain adjustment is by a pre-set control; maximum output is limited to 10 mW. Output can be arranged to suit balanced or unbalanced lines. The high-level amplifier employs a total of five transistors and provides output for an external loudspeaker, an internal low-level monitor speaker and low impedance telephones.

Typical Performance Data

Some figures for the 990R are: *Noise Factor*, of the order of 10 dB. *Sensitivity*, 5 μ V for 10 dB S/N ratio with 50 mW AM output at 30 kc selectivity. *Calibration Accuracy*, within 1 per cent, markers at 10 mc intervals, 27 to 240 mc. *Frequency Stability*, 1 part in 10^5 per $^{\circ}$ C change in ambient temperature; of the order of 1 part in 10^6 per $^{\circ}$ C under crystal control. *AGC Characteristics*, audio output level does not change by more than 10 dB for an increase in input of 80 dB above 10 μ V.

SOLID STATE MODULES

TRANSISTORING A BC-454

Part II

D. R. DRYDEN (G3BKQ)

In our December 1967 issue, we started this interesting article, explaining how plug-in modules, using transistors or FET's, can be constructed on standard valve bases to be pluggable replacements in an existing receiver. Here, our contributor takes the example of the BC-454—a well-known surplus type, in wide use—to show how its various stages can be replaced, without undue complication but with results that can make even an old design like the BC-454 into a very much better Rx, with improved gain and selectivity and a much lower inherent noise figure. This article should be read with Part I, so that all points are clear.—Editor.

FIVE basic modules are used, one of each being required. They are: (1) RF Module, (2) Mixer Module, (3) 1st IF Module, with electronic attenuator, (4) 2nd IF Module, (5) BFO Module. These are all depicted in Figs. 5, 6, 7, 8. The pin numbers refer to those used on the corresponding valve-bases. These modules can be assembled on an octal valve base. American metal-cased types of valve (e.g., 6SG7, 6SJ7, etc.) are easily stripped of their electrodes and leads, and the transistors and components then mounted on the base. The metal envelope is replaced to produce a well-screened

unit. Examples of such assemblies were shown in the photograph on p.615 of the December issue.

The audio amplifier is either constructed on fibre-glass board, and mounted in the rear of the receiver in place of the dynamotor, or constructed on the modular principle and plugged in instead of the 12A6 output pentode. Alternatively, a cheap amplifier could be purchased, since there are several suitable ones available. The original BC453/4 circuit is modified as in Fig. 9, and indicates the location of the modules, and the extra circuitry required for the detector, AVC, RF gain control, etc.

All the heater leads are removed from the underside

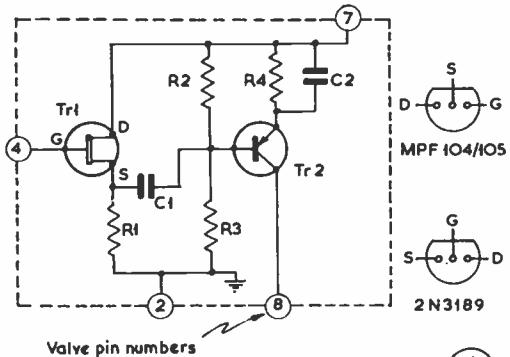


Fig. 5. RF stage and 2nd IF module, with connections to replace a 6SK7 valve. Values are: C1, .001 μ F (C2 for a 2nd IF only); R1, 3.3K; R2, 22K; R3, 100K; R4 (RF stage only), 1K; R4 (2nd IF only) 330 ohms; Tr1, 2N3819, MPF104 or MPF105; and Tr2, OC170/171.

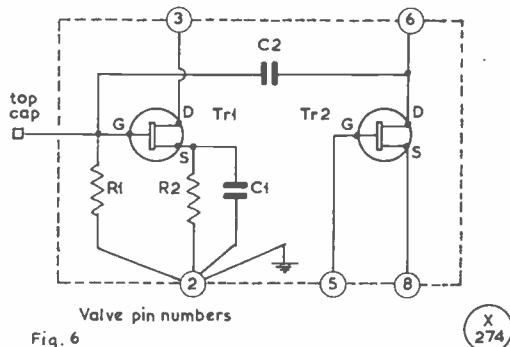


Fig. 6

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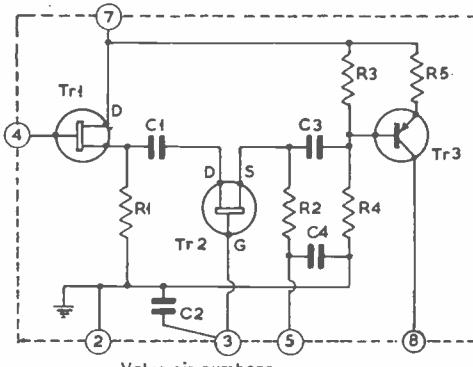


Fig. 7

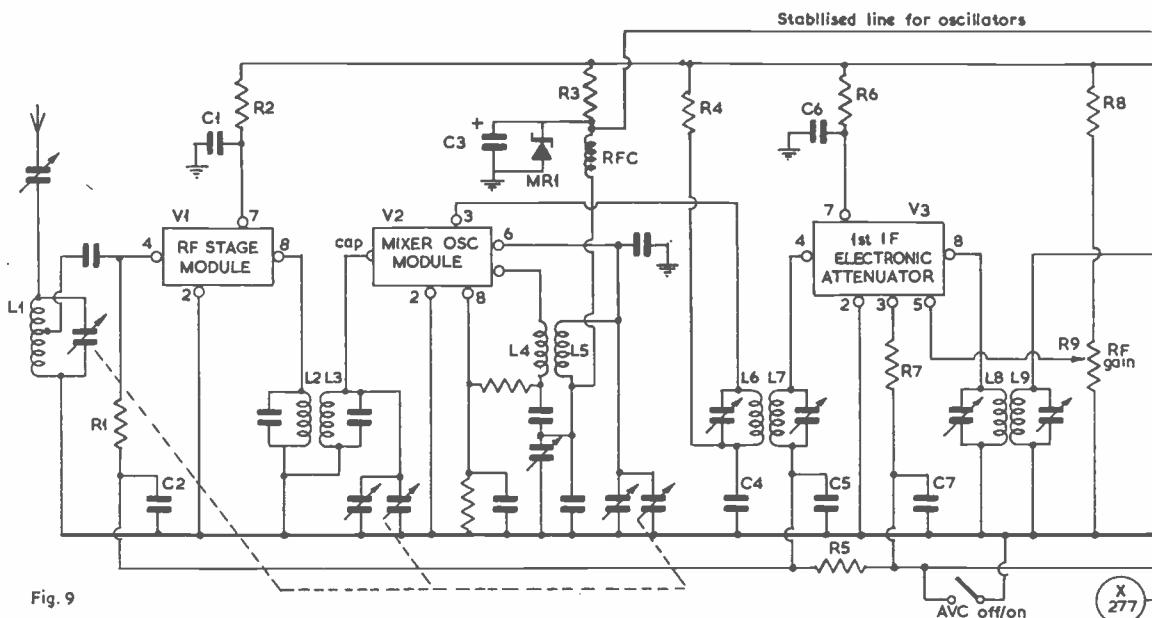
X 275

of the unit, together with the screen HT leads. All the suppressor connections are also taken off. It is strongly recommended that the potted capacitors be discarded, and only three of the existing resistors are used in the modified circuit. The BFO coil is retained.

The RF-Mixer-Oscillator coil unit is removed by unfastening the two retaining screws at the side of the chassis, and lifting it out to expose the coil-plugs. These are disposed as in Fig. 10. A 2.5 mH RF choke is connected on the oscillator plug to the blank pin 4, using a covered lead. The other end of the RF choke goes to the 12v. HT line, via a zener diode. The coils may now be replaced. The 12v. HT line and decoupling networks are rewired and fitted according to the modified diagram in Fig. 9. Small resistors and condensers common to

transistor radio practice are eminently suitable. The HT end of coils L2 (RF stage anode), L8 and L10 (IF coils) are earthed to the chassis.

AVC is applied to the RF stage and to the first IF stage, as shown in the diagram. The BFO coil is removed and an additional 220 μ F condenser is connected in series with C27 across the coil. The BFO coil is then replaced, also this winding has a lead connected to pin 6 of V7, which is retained. The remaining leads are removed, and the end of the coil earthed down, as in Fig. 9. The remaining modifications are self-evident, and although the job looks complex, in practice it is easy and quick once the modules are assembled ready to plug in.



X 277

Check the HT wiring carefully, and switch on the HT (12v. DC) with no modules in place. Check the HT current, which should, at this stage, be about 10 mA. Then plug in the modules one at a time, starting with the RF modules. The current increments should be as follows: RF stage, 1.8 mA; Mixer/Oscillator stage 4.0 mA; 1st IF, 1.8 mA; 2nd IF stage 3.0 mA; Audio Amp. 1.5 to 3.0 mA (for the recommended circuit). The total current should be about 17-20 mA with no signal applied to the receiver.

If the aerial is now connected, the RF and audio gains turned up, and AVC applied, it should be possible to tune in a signal. Select a weak one, and peak the IF coils. The tracking of the oscillator coils will be unchanged, but the *input* trimmer and *mixer* trimmer will require adjusting to give maximum output. The alignment is now complete. A strong signal will increase the current drain to 50-100 mA, due to the Class-B audio output stage

Table of Values

Fig. 9. The BC-454 Modification by G3BKQ

C1, C2, C4, C5, C6, C8 = .05 μ F C3 = 10 μ F, 12v. C7 = .01 μ F	R3 = 220 ohms R8 = 33,000 ohms R9 = 25,000-ohm potentiometer
C9, C10 = 220 μ F C11 = 0.1 μ F C12 = 250 μ F, 16v.	R12 = 500,000 ohms R13 = 50,000 ohms R14 = 250,000-ohm potentiometer
R1, R5, R7, R11 = 1 megohm R2, R4, R6, R10 = 470 ohms	Mr1 = 9v. zener diode Mr2 = OA5 diode

Notes: Only added components are shown here. Parts differing from the original are alone numbered. RFC is a 2.5 mH RF choke. A pair of PP1 batteries (6v. each) will suffice for power.

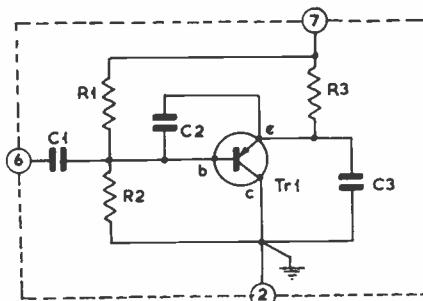
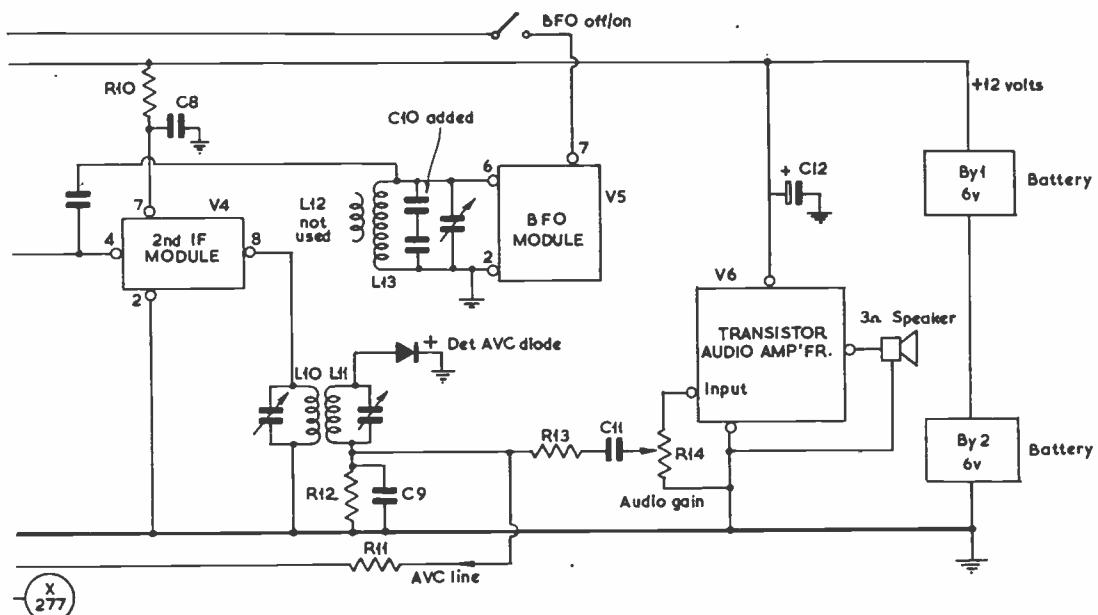


Fig. 8

X 276

Fig. 8. The Vacar circuit BFO module, excellent for short-long-term stability and specially suited to single-frequency working. C1 is 100 μ F; C2, C3, .001 μ F; R1, 4.7K; R2, 10K; R3, 2.2K; and Tr1, OC170/171.

opening up. Owing to the great increase in selectivity, tuning will be very sharp. Also the noise-figure of the modified receiver will be much lower than the original, which can be deceiving. Disconnecting the aerial seems to leave the set dead. However, a short length of wire connected to the aerial socket will immediately produce an output. The BC-454 is particularly useful as a tunable IF amplifier for a 2m. or 70 cm. converter. Note that the above procedure calls for weak signals to be located at maximum RF gain, AVC on. A very strong signal will reduce the gain of the set by 100 dB, AVC on. The range of the manual RF gain control is around 32 dB. If a single module is used to try out the effect of the modification of a single stage, care should be taken to disable the AVC applied to the module. Valve receivers require a very much higher AVC voltage than do the modules, and



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V3, 1st IF and attenuation, V4, 2nd IF; V5, BFO module; and V6, transistor amplifier.

Fig. 10. Underside of BC-454, to locate items mentioned in the text.

if the existing AVC is applied, the module will probably be almost cut off, and its performance will appear disappointing. As the number of modules is increased, this problem becomes less acute. The overall gain attainable exceeds anything which can be realised using valves, but owing to the existing layout of the coils, the usable gain is limited by regeneration problems. As described, the modified set produces useful output for less than 1 μ V in. A two-metre conversion for the RF stage will be shown later. This circuit produces a gain of 80-100, with a noise-figure of around 2 dB. The author acknowledges valuable help from G6CIK/T, who built and operated a BC-454 conversion rig, and to SWL Nutting for helping with the author's own rig.

"VHF BANDS"—RESUMPTION

We are glad to be able to announce that, with effect from our forthcoming (March) issue, "VHF Bands" will be resumed as a regular monthly feature. It will be conducted by a well-known personality on the VHF air—Gp. Capt. A. H. Dormer, M.I.E.R.E. (G3DAH), R.A.F. (retd.).

Licensed in 1946, Mike Dormer was first active as VS1BD. On his retirement from the Royal Air Force—with a considerable record of service in the Signals Branch, at home and overseas—G3DAH turned his attention to VHF as his main interest, and is now regularly on two metres and 70 centimetres, with gear for 4 metres recently installed.

We are sure that readers interested in and active on VHF will welcome his appointment as successor to A. J. Devon (whose own energies will henceforth be devoted to other aspects of Magazine work). G3DAH having now assumed the mantle and taken his seat in the chair, he will look forward to hearing from the VHF fraternity. The annual tabular matter will be re-started w.e.f. January 1, 1968. All correspondence should be addressed (only) to: "VHF Bands," Short Wave Magazine, Buckingham—and, for the March issue, must reach us by Saturday, February 3.

LASKY'S RADIO—35 YEARS

The business of Lasky's Radio, Ltd., was started in 1932 in the Harrow Road, Paddington, London, supplying valves, wireless parts and equipment to the relatively small body of enthusiasts of that period. Since then, there has been tremendous expansion and Lasky's now have five branches, two of which are devoted to Hi-Fi and

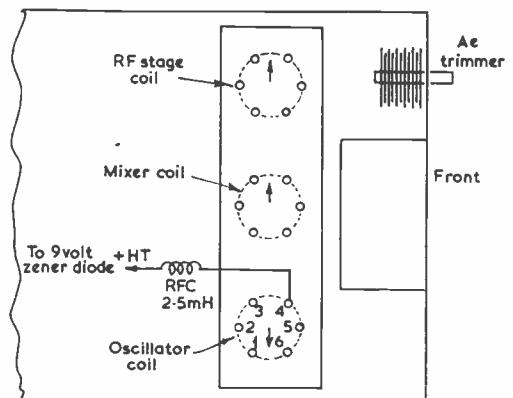
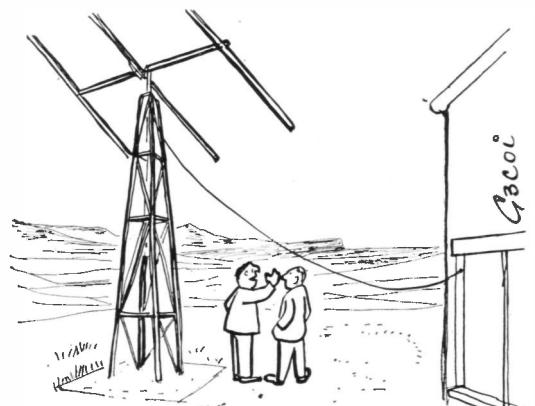


Fig. 10 Underside of BC-454

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associated interests. Additionally, there is a large mail order department, from which they deal in radio and electronics components and apparatus of every kind with customers throughout the world.

To celebrate their 35 years in the radio business, Lasky's have produced a 12-page, newspaper-size, pictorial catalogue, which offers customers all the facilities and benefits of direct mail order—and there is a gift-voucher scheme incorporated with the catalogue. Large stocks are held of everything listed and rapid delivery is assured from a modern mail order organisation. Lasky's Radio, Ltd., 3-15 Cavell Street, Tower Hamlets, London, E.1 (Tel: 01-790 4821).



"... And I hear they want to ruin this lovely view with pylons ..."

PRACTICAL TOP BAND TRANSMITTER CIRCUITS

SOME TRUSTWORTHY DESIGNS DERIVED FROM EXPERIENCE AND EXPERIMENT

F. G. RAYER, A.I.E.R.E. (G30GR)

IT is very clear that there is considerable interest in straightforward transmitter circuits which allow the newly licensed operator (or old hand) to get on the air with the minimum of expense and difficulty. Valve equipment of this type, with cheap popular valves, readily available, makes it easy to build one's own rig practically on a "switch on and speak" basis.

On Top Band the 10-watt limit also favours low-cost receiver type components and the circuits given here are termed "trustworthy" because they really do work without snags. The finished transmitter will have three sections: (1) RF section, (2) Modulator, (3) Power supply. These can occupy one chassis, or be in two or three separate units. One chassis, or RF and modulator plus separate power pack, seems most convenient.

Sundry equivalent and similar valves may be substituted in all stages. Component layout is generally flexible, essential precautions being mentioned.

Crystal Control

Buying crystals is scarcely worth while, but if any

for 1.8-2.0 mc are to hand Fig. 1 can be hooked up rapidly, leaving space for a VFO. VC1 is the 6C4 oscillator tuning capacitor, adjusted so that a meter at X shows 2-3 mA grid current. L1 is 90 turns, 34g. silk covered, in a pile on a $\frac{1}{2}$ in. cored former. Or fit a surplus medium-wave receiver coil, removing turns as needed.

The 5763 PA will take up to 50 mA at 300v. (15 watts) the SG then needing 5 mA at 250v. If PA anode voltage is V and anode current is I then $V \times I$ must not exceed 10 watts, with any of the circuits. As example, 30 mA at 300v. = $300 \times 0.03 = 9$ watts.

C6 has short leads, from cathode to chassis. C7 and R5 are at the key jack. PA tuning is as described later.

VFO Transmitter

Variable frequency oscillator control is of course usual, and allows working any frequency without crystals. Fig. 2 has a VFO, buffer, and PA. For immediate coverage without fiddle L1 can be a Wearite PHF6 coil (Home Radio, Mitcham) with

Table of Values

Fig. 1. Circuit of a Crystal-Controlled Tx

$C1 = .05 \mu F, 250v.$	$R1 = 22,000 \text{ ohms, } \frac{1}{2} \text{ w.}$
$C2 = 100 \mu \mu F, \text{ mica}$	$R2 = 10,000 \text{ ohms, } 1 \text{ w.}$
$C3, C4 = .002 \mu F, \text{ mica}$	$R3 = 22,000 \text{ ohms, } 1 \text{ w.}$
$C5, C6,$	$R4 = 5,600 \text{ ohms, } 2 \text{ w.}$
$C7 = .005 \mu F, \text{ mica}$	$R5 = 270 \text{ ohms, } \frac{1}{2} \text{ w.}$
$C8 = .001 \mu F, \text{ mica}$	$\text{RFC} = 2.5 \text{ mH, } 60 \text{ mA}$
$VC1 = 100 \mu \mu F, \text{ air-spaced var.}$	$X = \text{Crystal for band }$
$VC2 = 250/500 \mu \mu F, \text{ air-spaced var.}$	$1.8-2.0 \text{ mc}$
$VC3 = .001/0.0015 \mu F, \text{ BC-type gang var.}$	$L1, L2 = \text{see text}$
	$V1 = 6C4$
	$V2 = 5763$

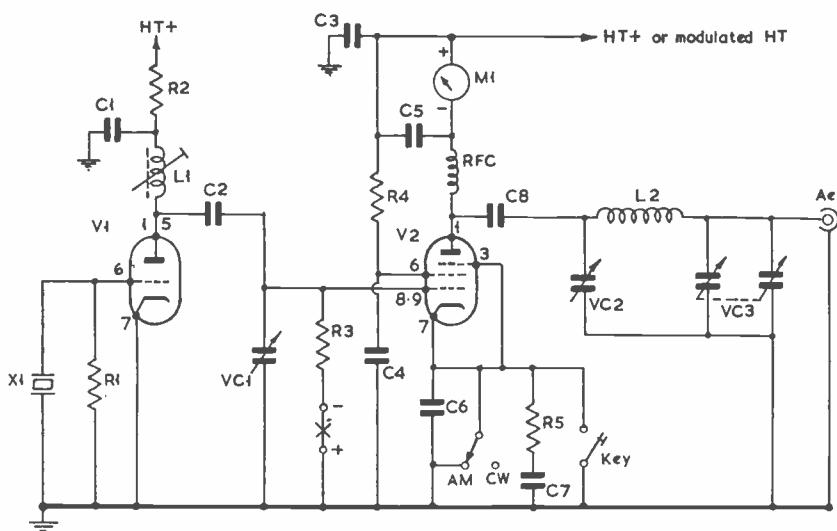
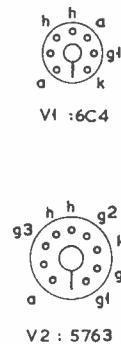


Fig. 1

Fig. 1. Circuit of crystal-controlled Top Band transmitter.



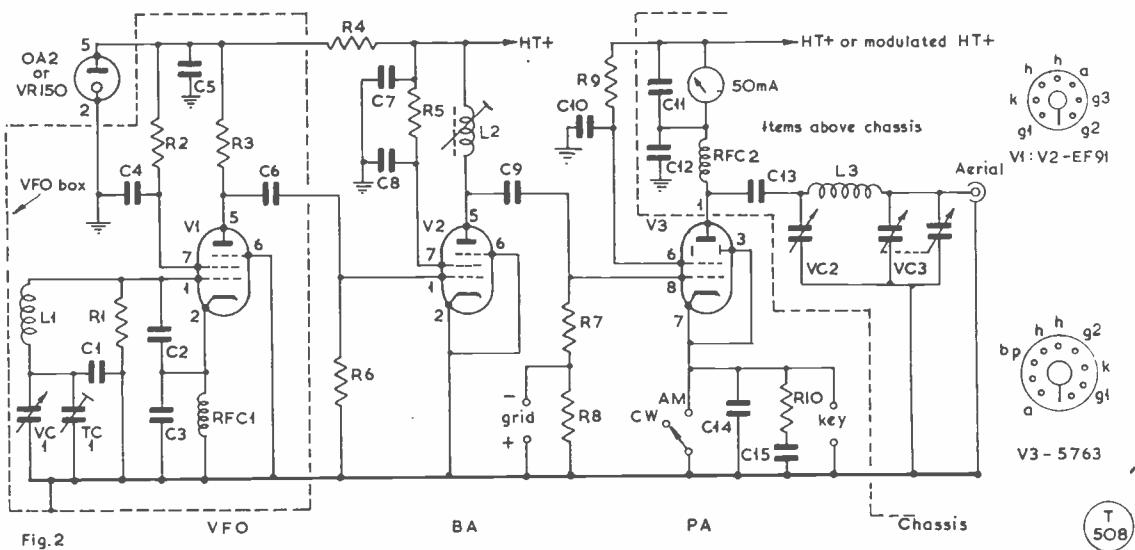


Fig. 2. Three-stage VFO controlled 160m. transmitter.

windings in series. Set VC1 half open, and rotate T1 until the signal appears at 1.9 mc on the receiver.

The VFO is accurately calibrated (after all constructional work has been completed) at 1.8, 1.9 and 2.0 mc, by tuning a receiver to these frequencies, as shown by a 100 kc crystal marker, then adjusting the VFO to zero beat. To calibrate at 1.85 and 1.95 mc, tune the receiver to 3.7 and 3.9 mc with the 100 kc crystal, and listen for the VFO 2nd harmonic. Other markings are inserted by estimation.

The screening compartment can be a small inverted U-shaped chassis with flanges bolted to main chassis and panel, the back afterwards being closed by a plate held with self-tapping screws. The EF91 holder can be on top of this box.

RFC1 is a 2.5 mH sectional SW choke, miniature cored choke, or similar item. RFC2 is a 60 mA 2.5 mH RF choke. L2 may be a choke, or resonant at about 1.9 mc. A meter clipped to "grid" points should show about 2.3 mA over the band. Old valve receiver medium wave aerial coils do for L2, with unused windings removed. Adjust the core at the middle of the band, for best grid current. L2 is under the chassis.

Items to the right of the double line (PA output) are above the chassis. This offers a natural layout. A 6BW6 PA gives equal results; so does an 807 or miniature 807.

If you prefer to wind L1, then 95 turns of 34g. enamelled wire, side by side on a $\frac{1}{4}$ in. dia. cored former previously smeared with adhesive, will do.

For a good 300v. HT supply and 20 mA regulator current, R4 is 10K 5-watt. But if the HT supply is a bit meagre R4 can be 20K, for 300v. For 250v. 10K 3-watt is satisfactory.

Table of Values

Fig. 2. Three-stage VFO-controlled Tx

C1 = .56 μF , 1% silver mica	R1 = 68,000 ohms, $\frac{1}{2}$ w.
C2, C3 = .002 μF , 250v.	R2 = 47,000 ohms, $\frac{1}{2}$ w.
C4, C11 = .001 μF , 250v.	R3, R7 = 22,000 ohms, 1w.
C5 = .002 μF , 250v.	R4 = 10,000 ohms, 5w.
C6, C9 = .100 μF , mica	R5 = 33,000 ohms, 1w.
C7, C8 = .01 μF , 500v.	R6 = 100,000 ohms, $\frac{1}{2}$ w.
C10, C12,	R8 = 470 ohms, $\frac{1}{2}$ w.
C14 = .002 μF mica	R9 = 5,600 ohms, 2w.
C13, C15 = .001 μF , mica	R10 = 100 ohms, $\frac{1}{2}$ w.
TC1 = 30 μF , trimmer	RFC1 = 2.5 mH RF choke, midget or sectional
VC1 = 250/500 μF , air-spaced var.	RFC2 = 2.5 mH, 60 mA
VC2 = 250/500 μF , air-spaced var.	L1, L2, L3 = see text
VC3 = 2/3-gang, 500 μF or near per section	V1, V2 = EF91
	V3 = 5763

PA Tank Coils

L3 is 65 turns of 20g. or 22g. enamelled wire, side by side on a 1in. diameter paxolin tube. Or wind about 18ft. of such wire in this way on a $1\frac{1}{4}$ in. or 1 $\frac{1}{2}$ in. diameter tube.

A 240v. 15-watt house lamp is a suitable load for a test (but not when keying). Close VC3. Rotate VC2 for least anode current. Open VC3 slowly, meanwhile restoring the "dip" with VC2, until the wanted input is reached (say 30 mA at 300v.). With 8-10 watts input the lamp should light well.

In use, with various aerials, tuners, or surplus coils for L3, loading or tuning difficulties may arise.

(1) PA input (anode current) may be too large with VC3 closed. A low impedance aerial may be responsible. Shunt a

.001 μ F or so mica capacitor across VC3. Or place a tapped coil between transmitter and end-fed aerial connection, or use a tuner.

(2) Resonance may not be reached at the HF band end, with VC2 fully open. This indicates too many turns on L3.

(3) Resonance may not be reached at the LF end, with VC2 fully closed. VC2 may be too small—at least 250 μF is recommended and a 500 μF condenser is not too large. Or L3 may have too few turns, or the aerial feed impedance be too high, so that VC3 is open.

(4) PA input may be too low despite full anode voltage and grid current. Probably the aerial impedance is outside the range of the transmitter. A tuner will correct this.

(5) Loading from some lower input to 10 watts may not actually increase RF output. This can arise from insufficient grid drive (under 2 mA grid current) or poor HT supply (less than 250v.).

These points are mainly to be kept in mind when departing from the PA constants given, to use a coil or condenser that may be to hand.

Power Input

This is for anode only, the SG being ignored. Measure the anode voltage at the anode end of the RF choke, with full input. For good efficiency, it is wise to plan for a 300v. HT supply, though a 250v. 60mA receiver type supply is suitable temporarily.

The anode meter can be 50 mA, 100 mA, or any shunted meter capable of indicating around 30-40 mA. Shunts for 1mA or similar sensitive meters can be made from 28g. resistance wire.

Keying

Filter values shown are usually satisfactory. If HT is through a modulator transformer, short or

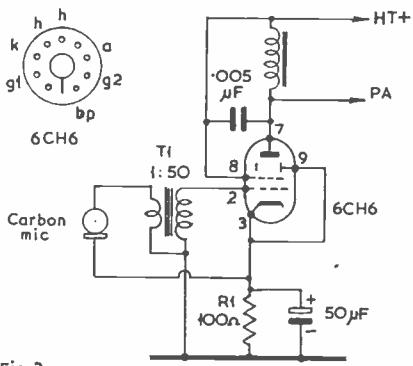


Fig. 3. An "economy" (or simplified) single-stage modulator, for a carbon microphone.

disconnect this winding when on CW. An adequate and thus well regulated HT supply is best for CW.

Modulating Circuits

Fig. 3 is about the easiest way to get adequate speech on the carrier. T1 is a microphone transformer or old speaker matching transformer, giving a step-up ratio of about 50:1. (A speaker transformer secondary forms the primary, here.)

Valves such as the 6BW6 and 6V6 can be used with some loss of gain. R1 is then 240 ohms. Since these valves have a cathode voltage rather high for many carbon microphones, make R1 from two resistors, or use a 250-ohm pre-set potentiometer with the microphone drawing current from the slider. Place another large capacitor from slider to HT negative line.

Three-Stage Class-A Modulator

Class-A modulators give good results with 10-watt and lower inputs to the PA, and Fig. 4 is a useful 2-valve circuit, for a crystal microphone. VR1 could be a 470K fixed resistor. A little more audio gain can be obtained (if wanted) by capacitors

Table of Values

Fig. 4. Class-A modulator for crystal microphone

C1 = .002 μ F, mica	R6 = 470,000 ohms, $\frac{1}{2}$ w.
C2 = 8 μ F, 350v.	R7 = 22,000 ohms, $\frac{1}{2}$ w.
C3, C4 = .005 μ F, mica	R8 = 270 ohms, 1w.
C5 = 50 μ F, 25v.	VR1 = 500,000-ohm potentiometer
R1 = 1 megohm, $\frac{1}{2}$ w.	V1 = 12AX7
R2 = 470,000 ohms, $\frac{1}{2}$ w.	V2 = 6BW6
R3, R5 = 3,300 ohms, R4 = 270,000 ohms, R6 = 470,000 ohms, $\frac{1}{2}$ w.	

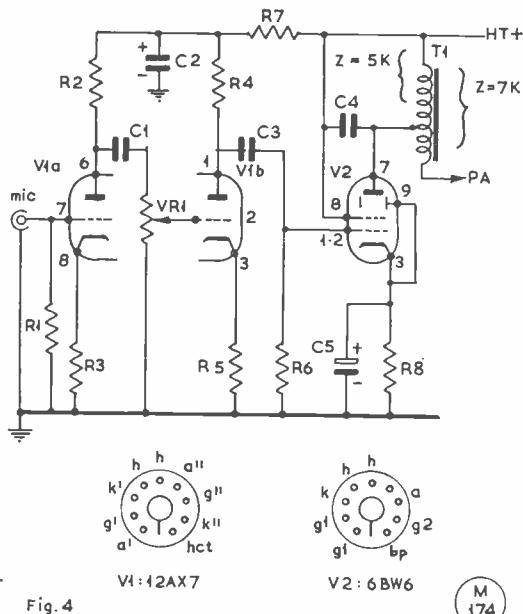


Fig. 4. Class-A modulator for use with a crystal microphone—values are given above.

Fig. 5. Methods of driving the PA from a Class-A modulator.

across R3 and R5.

T1 is a 60 mA or larger multi-ratio speaker matching transformer. The 5K and 7K tappings give an auto-transformer ratio of about 1:1.4. Another way of using such a transformer is at (A), Fig. 5. Alternatively, a transformer with no primary tappings can be connected as at (B). This automatically prevents full modulation (and also over-modulation) but seems perfectly satisfactory in practice. With this method of connection, modulation depth can be increased by adding C and R, as in (C) Fig. 5. Since volts are lost in R, a 350v. HT supply is wanted. R can be 1.5K, or chosen to give full modulation, as observed with a 'scope (or by on-the-air reports).

When building the modulator, keep grid circuits clear of heater wiring. Microphone and input circuits must be carefully screened. The modulator should not be tested with no load. Where T1 is a speaker transformer, an easy test is to connect a suitable speaker to the unwanted transformer secondary. Microphone and loudspeaker must be well separated.

The whole transmitter can be tested for modula-

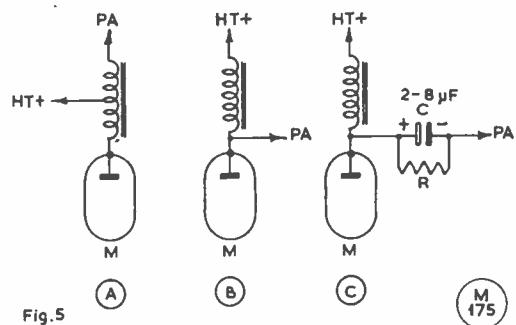


Fig. 5

M 175

tion with a receiver. Connect receiver aerial input to chassis, or otherwise guard against overloading early stages. Alternatively, connect a crystal diode in series with a few turns of insulated wire and phones. Carefully approach the loop to the vicinity of the tank coil. Speech should sound clear and strong.

(To be continued)

THE NEXT R.A.E.—MAY, 1968

Though it sounds a long way off, this is to remind all candidates that their applications to sit must be in well before the end of February. This can usually be arranged through the Course Tutor where an R.A.E. class is being attended. Those making individual entries, i.e., not through any course affiliation, should check with the local office of their Education Authority (address in the telephone book) quoting Subject No. 55, City & Guilds of London Institute. It is not possible to be specific about exactly what date in February applications must be in, because this varies with different technical colleges and night schools across the country.

MOBILE RALLY SEASON

Though at the moment when this is being written any idea of sunny Mobile Rally occasions seems far ahead, in fact now is the time when Rally Organisers—those devoted workers for the cause—will be fixing their dates and thinking about plans for the 1968 Season—in spite of all that there seems to be against the slightest jollification! Never mind—with effect from the March issue of SHORT WAVE MAGAZINE we shall be showing our usual Mobile Rally Calendar. We suggest that as far as possible organisers should avoid clashes, unless venues on the same date are well apart in terms of mileage to be run.

Mobile Rally dates already notified to us for the 1968 Season are as follows:

North Midlands, April 28; Hunstanton, June 16; Swindon, August 25; Peterborough, September 2.

We shall be publishing details covering these events when they are received—and in the meantime, other Rally Organisers should peg their dates as soon as possible. Write "Mobile Rally," SHORT WAVE MAGAZINE, BUCKINGHAM.

OBITUARY

We very much regret to have to record the passing of the following amateurs:

—G2NV, Howard Littley, of Ventnor, Isle of Wight, on New Year's Day, after a short illness. He was 75 years of age.

—G2VV, James Roe, M.I.R.E., F.R.S.A., of Sunbury-on-Thames, Middlesex, on January 7, after a long illness, borne with great fortitude. He was a well-known contributor to SHORT WAVE MAGAZINE, and had been licensed and active on the air since the 1930's. He was in his 58th year.

—G3MN, Sydney Pountney, of Birmingham, at the age of 54, following a heart attack. He was an active member of the South Birmingham Radio Society for many years.

—G3VXL, Miss P. A. Lonsdale, suddenly, at the British Home for Incurables, London, S.W.16, where she had lived for some years. A paragraph item "Example To Us All," on p.726 of the February 1967 issue of SHORT WAVE MAGAZINE, described how she became licensed and the help she had to get on the air.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

SOME considerable discussion among the fraternity has resulted from the latest moves in the saga of DXCC. W9WNV, in an "open letter" to the ARRL, appears to be saying that he is taking legal action, on the basis of his earlier letters and the agreement made with ARRL which he claims has been broken; along with this we have news from a source which is usually pretty reliable of the deletion of some of Gus Browning's DX-peditionary activities. What does it all mean in the end—from the wider point of view of Amateur Radio, as distinct from the narrow aspect of DXCC?

There are already countries where Amateur Radio activity, in the general sense, is barred. At a time when many people, with the interests of our hobby, and indeed of the developing countries themselves, at heart, are trying to "sell" us to various administrations—G3BID springs immediately to mind—these same administrations are going to discover that over-enthusiastic amateurs have been operating from their territory without their knowledge or permission. They are going to see the highly-civilised Western races indulging in undignified bickering over the validity of a contact with a station alleged to have been sitting at the material time on a lump of coral just visible at low tide—when other people are busy saying the same station at the same time was being received on a beam heading which places it somewhere entirely different. They are going to hear reports of stations running well over the legal limit for the country from which the signal emanates; and they are going to hear that stations are claiming to be in a certain country while operating from the wrong side of that country's borders.

Leave out of account the rights and wrongs of all these statements at this point in time—for each one of them will come up and each will be disputed—but just realise what

this means in terms of the image of Amateur Radio we are so busy building up, in the African countries particularly. If it comes to a head-on collision with ARRL, then ARRL are going to have to defend their position, which could lead to all sorts of unfortunate consequences.

It may be outmoded to talk of the "Spirit of Amateur Radio," or the "British Way of Life"—but do we *have* to substitute something which lands us in a position where the pressure on our bands at International Conferences can be justified by statements that we are not much better than pirates? If we remember the power of the "one-country, one-vote" rule, and think of the number of African and Asian countries with only a handful of amateurs between them but all with a desire legitimately to build up their total of frequencies, then it does not take a lot of thought to realise that the votes wielded by the Western countries, the Russian bloc and the Americans put together may not be enough to save Amateur Radio from near administrative extermination.

Sounds a little terrifying, you say, and possibly somewhat exaggerated—but is it? The activities of an irresponsible few are leading us to a situation where it could well come true, unless some action is taken to stop the rot. It seems from this chair that the only possible thing for ARRL on the one hand and the DX-peditioners on the other to do is to pipe down very smartly indeed, and for DXCC in its present form to be written off altogether. A clean sheet of paper can then be taken and a new form of competition worked out, using a new formula to define a country and the status of anyone connected with the competition. Perhaps the answer would be to define a country as a territory for which an amateur licence can be obtained, a photostat of which can be sent by the operator to ARRL. At the same time evidence of actual

presence in the place at the material time should be called for *in all cases*. If there is no local authority then the place should be *out* as far as the competition is concerned. Further, by deleting all existing listings and starting again, it would demonstrate to the world that Amateur Radio is being, and can be, cleaned from within its own house. It would be a darn nuisance to start again for all of us—but a much darnder one to find Amateur Radio swept out of existence!

* * *

Turning to the other side of the coin, we have a letter from G3BID indicating that *his* efforts in the International context have not finished. Far from it—he is hoping to visit the Gambia once again during February, and to be on the air from there signing ZD3F and ZD3F/M. Operation is also planned from Senegal, all being well, and here the call will be G3BID/6W8 and G3BID/6W8/M. Readers may not be aware that jaunts of this sort by G3BID are not business or just fun—suffice it to say here that they also represent a serious attempt to sell the basic idea of Amateur Radio to administrations which previously had little or no concrete knowledge of it—and hence to show that Amateur Radio is the more necessary the more a country is developing.

Top Band

Having unburdened ourself of that little lot, a browse through the mail concerning the allegedly most civilised band available to U.K. amateurs shows the first letter also to have a king-sized gripe here! G2DC (Ringwood) believes that rather a lot of the "top dogs" on this band, in the DX sense, are using power greatly in excess of the legal limit. Now, this is a sticky one. The writer knows of one operator who found he could not get much further than the end of the road on Top Band, so went out and installed about a hundred radials.

The first QSO after so doing was a 579 from a W! Again, there are many stations running commercial transmitters which have, at least nominally, ways and means of reducing power for Top Band purposes, but which do not cut input to the 10-watt level unless additional measures such as detuning the aerial and feeding into a reactive load are also taken; another, which can be made to reduce power to the correct level, kicks up such a rumpus from its power-supply smoothing choke under these conditions that the operator will knock it back to the full-power position rather than receive persistent reports of "bees in the modulation."

Here also there is another side to the coin. When a station at 20 miles out puts in a big signal which splatters all over the band—and this is what some of these characters do—then it is not unreasonable that the sufferer, having first taken steps to satisfy himself that cross-modulation and front-end overload are not due to trouble in his own receiver, should complain to the offender. If enough people do this and get no satisfaction then there are "other channels" which can be used. After all is said and done, in general the authorities are very reasonable with amateurs, and do not make themselves a nuisance, as any holder of a pre-war call can testify—but the price of that reasonability is, once again, the responsibility to keep our own house in order—which can be summed up by saying that it is not "the other fellow's" responsibility to act, nor is there any question of shooting at a sitting bird; they are flying high, and fair game for both barrels. But not, please not, just because old so-and-so puts out a big signal—it could be the aerial, or might even be his earth! The lousy signal, big or small, is there for any monitoring station to check on, but a big, good signal, is a different matter.

* * *

GI3WSS (Holywood, Co. Down) has been finding the going a little tougher of late, and suspects conditions were better when first he came on the air—could be, Cyril, or just that you have hooked the easy ones! One new country, and one new county go in the list, by

way of a DL5.

Up there in Inverness, GM3IAA mentions a contact with ZB2AY, when reports of 449/459 were exchanged; the QSO was followed by one with a G who gave him 589! Rather suggests that the GM3IAA set-up includes a special filter to reduce signal strength around his place.

Now for a spot of real interest for the lovers of international DX on 160 metres, who have always felt they have no chance against the Big Boys. G3SED (Portsmouth) made a "First" when he rang the bell with PZ1AH, who followed it up by working DL9KRA later the same day to make another "First." PZ1AH has of course been thrilled by these first contacts with Europe, and is therefore looking for more, each weekend from 0400z onwards. However, the sting is in the tail—the *PZ1AH aerial is only 36 feet long!* Be interesting to have details of the earthing system and the ground conditions at his location as there must be quite a lot accounted for by these factors.

Regarding the First-Timer's Tests, G3SED thinks conditions were very good indeed with W calls audible, and workable, from midnight onwards. The next one is down for February 4, and it is to be hoped things are again good. Arising from experience with the MC system which is being tried for the F/Ters, G3SED (who will be on 1825 kc) suggests the G stations select a frequency between 1822 and 1827 kc, and *stay on it*; thus, the MC can tell the W's just where to look for a given signal; this seems to be regarded as considerable help on the other side. However, there is no question of the MC putting any station across, merely of advising the W's that there is G activity and where it can be found.

Still on the international tack, we hear that DL9KRA has hopes of being on during the Top-Band *CQ WW Contest* on January 27/28, from CE3, to give the 'chasers another one to look out for.

Just as this point had been reached, a quickie came in from G3BDQ (St. Leonards-on-Sea) to the effect that on the morning of Jan. 14 he made his first 'cross-Pond contacts, with W1BB/1 and VO1FB. Their signals were peaking 589 and 569

respectively and John's reports were 449 and 459.

Nice to hear again from G3TKN (Wallasey) who has returned to Top Band after several months of inactivity. A couple of contacts with DL5YZ rather shook him, the report on one of them being 599. K1PBW was also hooked, using an ordinary Marconi-type aerial at 45 feet above sandstone rock—most of the earth system corroded away a year ago or more.

A first letter from G3WUD (Manchester), an avid county chaser at the ripe old age of 14, to put his first entry in the tables. Robert, who was a "regular" in the SWL HPX Table, has managed to rake up 47 counties, using an aerial that is 20 feet high at its peak, and, to judge from his description goes round the garden in ever-decreasing circles.

GM3UVL (Glasgow) reckons that Dunbarton may become somewhat rarer in the future, as he has been building for the HF bands and hopes soon to see his handiwork perking. Meantime, the 160m. score has gone up to 94, thanks to GC3ODE for Guernsey. On the Countries side, G3VPS, another ex-"SWL" trooper, has spent a little time

TOP BAND LADDER

(G3V-- and G3W-- stations only)

Starting Date, January 1, 1967

Station	Counties	Countries
G3VMW	95	19
G3VGR	94	16
G3VYF	83	17
G3VLT	80	16
G3WDW	79	8
GW3VPL	78	16
G3VMQ	73	15
G3VMK	63	17
G3VES	63	16
G3VOK	61	15
GI3WSS	57	8
G3VLX	53	8
G3VSL	52	10
G3WDG	52	8
G3VTY	49	9
G3WUD	47	9
G3VWC	34	7

on Top Band, and amused himself by working GI, for the first time on any band—as he says, he completely overlooked the little fella in the chase for *real DX!*

A great big question mark hangs over several logs at the moment, in the shape of "OY5E," mentioned by G3UBW and others. During his vacation, G3UBW (Sevenoaks) worked VO1FB, about ten W's, and heard several more. In addition, PY's have been heard, also a 5Z4 on 1803 kc—this could possibly have been G3RBP—and mention is made of VQ9JW and his skeds with the W's, which will be on Monday mornings, from 0130 to 0300 GMT, on 1823.5 kc, listening for the U.S. in the 1822 to 1824 kc segment. ZB2AY, says G3UBW, went QRT on January 13; also apparently QRT (but the reason not known) was WCC, the band conditions marker used by so many.

The excellent 160-metre news-flashes put out by W1BB, in addition to all his activities on the band, are always of interest here; it was all the more disappointing, therefore, that his last one landed the day after CDXN was closed last time round. Stew mentions with understandable pleasure the contact he made with VQ9JW on December 11, when the latter was "transceive" with only 10 watts. Signals were between 119 and 339 during the time W1BB was making his QSO, and then peaked to 449 for the benefit of W2RAA who just "happened along" and made QSO No. 2. The W signals in VQ9 were 56/79. This makes W1BB's all-time 160 score 98 countries—wonder whether he will see the ton-up this season?

G3IGW (Halifax) reports on his doings this season to date. The VK and JA tests were a washout—a complete blank in both directions. ZB2 and 9H seems to be his limit in a southerly direction, and OK to the east. However, the W's are being heard, albeit no actual QSO's have been made; so far they have not put in an appearance before midnight, although on December 17 they were in evidence at 0030z.

Hurrying on, we come next to G3WIT (Newport I.o.W.), who spent less time than usual on 160m. John managed, nonetheless, to raise some Europeans, although in his own view, the best was a contact



Station of Hans Heider, DL1IN, Box 343, Cuxhaven 219, Oldenburg Germany. As can be seen from the array of framed certificates, he is one of the leading DX operators of his country, always on the look-out for rarities and the DX-pedition stations. Fully equipped for all bands, including RTTY, it is obvious from this picture that DL1IN has a very fine station.

at 599 with G3VMW in Leeds. The report from G2HKU (Sheppen) is also self-deprecatory, but mentions PA0, GM3SVK, GM3LHV and GM3VAR worked and OE, GW, EI heard.

The nice new warm shack at the QTH of G3VLX (Sidcup) is now in service, and the big wire re-erected. Operations with the new set-up commenced on December 10, and started slowly, due, Deryck thinks, to his having "lost the touch." However, it seems to have only been mislaid, because a month later there were four new counties booked in, in the shape of Denbigh, Armagh, Down and Renfrewshire.

The Tables

Dunno whether it's you or us—but it seems to be understood that the new All-Time Countries Table is to include Top Band. So be it—you asked for it, now work 'em!

Entries for the Zones and Prefixes Table have been a little slow coming in, and queries have been raised. What you have to do is to go bac' to January 1, 1968, in the log. Tot up the prefixes worked, and the Zones worked since then, regardless of band—this should keep your paper-work down to a minimum.

Send an entry in with your letter, in the form of "G3KFE, Zones 10, Prefixes 124." The SWL's are firmly convinced we are horning in on their private territory and are determined to show that transmitters can't work the stuff as fast as they can hear it. It's up to you.

Eighty and Forty

These two bands carry enormous amateur traffic, and yet so rarely figure in the reports of our correspondents. There is certainly no shortage of funny noises, both amateur and professional (?), to keep the hearer amused and, on a reasonable aerial, it would seem that the main DX problem is merely that of getting the distant stuff on to the band before working it. As for the DX operators, they probably don't come on Eighty or Forty because they can't get a pile-up in the receiver and therefore assume there is no activity to speak of. A vicious circle, which could well be broken if only a few brave souls will publicly declare a "Be kind to the LF Bands" week—or something!

G3IGW (Halifax) found EA6DC, a station signing "ZA1AU," who must be either a phoney or a sensation, and a horde of W's. Reverting

to that ZA, it is possible that the statement that there would be no Amateur Radio in Albania in the foreseeable future, made by an Albanian official source a few weeks ago, is the key. Forty for Mike was CW only, and produced EA6BD, IS1CZQ, TU2CA and USARTEK—the latter having been fairly quiet of late he will no doubt be queried by hordes of people, and so it is as well to say he is quite definitely legit.

Turning to the letter from G2DC, we see that he found all W districts between 0400 and 0730z, and had an interesting contact with ZL4IE, in which the latter told him he had worked 105 different G stations on Eighty? On 7 mc, the best time, unfortunately, is between midnight on 0730z. Jack had no trouble at all in nailing PY0DX for an all-time new one, and HK4EY for a new country on Forty. All W districts and VE1, 2, and 3, VK, PY, LU, YV, XE, just go to show that the propagation is there if you are on at the right time.

Christmas provided G3WIT with a week off, and so he had a couple of late-night sessions, which netted a QSO with W1EVT, and several interesting gotaways, such as W6LVM, K4KS8, W1BMR, VU2SV, KP4DBR and LUIACP/MM, all of whom were carved up by the EU hordes.

The LU/MM was also heard, and worked, by G2HKU (Sheppen) on Forty, where in addition EL2D, VP2SC, PY and IS1CZY were heard. As far as 3·5 mc is concerned, Ted has been thoroughly enjoying the exchanges of CW which he has managed with G2QB and G2WJ in particular. Your scribe overheard the contact with the former, and there was no stopping to dot the i's or cross the t's on either side—a pleasure to hear Morse properly used for real communication at reasonable speed by a couple of masters of the art.

G3WJS (Dorchester) likes the 3·5 mc band and feels that all the DX-peditions should make a resolution to spend a larger proportion on it. Various new EU countries were cleaned off the slate during the month, then came The Night of The DX—but the transmitter was under repair! Finnagle's Law once again.

Reporting the HF Bands

Borrowing a rig so he could do the necessary for the Club on MCC was the stimulants that led the station of G3VMK (Abbots Langley, Herts) to be reactivated. Eighty yielded W1-5, 8, 9, plus VK and ZL; all worked between 0730 and 0800, and all CW. December activity by G8DI (Liverpool) was nil, but he does mention TJ1QQ, working W's on 7006 kc, 0600z.

Snippets

A very late letter from Royal Signals advises the early details about a DX-pedition to Brunei. They will be signing VS5RCS, mid-March to mid-April being as near as they can get to dates at the time of writing. Operators will be 9M2BD, 9M2NF, 9M2XX and HS3DR. This one will be of particular interest to the Top Band lads in that it is hoped, if licence permission is forthcoming, to operate 1·8 mc. From the same source, it is understood that VQ9JW will be QRT from Aldabra by the end of March; in this context it is indeed a relief to know that this unique spot is *not* to be used by the Services, it having apparently fallen victim to one of the axemen in the Government.

ZL2UW, well known on the DX bands, was carted off to hospital early in December. XYL Thelma, ZL2JO, was heard to say she hoped he would be home for Christmas but no later news is to hand. ZL2JO is sometimes to be found around 14235 kc SSB, for those who wish to enquire or QSP good wishes.

That comment about G3AAQ and his trains a few months ago by G8DI brought a letter from the man himself. G3AAQ (Kidderminster) has recently been airing his call again after a lapse of *eight years*, running a KW-2000A and a Joystick. With this gear, he has managed 48 countries, including VQ8CC, VK, W6, W7, VE7, CR6, 9J2 and EP2. Putting the rig in the car—for Jake gads around the country quite a bit—resulted in contacts with, for instance, ZF1ES on Ten, and MP4MBS on Twenty,

while standing in the works car park at Rugby. Wonder what the management said?

Reverting back for a moment to the DX-peditionary theme, a note from GI3FFF, the Ballymena Radio Club, to the effect that a Top Band DX-pedition to Co. Fermanagh is being set up for the Easter period—exact dates to come through later. Although the main activity is to be Top Band, they will attempt to produce gear for any band to 430 mc and have a sked contact on request. Address all enquiries for skeds, suggestions for other bands (or even your alternative choice for their next effort) to the Ballymena Radio Club, GI3FFR c/o GI8AYZ, who is handling the paper side of things.

By now, of course most of the keen-eared ones will have heard the prefix 8P6, issued to Barbados stations from January 1, 1968, upon the achieving of independence. Quite a few of the old VP6 calls are known to be on using their new ones, and it seems that in most cases the suffix-end of the call has changed as well; thus 8P6AZ is ex-VP6AO, and 8P6AY ex-VP6GC.

G3UUK writes from Shoeburyness to say that he has been assured that he will be able to obtain a call in ZD5-land when he arrives later this month; ZD5R has him under his wing, and on his advice all the essential items of gear are being shipped out with him, to include a KW-2000A and a three-band Quad. In the meantime—if you look sharp enough—G3UUK has still about 100 cards to use up, so if anyone is short, drop a line to G3UUK at his present address: 7 Sutton Road, New Ranges, Shoeburyness, Essex. The *Call Book* is out of date on this.

Another one to be on the move is D. F. Higgins who, after three years in Aden has become DL2DF. He is Royal Signals of course, and may be reached at: Sgt. D. F. Higgins, DL2DF, (Royal Signals), 2nd Bn. The Scots Guards, BFPO 24.

Yet another wanderer—this time G3UOF/MM, who is deeply embroiled in the business of putting a station together and getting the

technicalities of the ticket sorted out. By the sound of things, there are not too many snags, although there is a very slow cycle in getting them cleared, because the mail goes off at about three-week intervals, and then probably has to cross half the globe to its recipient. However, we hope soon to hear the successful conclusion of the exercise in the form of a fat signal from G3UOF/MM, wherever he may then be.

Florida Skip mentions the Florida QSO Party, which comes off on March 30 and 31 over the times 1500-2000, 0000-0500, 1400-2400, all GMT. Suggested frequencies on which to look out for them are, in kc, as follows: CW, 1815, 3530, 7030, 14030, 21030, 28030. Phone, 3930, 7230, 14230, 21230 and 28230 kc. For all the other dope, if you want to dive in seriously, the address to contact is *Florida Skip*, Contest Chairman, PO Box 501, Miami Springs, Florida 33166, where also the logs should go, postmarked no later than April 30.

A final snippet comes from G3IDG (Basingstoke), who mentions working a guy signing SPØHIL—and remembering SPØOK being on the band. He was even more doubtful when the laddie came back and said his name was "Bogus," although after long explanations and the chap pointing out he was "OK for new PX," Allan is still not going to add him to the WPX total until he sees the card!

The HF Bands

Having dithered all round it, and here and there, waiting for someone even to mention these bands, the while scraping the ice off the typewriter—In other words, it doesn't need a DX-addict to realise it's winter with a capital W, both on the bands and off them!

His first few months after his long lay-off gave G3AAQ a chance to size up the HF areas as compared with their condition when he went QRT eight years ago. Jake finds 20, 15 and 10 fairly civilised—in sharp distinction to his impressions of the LF allocations—and the majority of his /M operation has been there; particularly since the Top Band loading coil set-up was "vandalised." Incidentally, he found it pleasant to work W2HAQ on Fifteen recently and be reminded that their last



The husband-and-wife station of G3TNN/G3UCA, at 18 Clarendon Road North, St. Annes, Lancs., with Ruth Sinclair, G3TNN, on the right. Her real interest is CW operating on the DX bands. Her husband Peter has quite a different approach to Amateur Radio—he prefers VHF operation on Phone, with constructional work as time permits. So between them, happily, they cover it all—and a nice array of gear they have, too. We would like to see more about such stations operated in double-harness—and we might add that G3TNN/G3UCA also have a young family.

QSO was in 1957—and on the morning he posted his letter, to receive the card for a contact made in 1954!

G3NOF (Yeovil) has been under the weather, which accounted for his absence from the scene last time out. Don feels that conditions on 28 mc are quite a bit down on the equivalent period last year, an impression shared by your E.P.E. A few VK's, JA and VS6 were heard in the mornings, and in the afternoons W's till 1700, with the band going flat then. SSB contacts were made with CE3RC, GB5QM/MM—one of the very few reported QSO's, incidentally—KR6KJ, VP9DL, VQ8CBN (Nelsons Isles), VQ9JW, all W call areas, 5N2AAF, 5R8AX, 9J2DT and 9V1NT. As far as the 21 mc situation was concerned, things have not been much better, with short-path JA and VK around 1000, followed by W's from as early as 1130 to 1800. SSB QSO's here were, apart from the East Coast W's, only PJ5BC and W5

and 6's. Conditions were none too good even on Twenty, where the pattern has been long-path VK, ZL, JA around 0800, with occasional openings to W6, KH6, KL7 around 1600 to 1800, closing for the night by 1900. Contacts were logged with K7JVF (Utah), PJ5BC, PZ1BF, PZ1CE, TA2BK, VE7BW, VK's, VP8JD, VQ9CB/A, VQ9CBN, VQ8CC, W6, ZS, 5Z4AA, KN, and LG, 9G1BF, and 9L1DW. Gotaways were CE0PK (Juan Fernandez (S4 at 2355 working W's) FR7ZG, PY0SP (St. Peter and St. Paul Rocks) S4 at 2358, again working W's, and VR2IE who was heard at 1835 with the beam headed South.

Looking at his letter, in which those "heard" outnumber those worked, G2HKU says sadly: "I'll have to send the list to SWL in future!" Not to worry, Ted, it all comes right in the end. His 14 mc CW produced JA's and VE6, SSB ZL3SE and ZL2KP. On 21 mc it was UW9OU, 5Z4KO, ZL2QM, all CW, with the SSB trying possibly a

little bit harder by working VU2DKZ, who does not deal through the bureaux with incoming cards—all QSL's, therefore, with this station should be sent to him at 56 Cantt, Bareilly, India.

Always the letter from G2DC (Ringwood) is analytical in nature, and not just a list of calls-worked successes. Jack has found the DX times to be quite critical this last month on 14 mc. For instance, whereas in the earlier part of December 0600 to 0830z was fine for DX to all sorts of interesting places, provided one could dodge the JA's, by the first week in January things were doing only between about 0730-0815, and similarly the 20-metre band has been dying quite early in the evenings. CW contact was made with JA, VK, ZL, CE4AD, JT1KAA, VR2EK, VR4CR (QRP with only a low dipole, but solid nonetheless), UA0KCC and KX6ER. The middle band, 21 mc, was patchy also, but pleased Jack when the G2DC Quad hooked PY0DX at first call, 599 through

the entire pile-up. As for Ten, G2DC couldn't do a thing with it but, as usual, things were found to be a lot livelier at the weekends, to give CE4AD, VK2VN, VK6IZ, VK6DI, VK6RU, VK6LU, VK8HA and VK8UG.

CW and AM are the modes mentioned for 28 mc by G3IGW, the former giving the best of the month in VQ8CC, while on Phone he managed ZS's and 9Y4VP. Twenty CW gave only two contacts of note, in FM7WD and ZD8HAL. Clearly, most of his work was done on Fifteen, where AM produced the following results from CQ calls: CR4BJ, CR7GR, ZD8JP and 9G1FL. CW resulted in a couple of ET3's, HI8RVD, IS1CZQ, TA1AV, TJ1QQ, TY2KG, UH8AE, UH8BO, UI8AX, UJ8AB, VP2MU, ZD8's and a string of some twenty JA's on the morning of the CQ Contest.

Next we come to GM3JDR (Golspie) who, because of the early closing and late opening of the bands he uses (14 and 21 mc) has been forced to make all his recent contacts during the period 1300 to 1355z. The result has been of course mainly W's, but the following are mentioned on Fifteen in addition: VP6PJ, K5FKI/KP4, VK3AXK and OX3BX on CW (SSB working with the latter also) as well as 6Y5LT and VP2SAM/MM. Twenty was not used so much but nonetheless gave QSO's with VQ8CBN, FR7ZQ/G and I4RUI, all on CW. Incidentally, Don has been counting up, and finds that during 1967 he made a total of 3,823 QSO's on 14 and 21 mc, the majority on the latter band.

For G3IAR, 1967 ended up with a score of 192 countries. Not bad going in one year, you may say. Well, now, this G3IAR character is complaining about it being rather lower than it would otherwise have been—because normally he can only get home at weekends.

* * *

A most interesting letter this month from VE7BHN/WØ, with a good list of DX worked with 90 watts and a 3-element beam. What will be more interesting to readers of this piece, though, is Tom's description of the sort of competition there is from local stations in the search for DX. Take, for instance,

WØHTH, sitting on Castle Rock, just south of the VE7BHN/WØ location in Denver: The Rock is 200 feet above the surrounding terrain, and on top of it WØHTH has a *separate Quad for each HF band*, on a 170-foot tower, together with a two-element Quad for Forty at the same height, each fed with the full kilowatt. A miniature version of this beam assembly, belonging to KØVVV, was used by Tom for the *ARRL DX Contest*. It comprised a three-element Triband beam on a 135-foot tower, also supporting inverted-Vee aerials at the same height for Eighty and Forty—of course driven by the full gallon. No wonder Tom prefers rag-chewing with G's to chasing DX! A comic one in his list was the character signing PHØNY and claiming to be on Aldabra. Possibly part of the wild-life?

GIWSS managed to get in a spot of /A operation on the HF bands, during which he raised all W call areas and, for his best of the month, PJ5BC on 14 mc SSB, who came across with the QSL very smartly.

"Too many locals" is the complaint of GM3IAA—but he doesn't mean GM's! The 21 mc band showed YS1WKE working all the world except the U.K. one afternoon, about 1700. Jim hung on till 1730, when he had to QRT, and then made a last quick call before pulling out of it. Lo and behold, the man came back to him, and they swapped 559 reports. The interesting thing about this is that YS1WKE did not seem to be working any other U.K. stations at all at the time, as far as GM3IAA could hear.

G3VPS (Wartling) is still enjoying himself working all bands with his Panda Cub, and playing with aerials. His spell with the 19 Set made him rather fond of the LF bands, where he could enjoy a good old ragchew. On 20 metres he made a new country in ZB2, worked on an 18-foot vertical with no real earth. Theoretically, this aerial should not have radiated to any real effect, but G3VPS has had "startlingly fine" results with it—so much so that he is thinking about trying it on other bands.

G3WUD, our fourteen-year old, was "blessed with" a super-bent wire. After four months of trying with this, he decided that it was not

TOP BAND COUNTIES LADDER		
Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
G3HIW	98	98
G3VYF	77	83
G2HKU	73	77
G3VGR	71	94
GW3PMR	71	78
G3VLT	57	80
G3IDG	55	59
G3WDW	51	79
G3VMQ	45	73
G3VLX	31	50
GI3WSS	26	57
G3VWC	12	34
<i>Phone only</i>		
G2NJ	95	95
G3VYF	61	67
G3MDW	52	73
G3VMQ	30	51
<i>(Failure to report for three months entails removal from this Table. New claims can be made at any time.)</i>		

really the correct wear for a real DX 'chaser. So he marched over to the local pub, and opened negotiations with the landlord. Result is a new aerial, forty feet up, and all in a straight line. All that is now needed is an SSB/CW HF rig, which, says G3WUD, is going to be a "feat of engineering" on his pocket-money! Never mind—we are quite sure that something like it will emerge!

Finally, a note on the results of the 1967 *CQ WW SSB* Contest, for which our thanks are due to W1WY. Among the European multi-operator stations, we note G8FC at sixth with top U.K. rating as well, followed in second place in Britain by GB2SM. G8FC is the radio amateur station at R.A.F. Locking, Somerset (R.A.F. A.R.S.) and GB2SM is operated from the Science Museum, South

Kensington, mainly by G3JUL as chief op., with local assistance. For years, these boys have done well in international DX competitive events.

On the single-operator front, the all-band list puts G3NMH second—a really stout effort, this, with a score of 966,249 points. Sadly, among the single-band single-operator lists we only found G3NLY, who was cock-of-the-walk on 7 mc. To all these stations and their operators our congratulations, particularly to G8FC and G3NMH. As a matter of interest, the top African multi-operator station was ST5KG (Lloyd and Iris Colvin at the helm) with a score of 1,111,350 points. Again our congratulations to this very accomplished couple of DX'ers—we only hope Iris did not have to make the coffee as well.

Also from W1WY, we hear that a

change is proposed in the dates for the *CQ WW Contest* in future, in that the Phone end will always be the last weekend in October and the CW the last one in November; full weekends are of course meant here.

Sign-Off

And that's about the lot for this time; our thanks to all those who have fed in information, news and views. We hope that you will understand when sometimes, due to the pressure on space, only little snippets are taken from each letter. Deadline for next time is first post Monday, February 5, addressed as always to: "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM. This is the only address to use to ensure coverage in this feature—so, pse keep it like that. Till next time, *73 de E.P.E.*

NORTHERN SOCIETIES' ANNUAL CONVENTION

The Northern Radio Societies' Association will be holding another of their conventions at Belle Vue Exhibition Gardens, Manchester, on May 19. As usual, in addition to member societies' own stands, there will be trade and commercial displays and demonstrations, as well as various active events for visitors. The business manager for the convention is R. M. Clarke, G8AYD, Hillside, Quickeedge Road, Mossley, Ashton-u-Lyne, Lancs.

THE INTERNATIONAL "CALL BOOK"

The *Radio Amateur Call Book* is the world directory of radio amateurs, listed under countries by callsign, name and address. It appears quarterly, is published from Chicago and for more than 40 years has been the only such directory available on the international scale.

We are the sole agents for Europe and the U.K. and it is our particular responsibility to keep the G listings up-to-date. All callsign/addresses we receive not only appear in our regular "New QTH" page but are also airmailed to Chicago for the *Call Book*.

The current issue is the Winter Edition, and contains in the U.K. section all callsign/addresses notified to us up to and including the "New QTH" list in the October *SHORT WAVE MAGAZINE*, together with many of the notifications appearing in November's "New QTH's." Thus, on its quarterly appearance, the international *Call Book* is always up-to-date, the U.K. listing in the Winter Edn. being the latest available in print.

Because of the enormous number of listings involved on the world scale—something like 426,000 licensed amateurs, each with a callsign, name and address!—the *Radio Amateur Call Book* has to be produced in two parts: United States only, and DX Listings (meaning the rest of the world outside the U.S.A.). Price of these directories is 64s. 6d. for the U.S.-only section, 42s. 6d. for the DX Listings (which includes the U.K. and all

other countries except American prefixes). If ordering the two sections together, the price is £5 2s. 6d.

This makes the *Radio Amateur Call Book* an expensive buy—but it has to be remembered that not only were we faced with a price increase from Chicago (after all, 426,000 names and addresses add up to a very expensive job of print) but unfortunately it happened that their increase was followed by our devaluation of sterling. To make it reasonable for everybody, these consequential increases have been cut to the minimum and it is fair to say that the *Call Book* represents the best value for money that we can possibly offer.

When devaluation struck, our bulk order for the Winter Edn. of the *Call Book* was reduced. Hence, anyone wanting either the set (at £5 2s. 6d.), or U.S. only (64s. 6d.) or simply the DX Listings (the world outside the U.S., at 42s. 6d.) should put in an order right away, while we can deliver from stock.—Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BRITISH TECHNOLOGY INDEX

We are asked by The Library Association to say that all technical articles in *SHORT WAVE MAGAZINE* of page length or over are regularly listed in *British Technology Index*. This is designed and intended as a work of reference, covering the whole range of U.K. technical periodicals, and aims to present a month-by-month record of the literature.

YL's/XYL's ON THE AIR

According to a list we have seen recently—compiled by G3IDG (Basingstoke), who is an indefatigable keeper-of-the-records—there are now about 60 of the distaff side licensed in their own right as U.K. AT-station operators, in GM and GW as well as in England. Three are from overseas—G5AAJ/K6GFH, G5ABT/DJ6BS and G5ACZ WØHUE—who hold a British licence on a reciprocal basis.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for March Issue: February 2)

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

A DIFFICULTY that most groups have to face is finance. Activities have to be paid for in some way, and the more ambitious the club is, the more has to be got in from somewhere. However, while every member can be—and often is—vociferous in calling on the committee to be more ambitious, the vast majority are much less in evidence when it comes to the small matter of paying a subscription. It is very noticeable from this chair that of all the newsletters coming our way, ninety per cent have a note from the treasurer at regular intervals asking for co-operation on getting the money in, and "geeing-up" the laggards.

If the money does not come in from the members on the dot, and the Club does not have a large reserve, then the result often is that members of the committee have to lend the money from their own pocket and hope they can get it back "sometime." If the treasurer presses for a subscription, the chances are his victim will object violently, his argument being rather along the lines of "I've been a member for years and never been asked to fork out on the nose—is my credit no good these days?"

This really is more than unfair on the group and even more so on the committee members, and has even been known to be the cause of the resignation of a devoted officer who has served the lads for years, but who finds the strain is simply too much.

Perhaps therefore, all the readers of this piece will find time to check on their position and, if in arrear or overdue, pay up for this year at least, or even in advance.

Lecture Problems

Changing tack a little, to the eternal problem of lectures and how to obtain them, we hear that in due course there will be another version of the W1BB tape-and-slide lecture to go the rounds; the present version is extremely interesting, and has been to many clubs over the last year. It is still available at the time of writing, and can be obtained by booking up with G3MDW, Hon. Sec. of Northern Heights (see Panel), well in advance of the proposed dates.

Another possibility is the visit from a representative of one of the firms active in the field. *Electroniques-STC* gave a most interesting demonstration to the chaps at Bishops Stortford recently, ranging from the very small stuff right through to large Hallicrafters transmitting gear. The speaker hinted that a similar effort could possibly be laid on for other groups, provided it were at a location within a reasonable distance of Harlow, where the Company has its offices, and given adequate notice. As Bill Mann commented when discussing this, he not

only has his firm's commitments to think of, but also those of his wife and family, not forgetting the very important matter of a Morse Test to be passed!

Club Reports

First on the list for this time is Northern Heights, who mention that after a quiet December and January, the programme is back on full power; February 14 is set aside for a talk on TVI and BCI, while the evening of the 28th is given over to a Junk Sale; the auctioneer, G8CB, is confidently stated to be able to sell sand to the Egyptians!

The monthly meeting of the Sheffield crowd is set for February 27, the venue being the Beauchief Hotel, Abbey Road, Sheffield, 7, and the occupation of the evening being general ragchewing.

Two groups reporting in one letter is a little unusual, but Lothians Hon. Sec. is also a member of the Heriot-Watt University group, which explains it! Lothians are to be found at the YMCA, South St. Andrew Street, Edinburgh on February 8, when the entertainment will be provided by the president, GM3OWI, who is organising a Film Show. On the 22nd, "Amateur Radio in Norway" will be the theme, discussed by LA6VH, who is a fourth-year student at the Heriot-Watt University. The latter group is small but active, with three licensed GM's and a similar number of LA calls among the students, with GM3BMI on the staff. Anyone from Edinburgh University who is interested will be very welcome, and all enquiries should be directed to GM3SRV, address as Panel.

Now to Ipswich, who aver that the new committee have been hard at work twisting arms to ensure someone will be "on tap" for a talk at every meeting from April 1968 to April 1969—well ahead, this sort of planning—and in the meantime, they can be run to earth on the last Wednesday of every month at the Red Cross Hq., Gippeswyk Avenue, Ipswich, at 7.30.

February for Coventry means weekly meetings, with the first one on the 2nd; this and the third one, on the 16th, will be taken up by a Radio Quiz, by Arthur Noakes G2FTK, the president, and a Film Show respectively. The other two evenings, 9th and 23rd, will be devoted to the operation of the Club KW-2000, on the air. All these events occur on Friday evenings at Canal House, Civil Defence Hq. annex, Drapers Fields, Foleshill Road, Coventry.

Peterborough are looking ahead, to their Mobile Rally, which is slated for the August Bank Holiday, and for that event they have a wish to put on a show of

"Wireless in the Twenties." To this end, they would greatly appreciate hearing from anyone who would lend them old radio periodicals of the period, books, or gear. Details should be sent to G3KPO, at the address given in our Secretaries Panel on p.770.

It is ever a pleasure to hear of an old or defunct group being resurrected, and in this context that means the lads at R.A.F. Wattisham are back in business. Tuesdays are the evenings they get together, but the Club call, G3JLC, is on the air daily, Top Band to Ten, using AM, SSB, or CW, as the mood takes them.

The Sun Inn at Rastrick is the home of the Halifax gang, every Friday; this month there are a couple of formals in the list, the first being on the 2nd when they foregather to hear the auctioneer at their Junk Sale. A fortnight later, having recovered from the shock of seeing such bargains on show, they are off to Bradford Fire Brigade Control Centre at Birkenshaw. The other sessions are informal.

* * *

Burslem next, and here the first thing to note is their smiling faces over the win in MCC. To see this, visit the Moorland Road Junior High School, Stoke-on-Trent, and it is to be expected that there will be activity as well as smiles. The date for their meetings is the third Tuesday each month.

Mondays is favoured by Mid-Warwickshire, and they make alternate ones informal. The talks this month are slated for the 12th, when Dr. MacLachlan is to discuss the applications of Electronics in Medicine, and the 26th, when Glen Ross will deal with Transistorised VHF Equipment. Both the lecture and the informal sessions are held in the new Hq., which is to be found at 28 Hamilton Terrace, Leamington Spa.

The fact that the Mansfield lads get together in a pub—The New Inn, Westgate—does not mean that the juniors cannot attend; in fact there is a separate room which they rent on the first Friday of each month, and visitors, either juniors or those of less tender years, will be welcomed and catered for. G8HX held forth last month on the prewar transmitting licence, and in February ex-ZC1HR, who is now G3VVE, will talk

about operating from Cyprus.

February 13 is the big event of the month for the Leeds types, for on that evening they take over the Capitol Ballroom, Meanwood, for a Mullard Film Show and meeting. Back at Hq., Swarthmore Centre, Woodhouse Street, the regular session is on as usual; for details contact the Hon. Sec. at the address in the Panel.

An interesting and well put-together news-sheet is *QTC* from the Leicester crowd, the first number of which is to hand. The event of the month here is quite definitely the dinner-and-dance, which comes off on February 3, at the Empire Hotel in Leicester.

Purley and Wimbledon have come to an arrangement with each other such that those members who have paid the SARA sub will get a copy of both club newsletters. Sound scheme this, and from the sheets we find that this co-operation extends to meetings as well; first and third Fridays in each month are Purley's at the Railwaymen's Hall, 58 Whytecliffe Road, Purley. Second and fourth Fridays go to Wimbledon, their QTH being the St. John Ambulance Hall, Kingston Road, Wimbledon.

In addition to all this dope the Wimbledon and Purley sheets also enable us to keep tabs on the Addiscombe lads; second and fourth Tuesday is the tale here, and this time the venue is the delightfully-named "Coal 'Ole," 158 Lower Addiscombe Road, Croydon.

A change in the monthly routine has to be emphasised for Reigate who are switching from the second to the *first Wednesday in each month*, albeit the venue is unchanged at the George and Dragon, Cromwell Road, Redhill. Programme details are still a little fluid, as the AGM occurred in January, and at the time of writing the committee were still hammering out the details.

Some Successful Newsletters

February 1 sees the Cornish crowd getting together again, at the SWEB Clubroom, Camborne, when the topic will be Meteorology and Radio. March 7 is set aside for an Equipment Review. Incidentally this is one of the most active groups in the whole country, with an interesting monthly publication, the *Cornish Link*, as well as sub-groups covering specialised activities, such as VHF and SSB. The recent "Cornishman" trans-

At the annual dinner of the York Amateur Radio Society, the licensed members present were, left to right: G3WHH, G3TDA, G3FTS and G3WVO. As the most recent of the York group to gain their AT-station permits, G3WHH and G3WVO were presented with plated Morse keys!



mitter design, first published in the *Link* is now known to have been taken up by no less than 200 constructors, some as far afield as W, VE, and 5N2!

Another publication which is often outstanding is the *Challenge*, put out at intervals by the Norfolk crowd, who meet at Old Lakenham Hall, Lakenham, Norwich, each Monday evening. The latest issue contains a very funny account of the erection of a Heathkit tower, by Joan Wightman, G3TPZ, and a thoughtful piece on the organising of a station—and in particular its aerial system, to take best account of site variations.

Wessex is not a group that have been in the habit of reporting regularly, although we have been aware of their continued successful existence. Now, however, they have passed on to us a copy of their news-sheet. This group runs no less than three separate stations—covering Top Band, Two Metres and Twenty—to cater for all tastes, and have what they describe as a "large garret" as a Clubroom, the location thereof being the

Cricketers Arms, Windham Road, Bournemouth, where they are to be found on the first Friday in each month, and the Monday 17 days later. February 6 is a big event for them when they foregather at Room E21, Science Dept., Bournemouth College of Technology, to hear a lecture by the British Association for the Advancement of Science, the topic being Weather Forecasting, or possibly Exploration of Space.

The Royal Navy ARS *News Sheet* for Christmas 1967 recently came our way, and most interesting it was. From it we gain the impression of a lively and active crowd, well worth joining, for all serving and ex-Royal Navy types. The Hq. station is on the air as follows: Weekdays from 1200 to 1315z, 7010 kc CW; also Sundays 7030 kc from 1000z CW, followed by SSB from 1100z on 7070 kc, all signing G3BZU from Petersfield, Hants.

Now to Mid-Herts, who have a session on RF Transformers laid on for Thursday, February 8, at Welwyn Civic Centre, the lecturer being Mr. L. Baker

Names and Addresses of Club Secretaries reporting in this issue :

- A.E.R.E. (HARWELL): V. J. Galpin, 46 Harcourt Road, Wantage, Berks.
 BALLYMENA: I. J. Kyle, G18AYZ, 46A Bridge Street, Ballymena, Co. Antrim.
 BISHOPS STORTFORD: A. Marriott, G3VWC, 21 Thorley Hill, Bishops Stortford (4796), Herts.
 BRADFORD: E. G. Barker, G3OTO, 63 Woodcot Avenue, Baildon, Yorks. (*Shipley 58269*).
 BRITISH RAIL: H. Gray, Eleven Swanton Drive, East Dereham, Norfolk.
 BRIGHTON (Technical College): R. A. Bravery, G3SKI, 7 Copse Hill, Brighton (506418), Sussex. BNI 5GA.
 BURSLEM: P. Wild, 9 Red Lion Close, Talke, Stoke-on-Trent, Staffs.
 BURY & ROSENDALE: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, nr. Bury.
 CHILTERN: M. J. Pemberton, 205 Bowerdean Road, High Wycombe, Bucks.
 COLCHESTER: V. Levitt, Higham Road, Nayland, Suffolk.
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.
 COVENTRY: R. Steepe, 21 Wootton Street, Bedworth, Coventry.
 CRAWLEY: R. G. B. Vaughan, Tralee, 5 Filbert Crescent, Gossops Green, Crawley (23359), Sussex.
 CRAY VALLEY: D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent (*ELTham 6945*).
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23. (*FORest Hill 6940*).
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931).
 DORKING: B. Underdown, G3MBK, c/o G3AEZ, Eastfield, Henfold Hill, Beare Green, Dorking, Surrey (*Newdigate 236*).
 ECHELFORD: D. Walmsley, G3HZL, 153 Worple Road, Isleworth, Middx. (*POPeSgrovE 3239*).
 EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middx.
 FARNBOROUGH: D. G. Arigho, G3NVM, 6 Frensham Close, Yateley (2174), Camberley, Surrey.
 FLINT: J. H. Jones, GW3TMP, 3 Bryn Clyd, Leeswood, Mold, Flint.
 HALIFAX: R. Millar, G3WLW, 17 Brooklands, Bradley, Huddersfield.
 HEMEL HEMPSTEAD: A. Lex-Arnold, 13 Little Road, Hemel Hempstead.
 HEREFORD: B. Edwards, G3RJB, 5 Powys Walk, Hereford.
 HERIOT-WATT UNIVERSITY: R. M. Tatton, GM3SRV, 1 Hillview Drive, Edinburgh, 12.
 IPSWICH: J. Rhind, G3UJR, 67 Rosecroft Road, Ipswich (42504).
 LEEDS: M. Goldman, 8 Nunroyd Road, Leeds, 17. (681871).
 LEICESTER: J. T. McAllister, 239 Sturdee Road, Eyres Monsell, Leicester (*Wigston 6157*).
 LOTHIANS: A. J. Masson, GM3PSP, 20 Merchiston Road, Edinburgh, 10.
 MAIDSTONE: W. E. B. Kent, 72 Bower Mount Road, Maidstone (57634), Kent.
 MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead, Berks.
- MANSFIELD: F. N. F. Bewley, G8HX, 116 Westfield Lane, Mansfield, Notts.
 MID-HERTS: H. R. Thornton, G3PKV, 43 Fordwich, Welwyn Garden City.
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
 MID-WARWICKSHIRE: J. F. Coggins, G3TFC, 59 Dawnford Close, Walsgrave, Coventry, Warks.
 NORFOLK: W. Higgins, G3PNR, 13 Falcon Road East, Norwich, Norfolk NOR-88R.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (44329).
 NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (01-303-8655).
 OXFORD: P. Bradley, G3UJO, Trelawny, 114 Netherton Road, Appleton, Abingdon, Berks.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PUDESEY: *Secretary's name and address wanted*.
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey CR4-6DB.
 READING: M. F. Taylor, G3LFM, 58 Nightingale Road, Woodley, Reading.
 REIGATE: D. Thom, G3NKS, 12 Willow Road, Redhill, Surrey. (*Reigate 45033*).
 RHONDDA: C. M. Parry, GW3PHH, 34 Ca'er-Gwerlas, Tonypandy, Porth, Glam.
 ROYAL NAVY: R/S W. Metcalfe, G3TIF, H.M.S. *Mercury*, Petersfield, Hants.
 ROYAL SIGNALS: Major L. S. Beaumont, G3RUS, 24th Signal Regiment, Catterick Camp, Yorkshire.
 SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Cophorhne, Shropshire.
 SALTASH: D. Bowers, 95 Grenfell Avenue, Saltash, Cornwall.
 SHEFFIELD: G. Watson, 25 Underwood Road, Woodsats, Sheffield S8-8TG.
 SOUTH DOWNS: L. E. Tagliaferro, 9 Tugwell Road, Hampden Park, Eastbourne (53424).
 SOUTHGATE: R. Wilkinson, G3TXA, 23 Ashridge Gardens, Palmers Green, London, N.13.
 STEVENAGE: W. R. Sheppard, G3WMA, 83 Spring Road, Letchworth, Herts.
 SUTTON COLDFIELD: A. Ferneyhough, G8AVH, 114 Endhill Road, Kingstanding, Birmingham, 22c.
 VERULAM: J. Thomas, G3RXA, 9 Highland Drive, Hemel Hempstead (55136), Herts.
 WATTSHAM: R.A.F. J. W. Mitchell, G3SVF, Electronics Club, R.A.F. Wattisham, Ipswich.
 WELSH: S. W. Rees, 10 Tudor Crescent, Rogerstone, nr. Newport, Mon., South Wales.
 WESSEX: W. G. West, Windward, Corfe View Road, Corfe Mullen, nr. Wimborne, Dorset.
 WIMBLEDON: K. Alexander, 23 Pepys Road, West Wimbledon, London, S.W.20.
 WIRRAL: J. Phillips, G3PXX, 16 Collingham Green, Little Sutton, Wirral, Cheshire.
 WORCESTER: R. L. Avery, G3TQD, 24 Alexander Avenue, Droitwich (3943). Worcs.

The Moray Firth "B" station entered for the November MCC had as operators, left to foreground, GM3BVX, GM3KHH and SWL Drummond (logger). Their Rx was a double-conversion job (85 kc 2nd IF) built into an S.640 cabinet, and the Tx a VFO-BA-PA running a TT11 in the output, the aerial being a 262ft. folded dipole at 45 feet. An LF tone generator (seen climbing about the gear) was also available!



of Neosid Limited.

Wirral have a Junk Sale slated for February 7, and follow it up by a demonstration of Commercial Equipment on the 21st, both affairs being at the Scout Hq., 76 Park Road South, Birkenhead, Cheshire.

New Clubs—and Revivals

New reporters are the Welsh Radio Club, who formed at the end of October, with a large number of young members; they are at the moment searching for Hq. and at present meetings are held in the shack of one of the members, although we understand the problem of accommodation should be resolved by the time this is in print. What they are especially keen to do is to recruit licensed members who could be persuaded to give them a talk on something-or-other. Anyone, licensed or SWL, living in the area of Newport, Mon., would be welcome at meetings, for detail of which drop a line to the Hon. Sec. (*see Panel*). (Shades of the old Monmouthshire Radio Society of the early 1930's!)

It is not long since **Southdown** came into being, but there is no doubt that they are going very well—107 members in the book, and Hq. right up on Beachy Head; for details of one of the most go-ahead groups on the South Coast, refer to the honorary secretary. There is a limited-number visit to the BBC TV Centre on February 19, to be repeated later in the year for those who miss the first one.

Still about new Clubs—either in years or in the matter of reporting to this piece—we pass on to **Rhondda**, who have had a successful first AGM, after being moribund for several years. It is gathered that a move has been made to other accommodation, and a full programme of events organised; all the gen. can be easily obtained by contacting the Hon. Sec.—*see Panel*.

Pudsey has seen the birth of great cricketers—and now it is to be hoped it has seen the birth of a great Radio Club. Weekly meetings started on January 3,

the venue being the Game Cock Hotel, Pudsey Road, Leeds, 13.

Flint & District A.R.S. only made their start about six months ago but feel that they are making good progress. Having achieved a successful "first annual dinner," and having as a primary objective the aiding of SWL's, they should go from strength to strength. Meetings are at the Hawarden Castle, Church Street, Flint, every Friday starting at 7.30 p.m.

Last among our group of new ones or revivals is **Colchester**, who ran that delightful Rally last season, and who now assemble each Wednesday in term-time, at the North-East Essex Technical College, starting at 7 p.m., in Room 42.

Turning now to an older group—and one which your scribe knows quite a lot about, having been a member for several years—we hear again from **Stevenage**, who are still using their Hq. at Hawker Siddeley Dynamics, Gunnels Wood Road, where they settled several years ago after a long period searching for a reasonable place to meet. Now there is a lecture programme being laid on, with G3UYY talking about SSB on February 1, followed by G3RTJ on the 15th, the latter taking the Uses of Oscilloscopes as his topic. In addition, a determined effort is being made to find out all the possible SWL members who may not as yet be aware of the existence of the group. Meetings are held at the Hq.

HON. SECRETARIES TO NOTE!

It is essential that we have Club reports by the due date, given at the head of the feature and in the last paragraph, each month. Late reports cannot be written in. All Club reports should also include the name/callsign and full address of the hon. secretary, for inclusion in the Secretaries' Address Panel.

on the first and third Thursday in each month, starting at 8 p.m.

Bradford have three events laid on for the month of February; on the 6th there is to be a show of members' colour slides, while on the 13th a visit to Richard Allan Radio Limited, Gomersal, Cleckheaton, takes them away from Hq. The 20th is a "home game," when they have a lecture by an officer of Bradford Fire Brigade on Fire Prevention. Hq. is at Bradford Technical College, Great Horton Road, Bradford 7.

On to **Southgate**, where the second Thursday in each month sees them foregathering at Parkwood Girls School, located at the rear of Wood Green Town Hall. No details of the programme for the February meeting are to hand, but the information can be obtained by contacting the Hon. Sec.—*see Panel*.

* * *

The second Monday and the fourth Wednesday in each month is the form at **Sutton Coldfield**, at the Fox Inn, Walmley. Thus, February 12 is allocated to a talk on the Eddystone range of receivers. The other evening is, we gather, an informal.

For **Cray Valley**, the 1st will be a "Receiver Forum" at the Congregational Church Hall, Court Road, Eltham, S.E.9. The Natter Nite for February is on the 15th, this one being at the All Saints Church Hall, Bercta Road, New Eltham.

A series of lectures to the Reading chaps during January covered the practicabilities of operation of 144, 70, and 28 mc stations; the series is rounded off on February 13 by a lecture entitled the "Complete G3NBU." The other date in February is the 27th, when it is proposed to have a discussion on the progress to date of the group.

Their AGM was held during January by the lads of **Mid-Sussex**, and thus we have no firm information on the nature of the forthcoming programme; however, it is understood there is a change of venue for February and after, so in any case it is suggested that any prospective new member or visitor should contact G3RXJ, *see Panel*.

Turning now to the events at **Salop**, where the venue for the home meetings is the Old Post Office Hotel in Milk Street, Shrewsbury, we find on February 8 they will be visiting the Midlands Electricity Board Control Room at Ditterington. The 13th is set aside for the Club Project, with G3UDA, while on the 22nd the lads are to show each other their colour slides.

A thing called the "Little Gem Fuseblower" forms the technical piece in the current issue of the **Echelford Newsletter**; this is a catch for people who *will* persist in twiddling the knobs and switches of any electronic gadget they see. In use, it is plugged into a convenient power-point, and when someone cranks the switch a neon lamp goes out, as indeed do the fuses on the power plug—inside the unit there is only the neon and a switch to short out the mains! On a more serious tack, the Hall, St. Martins Court, Kingston Crescent, Woodthorpe Road, Ashford, is Hq., and there are meetings on the 19th and 29th February. The former is devoted to Aerials (the talk being given by G3HZL) while on the latter date a Tape Lecture on Transmitter Design and TVI will be heard.

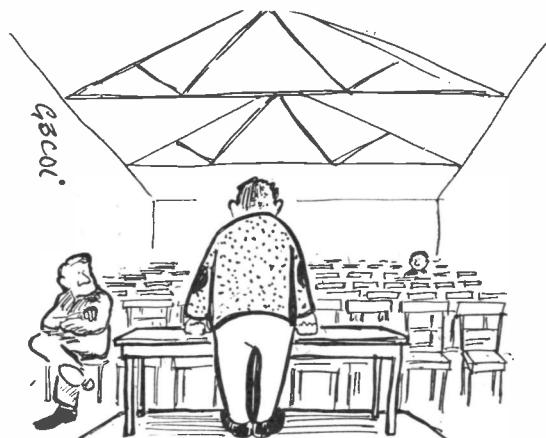
Hemel Hempstead and District are in session on the first and third Friday evening in each month, at Rucklers Lane Hall, Kings Langley. February's programme is not to hand at the time of writing.

It is a usual thing for a hiatus to occur in the programme just after the AGM—how obvious it is to the ordinary member who only turns up to be entertained is often a matter of luck—and this is just the situation at **Bishops Stortford**, where the January affair was the AGM and the programme for February 19 is in the melting-pot. However, in the few short months of their existence there has already grown up a tradition that there is *always* something doing, and a "backstop" arranged in case the advertised entertainment for some reason fails to materialise. On the third Monday in every month, at the British Legion Club in Windhill, Bishops Stortford, kicking off at around 2000z, when visitors and prospective members are always welcome (and stand a chance of going home with a bottle of wine, which is raffled at each meeting to pay, over the year, more than the cost of the room).

Once in a while we hear of someone in a club who has boozed; this time it is a member of **A.E.R.E.** (Harwell), who managed to sabotage their score in a recent VHF Contest by a slip of the pen, so disqualifying the 144 mc and 432 mc entries. In such a keen crowd of contest operators, the reaction when the boys found out must have been quite something! Seriously, though, it is worth checking the rules before finally sending off the log, particularly if, as in this case, the score would have put the group near the top.

Over at **Verulam** there is usually something doing, and this month is no exception; an informal on February 7, and a lecture on TVI on the 21st, to be given by G3HVA. Both these are, as always, at the Cavalier Hall in Watford Road, St. Albans.

Disaster! When the North Kent chaps came out of a recent meeting to their cars they found on each one a little sticker saying they must leave cars with lights on and please pay two pounds. So—if you visit them, leave



"... Some of you may have noticed that recently our attendances have been falling off a bit . . ."

The Marconi Apprentices group signed G3JTW for MCC and used a CR-150 Rx with an EF91-EF91-6CH6-807 transmitter, their score being 373 points for 22nd place out of the 94 entrants. The operators were G3RZP (left, on key) and G3WFF (standing, right), assisted by a keen group of SWL's.



your lights on! The Congregational Church Hall, adjacent to the Clock Tower, Bexleyheath is Hq., but we have no detail of the arrangements for February, so try the Hon. Sec. at the address in the Panel.

A new look is forecast for Bury and Rossendale, with regular lectures, participation in local events and so on, are all in hand for the coming year. Monthly sessions are the form here, on the second Tuesday, the venue being the George Hotel, Market Street, Bury.

Maidstone are now firmly fixed in the new "Y" Sportscentre, Melrose Close, off Cripple Street, which was opened by HRH the Duchess of Kent in November; here they have something very nearly approaching the ideal premises, with shack, workshop, test section, all available to members at any time by prior arrangement, plus Wednesday evening formal meetings and an R.A.E. and Morse class on Fridays.

Just time for us to pass a spot of late news on for Crystal Palace; the day after we appear, on Saturday, January 27, Crystal Palace will be getting together. In other words, their normal meeting has, for January only, been put back. The lecturer is to be G2FKZ, who will talk about VHF Propagation, a subject on which he is in great demand. As for the February "do," which takes place on the normal date, 17th, this will be the Annual General Meeting.

Down in the West Country Saltash were recently dismayed to be beaten roundly by Plymouth in an inter-Club quiz, but were, we understand, somewhat consoled by the feast that followed. Their own meetings are at Burraton Toc H Hall on alternate Fridays, which looks rather like February 9 and 23 from here, although we have no details at the moment.

If you live in the High Wycombe area your local group is the Chiltern crowd, who have Hq. at the British Legion at High Wycombe. It is understood that the last Thursday in each month is the normal meeting-evening; and that there are sundry other activities, such as a Club contest, which was played off on January 21, on Top Band.

For Farnborough, the meeting on February 13 will

have G3OLN giving a talk and demonstration on miniaturised aerials using 10-centimetre equipment. On the 27th, it is to be an informal occasion. Place of meeting is the Railway Enthusiasts' Club-room, 310, Farnborough Road.

The Oxford & District Amateur Radio Society, which meets at the Cherwell Hotel, Water Eaton Road, North Oxford, on the second and fourth Wednesdays of the month, is now making preparations for the annual dinner, to be held this year on March 23, at the Royal Oxford Hotel—further details from G3PMI, or see Panel.

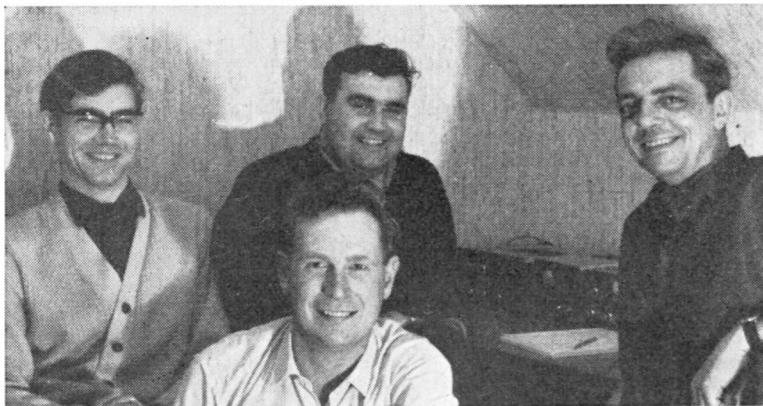
Over in Co. Antrim, Ballymena report plenty of things going on and a sustained interest in contest working. They intend to enter as many as possible this coming year, under their callsign GI3FFF. At least one Top Band exhibition is planned (to Co. Fermanagh), and they also mention recent R.A.E. and Morse Test successes, which have given a fillip all round. Their local paper, *Ireland's Saturday Night*, runs a weekly column (conducted by GI3NQH) devoted to Amateur Radio. It seems that many local-newspaper Editors would be glad to give space to a regular and competently written column on our subject.

The current issue of *Mercury*, the newsletter of the Royal Signals A.R.S., contains much in the way of useful technical material, and some interesting pictures; reading through it one is struck by the thought that here is an ideal sort of outfit for any serving or ex-Signals radio amateur to belong to, and well worth the annual subscription.

Worcester seem to have had quite an attractive series of meetings in the last few months, with the prospect of more to come; dates and details are not given in their letter and so it is suggested that contact be made with G3TQD, as panel.

* * *

British Rail are on the lookout for news and views, for inclusion in their *Newsletter*, the current issue of which contains the second part of a most interesting description of the trip made by G3SCW to the FIRAC



The Hereford chaps, signing G3HVX/A and making their first appearance in MCC, did very well to work themselves into 18th place with 387 pts. in this season's event. Left to right are: G3WTK, G3WNO (front), G3RJB and G3HVX. The accommodation was provided by G3WNO and the gear (a home-built transceiver) by G3HVX. Two aerials were tried.

(international railway rad'o-amateur group) Convention at Ribe, and the friendships made.

Films are the entertainment for Dorking when they get together next, on February 27 at the Star and Garter, Dorking—a couple of technical runs, then an interlude, after which there is one on Switzerland, and some slides covering the Club activities with that ex-GPO van.

February 5 is the date of the formal session of the Maidenhead crowd, when G3VCT will give a talk on Frequency Synthesizers; Tuesday 20th will be an informal at which the club call G3WKX will have its regular airing.

A crowded month—as always—for the group at Derby; February 7 kicks things off with the AGM, and once that is safely out of the way, the 14th is given over to an open forum and discussion. The annual dinner and dance will be on the 17th, at the Derbyshire Yeoman, Kingsway, Derby, followed on the 21st by a demonstration of their activities by the Derby Tape-Recording Club. The month is rounded off by a limited-number visit to Derby Sorting Office of the GPO. All the "at home" meetings are at Hq., Room 4, 119 Green Lane, Derby, and a special welcome is extended to all visitors and prospective members.

Edgware seem to have made such a success of their recent Junk Sale, when 10 per cent of the takings went into the kitty, that they have made no mention of the doings for February—but the dates are 12th and 26th. Details will no doubt be given with the greatest of pleasure by the Hon. Sec.—*see* Panel.

At Crawley, the meeting on February 14 is noted as "Informal, contact G3FRV." Their big night is the 23rd, when the annual dinner takes place at the New Airport Hotel, Crawley.

Brighton (Tech. Coll. A.R.S.) gets together on alternate Wednesdays, their next being on January 31, February 14 and February 28, at the College and commencing at 7.0 p.m.

Last, but by no means least are Hereford, who have passed the first six months of their existence—can it be *that* long since we first heard of them?—and seem to be booming; the percentage of attendance to members is always a good guide and theirs is very high indeed. Friday, February 2 is the date of the monthly shindig

this time, and there will be—all being well—a demonstration laid on by Daystrom of the Heathkit gear. We understand there is a slight element of doubt on this one, and so the chaps have lined up Tape lecture as backstop.

Deadline

And there it is for this month. Your news and views for next time—which, it should be noted will cover the March events—should be sent to reach us by first post February 2 latest. A little tight this month, from your point of view, but it is essential if we are to get all the bits and pieces sorted out at our end. Meanwhile, good luck and good lectures. Address for reports: "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM.

INDEX, Vol. XXV

The next (March) issue of SHORT WAVE MAGAZINE will contain the usual free loose supplement comprising a detailed Index of all that we have offered during the last twelve months, under subject headings and fully cross-referenced. It has often been said that our Annual Index is a guide to all that is worth knowing about in Amateur Radio—that is what we are told. We can only hope that it is true!

"SPECIALLY ON THE AIR"

At about this time of year, we remind those concerned that forthcoming issues will include details under this heading—that is to say, amateur stations to be operated for some local occasion, in the presence of the public, e.g., at trade or hobbies exhibitions, youth club demonstrations, galas, fêtes or jamborees. For a serious short-time endeavour, the GPO will issue, on application to Radio Services, a special callsign "for the duration only." If you want your event publicised, what we require is the callsign to be used, date(s) covering operation, function with which activity is associated, bands and modes to be worked, and QTH of the responsible contact-man for information and QSL's.

ANSWERS FOR THE R.A.E.

TO ASSIST THE NEWCOMER TO AMATEUR RADIO

The next Radio Amateurs' Examination is in May, for which many candidates will be preparing—there were over 1,500 entrants last year, of whom 60 per cent passed. Here we give a set of suggested answers to that Paper, in full, though only eight out of the ten questions need be attempted, noting that both questions in Part I are always obligatory. The choice lies in selecting the six out of eight to be answered in Part II. In the treatment here, rather fuller answers are given than would be expected, as a candidate could allow himself only about 20 minutes per question (to include any sketching) so as to have adequate time for a final check-through before handing the paper in. What the candidate has to do is to show the Examiner that the questions done are fully understood, and could be expanded on if necessary. Long and detailed explanatory answers are not usually required. The R.A.E. is Subject No. 55 in the City & Guilds of London Examination Syllabus and its pass-certificate is the basic qualification for an AT-station licence in the U.K.—Editor.

PART I

Qu. 1/ What are the conditions of the Amateur (Sound) Licence A as regards:

- (a) Frequency control and measurement,
- (b) Receivers,
- (c) Non-interference with any other wireless telegraphy?

(15 marks)

Answer (1)

(a) With regard to frequency control, the licence states that a satisfactory method of frequency stabilisation shall be employed in the sending apparatus used in the station. Equipment is to be provided capable of verifying that the station is operating with emission within the authorised frequency bands.

(b) As to reception, a receiver is to be available capable of receiving, on the bands in use at the station, the type or types of emissions currently in use at the station for the purpose of sending.

(c) The station shall employ apparatus so designed, constructed, maintained and operated that its use does not cause any undue interference with any wireless telegraphy (which, *inter alia*, includes telephony). Spark sending apparatus is specifically forbidden.

When telegraphy (CW) as distinct from telephony (Phone) is being used, arrangements shall be made to ensure that the risk of interference due to key-clicks is eliminated; similarly, with telephony transmission, all precautions shall be taken to avoid overmodulation, and to retain the bandwidth as narrow as possible for the type of transmission in use. In particular, the radiation of harmonics and other spurious emissions shall be suppressed to ensure a level such that no undue interference to other stations shall be caused, and tests are

to be made from time to time—and recorded in the log—to ensure the clause is met.

* * *

Qu. 2/ What is meant by:

- (a) Adjacent channel interference,
 - (b) Image frequency interference,
 - (c) Intermediate frequency breakthrough?
- Explain how filters and wavetraps can be used to protect receivers against interference from transmitters operating on other frequencies.

(15 marks)

Answer (2)

(a) Adjacent channel interference is the interference caused by two stations operating on very closely related frequencies, as for example two telephony stations, respectively on frequencies of, say, 1000 and 1001 kc.

(b) Image interference is peculiar to the superhet type of receiver. Consider a superhet having an IF of 450 kc, receiving a signal on a frequency of 1 mc from the aerial. The receiver local oscillator, therefore, would be on 1450 kc, so that the difference between the two frequencies would be 450 kc, which would appear at the first IF transformer, and be amplified and detected in the IF/AF chain. Now, consider an unwanted signal at 1900 kc, with the receiver still tuned to its signal at 1000 kc. This unwanted signal may be strong enough to pass through the first stages and reach the mixer signal grid at a significant level; here it is mixed with the local oscillator signal, and the difference is once again 450 kc, which is passed down the IF/AF chain as interference. The interfering signal in this case is twice the IF away from the desired signal, on the same side as the oscillator—*i.e.*, if the oscillator is above the wanted frequency, the "image" as we term it, is to be found twice the IF above the signal-frequency. Once the image has found its way into the IF/AF strip it appears as though, in our example, both signals were on the same frequency. Improving the IF characteristic does not help to combat image interference. Only greater selectivity ahead of the mixer will help to effect a cure.

(c) A third form of interference is that from a signal the output of which is on the IF of the receiver, and finds its way into the IF strip. It then appears as an untunable signal, or sometimes whistle, underneath—or on top of—

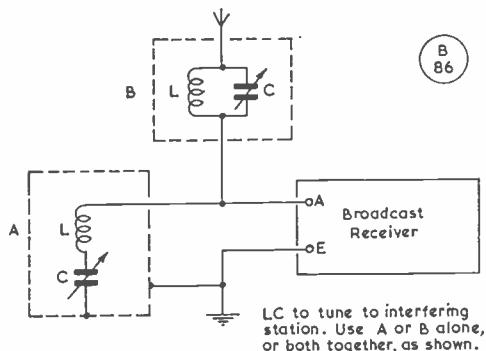


Fig. 4

any normally-received signal one tunes in. This is known as "IF breakthrough."

A wave-trap is simply a series or parallel resonant circuit, respectively arranged across the aerial and earth terminals of the receiver suffering interference, or in the aerial lead. These traps can be tuned to the frequency of the offending station. However, a better solution is the use of filters to give protection over a range of frequencies. An example of the use of the latter is the employment of a "high-pass filter" in series with a television set aerial lead; the filter in this case discriminates against any signal lower than, say 38 mc (such as the fundamental signal from an amateur transmitter), while allowing a signal in the television bands through. Similarly, a filter designed as a low-pass type can be inserted in the mains lead of the receiver, which allows the mains frequency through unaffected but discriminates against any RF picked up on the mains lead. Such filters should always be fitted as near as possible to the input terminals of the device being protected, whether the aerial or the mains lead.

PART II

Qu. 3/ What is meant by electro-magnetic induction?

Describe two methods of demonstrating this phenomenon. (10 marks)

Answer (3)

Electro-magnetic induction is the phenomenon which is observed when a wire is subjected to a changing magnetic field; one method of demonstrating the effect is to wind a coil of wire of many turns and of sufficient diameter to pass through it an ordinary bar magnet. If a sensitive indicating instrument is simply connected to the terminals of the coil, no deflection will be observed. However, if now the magnet is passed through the centre of the coil, the indicating voltmeter will be seen to deflect as the magnet passes through the coil. With the magnet stationary in the coil, no effect is seen—only when the magnet is moving relative to the coil, or vice versa. The effect is easier to display using a sensitive oscilloscope as the indicating device, due to the "dead-beat" of a meter pointer.

A second method is to wind two coils side by side, or one on top of the other, preferably on an iron core. In this case, connecting a battery to a switch and the terminals of one winding (called arbitrarily the primary), and the indicating instrument to the other (called the secondary), see sketch, provides the basis for a better demonstration. Closing the switch in the primary will cause the meter to deflect one way, while opening the switch causes a momentary deflection in the opposite direction. Furthermore, it will be found that varying the spacing of the coils relative to each other will vary the effect, reducing the amplitude of kick as spacing is increased. The effect is clearly due to the change of flux—either when the flux is collapsing to zero, or when it is rising from zero to some steady value. By using the first method, it can be shown that the effect is connected with the speed at which the magnetic flux changes, all other things being equal, while the second experiment shows

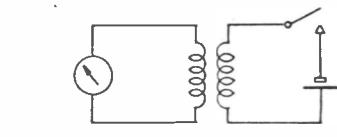


Fig. 2

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that for a constant rate of change (in this case determined by the speed of operation of the switch), the effect varies in magnitude with turn spacing, number of turns and so on.

Thus we may say that magnetic induction is an effect in which a changing magnetic field causes a current to flow in a wire physically unconnected with the circuit causing the magnetic field but placed such that the magnetic field cuts it.

* * *

Qu. 4/ Describe with the aid of a block diagram a superheterodyne receiver, and explain the superheterodyne principle of reception. (10 marks)

Answer (4)

The block diagram is shown herewith. The sequence of operation is as follows:

A superheterodyne receiver uses the principle of frequency conversion—thus, in our block diagram the boxes labelled "IF Amp," "Detector" and "AF Amp" form a single-frequency receiver which is designed to give the best possible amplification of signals at the correct frequency (often around 450 kc) and to reject any signals offered to it on closely neighbouring frequencies. All the signals to which it is desired to listen, regardless of their original frequency, must then be converted to appear at the correct frequency—the intermediate frequency, abbreviated to IF—by means of the stages labelled "RF," "Mixer" and "Local Oscillator."

The RF stage is intended to give some gain, and to provide selectivity against images. It gives enough amplification at signal frequency to over-ride the noise level generated in the mixer but it is considered good practice to keep the gain ahead of the mixer as low as possible consistent with meeting the above requirement. The mixer is fed with both the signal to which it is desired to listen and the output of the local oscillator. As it is arranged to have non-linear characteristics, the output of the mixer will comprise not only the original frequencies but also the sum of these two and the difference between them. One of these latter is arranged to

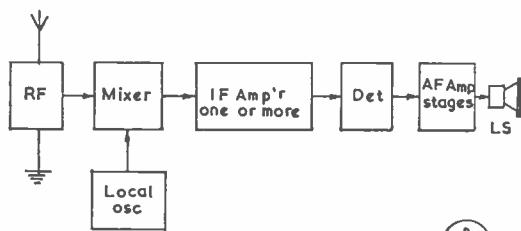


Fig. 3

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fall on the frequency of the IF amplifier, the others being rejected by the tuned circuits and decoupled away. In all but the most simple receivers, the Aerial, RF and Mixer input tuned circuits are gang-tuned along with the local oscillator, so that at all times they are "in step" with each other. As a result of this, there arises the problem of "tracking" of the circuits, which is eased if the local oscillator is so arranged that at all times it is running at a frequency higher than the signal frequency by a suitable difference, rather than lower.

* * *

Qu. 5/ Describe the part played by the ionosphere in the propagation of radio frequency waves in the band 3 mc to 30 mc.

(10 marks)

Answer (5)

The subject of propagation is an enormous one, and it is necessary to simplify considerably in order to give a coherent answer in a limited space. Were there no ionosphere, all radio signals would, no matter how low the angle at which they were radiated, eventually leave the earth's surface and be lost into space. Thus the extent of propagation in the range mentioned would be no more than the familiar "line-of-sight plus a third," which is the basis of VHF thinking. However, there are, girdling the globe, several layers of ionised atmosphere, the effect being caused by the sun. The layers of interest are the D-layer, which acts mainly as an absorber of RF, the E-layer at about 120 km. up, and the F-layer at 250 km., which splits in the daytime into F1 at 200 km., and F2 at 300-400 km. During the day these layers are all more intensely ionised. Lower frequencies tend to be absorbed by the D-layer, while all frequencies up to the "maximum usable frequency" (MUF) over a particular path are refracted (or bent) by the F-layer back in the direction of earth. A direct check on the degree of usefulness of the layers is by measuring the highest frequency at which a signal radiated vertically upwards will be returned to earth—this being called the "critical frequency." The absorption by the D-layer by day will set up a "lowest usable high frequency," which will be dependent also on the power at the transmitter and other factors.

The pattern thus created is one where during the day lower-frequency signals tend to be absorbed, and so these bands, if the MUF is high enough (as it generally is) are "open" mainly at night. The HF bands, on the other hand, are not seriously absorbed by the D-layer and so, if the MUF is high enough, are open for long-distance work during the day. Depending on the state of the sunspot cycle, and hence the degree of ionisation, the 14 mc and 7 mc bands may display signs of long-distance propagation during both day and night.

* * *

Qu. 6/ Define the units of EMF, current and resistance, and state Ohm's Law.

A battery, whose open-circuit EMF is 6v, passes a current of 1A when connected to a 4-ohm resistor. What is its internal resistance?

(10 marks)

Answer (6)

All units are derived from the basic ones of time, length, and mass. Our unit of current is defined as an ampere, being that rate of flow of current which permits a quantity of electricity of one coulomb to pass a given point in a time of one second. In order to make a current flow, it is necessary to have some electrical pressure, or EMF; this EMF is measured in Volts. The volt may be defined as that EMF which is needed to drive a current of one ampere through a resistance of one ohm. The unit of resistance is defined, independently of these two, as that resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, 14.4521 grammes in mass, of constant cross-sectional area 1mm. square, and of length 106.300 cms. Hence, Ohm's Law states that the ratio of the voltage applied across a resistance to the current flowing through the resistance at a constant temperature is constant. This may be expressed algebraically as $E/I = R$.

The total resistance in the circuit is given by $E/I = R$. Inserting figures, $6/1.2$ equals 5 ohms. However, since the external resistance is given as 4 ohms, the internal resistance of the battery must, therefore, be $5 - 4$ ohms, or 1 ohm.

* * *

Qu. 7/ What is meant by resonance in a series circuit? Why is such a circuit sometimes called an acceptor circuit?

What is meant by the magnification or Q of a circuit?

A vertical aerial has a natural inductance of $10 \mu H$ and a natural capacitance of $60 \mu F$. What is its resonant frequency when it is connected to earth through a coil of $50 \mu H$?

(10 marks)

Answer (7)

The condition of resonance occurs when the inductive and capacitive reactances are equal. In a series circuit, the current is the same throughout the circuit, and the phase of the voltages are taken with reference to the current; thus, since the two reactances produce voltages of equal amplitude, each being at 90° (but leading and lagging), then we end up with the two voltages being equal in amplitude but opposite in phase. Thus they cancel, and disappear. Since there is no voltage across the circuit, it follows that the current is higher at the resonant frequency than at any frequency on either side. That is, it "accepts" current at the resonant frequency, and is called an acceptor circuit.

A practical acceptor circuit has resistance built into it because of the wire in the coil and the leads. Thus, a good measure of the goodness is to work out the ratio of $\omega L/R$, where ωL is the inductive reactance and R the DC resistance—the resistance inherent in the capacitor being normally much less, and so negligible. This ratio is known as the magnification or Q of a circuit.

Assuming the inductance of the aerial is not coupled to the inductance of the loading coil, then the two add arithmetically. Thus, we have a series-resonant circuit

of $60 \mu\text{H}$ and $60 \mu\mu\text{F}$.

$$\text{Now, resonant frequency, } F = \frac{1}{2\pi\sqrt{LC}}$$

$$\text{i.e. } F = \frac{1}{2 \times 3.142 \sqrt{60 \times 10^{-6} \times 60 \times 10^{-12}}}$$

$$\text{Simplifying, } F = \frac{1}{6.28 \times 60 \times 10^{-9}}$$

$$\text{or } \frac{10^{-9}}{6.28 \times 60} \text{ cycles}$$

which simplifies out to 2.65 mc, using a slide-rule.

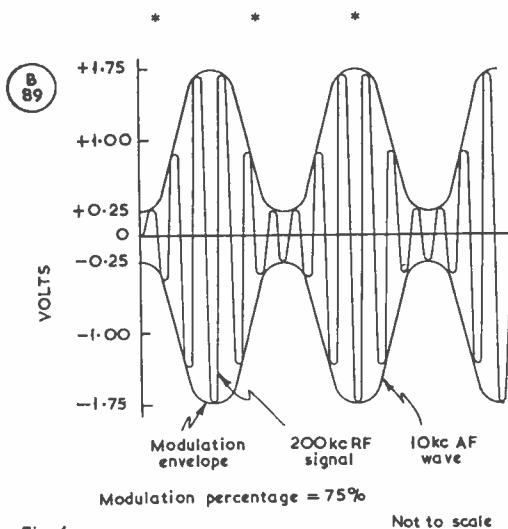


Fig. 4

Qu. 8/ What is meant by Amplitude Modulation?

Explain the meaning of the terms "modulation envelope," "depth of modulation," sidebands."

Sketch a graph illustrating a carrier frequency of 200 kc, having an amplitude of 2v. modulated by a sinusoidal frequency of 10 kc, having an amplitude of 1.5v. What is the depth of modulation in this instance? (10 marks)

Answer (8)

A carrier-wave by itself conveys no intelligence other than that of its mere presence. Hence, in order to convey a message we have to do something with it. As far as telephony is concerned, we can vary the amplitude of the carrier in accordance with an audio waveform, or the frequency, or the phase, to choice. If we vary the amplitude of the carrier by means of a sinusoidal AF signal, keeping the mean level constant, we reach a maximum condition when the carrier is reduced just to zero when the AF goes negative, and double the carrier

amplitude when the AF signal goes positive. This is known as the condition of 100 per cent modulation, while that of no variation in the carrier amplitude may be regarded as zero modulation depth. Any attempt to go beyond the 100 per cent modulation condition in the negative direction results in the carrier disappearing altogether for that period of time during which 100 per cent negative modulation depth is exceeded—which is another way of saying the sine-wave of modulation is distorted. This is known as "over-modulation." Consider now the case of an RF carrier, 100 per cent modulated by, say, a 1000-cycle tone of sine-wave shape. A little thought will show that each cycle of the RF is slightly different from the last, as the AF envelope exists due to the amplitude varying. Clearly, this is a form of non-linearity and under these conditions, we can regard the PA valve as acting in the fashion of a mixer, mixing the carrier frequency, F_1 , with the AF, F_2 . At the output we shall find, as with any mixer, F_1 , F_2 , also $F_1 + F_2$, and $F_1 - F_2$.

Now, F_2 is purely audio, and "sees" the PA tank coil as a short-circuit, whence it disappears back to ground through the decoupling circuitry. However, the other three frequencies are the carrier, the carrier plus 1 kc, and the carrier minus 1 kc; clearly, the PA tank cannot itself sort out one from the other and passes all three to the aerial. The signal above the carrier is the "upper sideband" and that below is the "lower sideband." (It can be shown by Fourier's analysis that the process of modulation cannot take place without this routine occurring.)

The remaining term to explain is that of "modulation envelope." The modulating input varies the amplitude from peak-to-peak of the RF signal, which is all the time swinging on each cycle about a mean. Thus, as the sketches show, the composite waveform looks as though the carrier were contained in an envelope which is symmetrical about the zero axis—hence the term "modulation envelope." As usually seen, an oscilloscope is locked to the AF modulation, and the RF is only visible as "shading" within the envelope.

* * *

Qu. 9/ What is meant by standing waves in an aerial feeder. In what circumstances are they present, and how can they be detected?

(10 marks)

Answer (9)

A feeder terminated in its own characteristic impedance will transfer all the power fed to it into the termination. But if the feeder is terminated by any other load it is to be expected (from the basic proposition that "maximum transfer of power occurs when the source and load resistances or impedances are equal") that there will be a mis-match.

This being the case, all the power cannot be taken by an incorrect load, and hence, having nowhere else to go, it will be reflected. Now, since the RF going towards the load, and the RF coming back are at the same frequency, then at any given point in the line, the outgoing and the returning signal have a *fixed phase relationship*. Considering the voltage, we find, that

although the wave going down the line and that returning are altering rapidly at any given point, the sum of the two as seen by a voltage measuring instrument is *constant*—the same situation holds good at any other point on the line—and hence we may take measurements of the voltage at various points along the line and trace out a fixed, non-moving, pattern. Considering the voltage pattern, the ratio between the maximum and the minimum is called the voltage-standing-wave ratio. The distance between two adjacent points of, say, maximum voltage, is found to be a half wavelength, at the frequency of operation.

As to the detection of these standing waves, there are various methods. With a coaxial line, a device known as a Reflectometer, normally used to indicate an absence of return currents and hence zero VSWR, will measure the ratio by interpretation of the readings. On a balanced line, a simple method is to insert an RF ammeter at the same place in each leg of the line, and note the readings. Moving the ammeters to another spot on the line will show (provided the new position is not a half-wave away from the old) a different current if standing waves are present.

* * *

Qu. 10/ Describe, with the aid of a circuit diagram, a PA stage suitable for use in an amateur sound transmitter, and which provides a reduction in radiated harmonics. Explain carefully the method of tuning and adjusting the stage. (10 marks)

Answer (10)

The stage shown consists of a pentode valve, arranged for anode and screen modulation; provision is also made for the insertion of either a key or a meter in the grid circuit.

In theory, a pentode stage should need no neutralisation, and parasitic oscillation should be prevented by the stoppers inserted at the grid and anode, shown as APC1 and APC2. Having checked the connections a start can be made by removing the driver stage valve (so that there is no grid drive) inserting a resistor of suitable value at the point X to reduce the PA anode current to a safe value, and switching on. With the aerial disconnected, and the loading capacitor at maximum, the grid and anode tuning condensers should be rotated, while a meter set to a suitable range (say 10 mA) is plugged into the grid keying socket. *No combination of settings of the two variable capacitors should result in any flicker of grid current.* To make certain this condition is met, the range setting of the meter may then be reduced down to 1 mA, or even lower, after a first trial at the higher current range setting.

Remove the resistor fitted at X, and connect a resistive load of 75 ohms (carbon resistor) to the aerial socket, of a suitable wattage rating. Replace the driver valve, and reset the meter to the 10 mA range. Adjust the grid capacitor for maximum drive as shown on the meter. Quickly swing the anode tuning condenser until the plate current dips, and "centre" the tuning at the bottom of the dip. If the anode current is now low, slightly reduce the loading capacitor and redip by means of the tuning capacitor. This process of dipping, checking, altering the

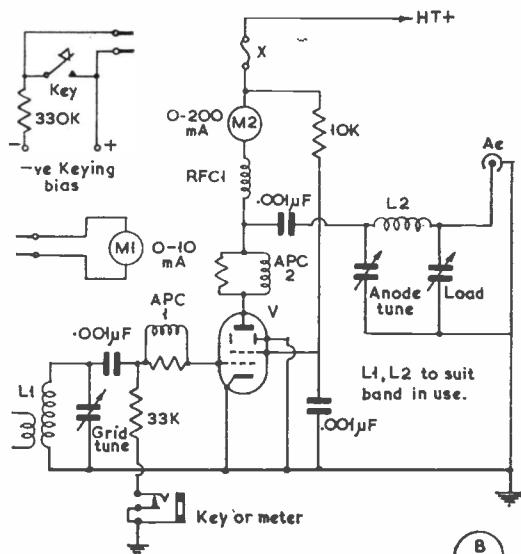


Fig. 5

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loading and redipping may be repeated until the stage is "loaded up" to the point where the anode current on the meter at the bottom of the dip is as desired. HT may then be switched off, and the dummy load replaced by an aerial. If the aerial departs appreciably from the 75-ohm characteristic, (so that the feeder has standing waves on it) it will almost certainly be necessary to "touch up" the tuning of the PA tank circuit to some slight extent.

Reduction in radiated harmonics results from the use of a *pi*-section as the output tank circuit, this being basically a low-pass filter. In addition, one would expect that the coaxial output to the aerial would be operated—possibly by means of a suitable aerial coupler—at unity VSWR, with a low-pass filter connected between the transmitter output socket and the coupler.

Amplitude Modulation, by the plate-and-screen method, involves making use of the link at X; if this is removed, the secondary of a modulation transformer can be coupled in, of suitable power and impedance fully to modulate the PA. If this is done, adequate drive should be made available at RF, and the key disconnected by unplugging.

Note: Copies of the last three years' question papers are available as one set, price 2s., and the syllabus for Subject No. 55 is 1s. 6d.—not from us, but of the Sales Section, City & Guilds of London Institute, 76 Portland Place, London, W.1, quoting (and this is important) "Subject No. 55." A list of suggested books suitable for R.A.E. reading appeared on p.371 of the August 1967 issue of SHORT WAVE MAGAZINE. We can also now supply Amateur Radio, by F. G. Rayer (G3OGR), which is specially recommended for R.A.E. students. It is 31s. post free, from stock.



THE OTHER MAN'S STATION

G3COJ

THE photograph shows the station of A. H. B. Bower, M.A. (Cantab), M.I.E.E., G3COJ—now of Lindisfarne, Chapel Road, Flackwell Heath, High Wycombe, Bucks. Brian's interest in radio began during Hitler's War, when he became an SWL listening to BC/DX and phenomena such as German night-fighter control stations.

At the end of hostilities, when the amateur bands became active again, his interest shifted to them, and he soon decided he must get his own licence. With the encouragement of G3PL and G5GX, he learnt the theory and Morse and was issued with the call G3COJ in September 1947.

Operations began from the parental QTH in Hull on the old 5-metre band, but soon had to be temporarily suspended, as he went up to Cambridge, where he became a keen member of the Cambridge University Wireless Society, and operated from their station G6UW. It is interesting to recall that the Club transmitter at that time was built by G3CY, who is now Professor Sir Martin Ryle, the authority on radio astronomy.

G3COJ continued activity from Hull during vacations, until the end of 1950 when he was called up into R.E.M.E., and had to close down. However, he duly appeared on the air from Arborfield, Berks., as G3COJ/A,

also using the Club callsign G3HIE. At this time, he began to operate on SSB—a novelty in those days, when the hardest thing was to find another SSB station to work.

On demobilisation after national service G3COJ moved to Maidenhead, and there followed several years of intermittent activity, mostly on the DX bands. In 1958 came a move to London, this time to a flat, with no space for aerials, so he turned to VHF portable work, and operation from the BBC Club station G3AYC, (for which G3COJ holds the licence).

Finally, in 1965, he was able to settle at the present location, and the task began of assembling a permanent station. At present, activity is on two metres and 70 cm., with occasional forays on four metres and Top Band, but G3COJ looks forward to returning to the DX bands in due course. As the photograph shows, the gear is all home-built except for the aerial rotator and the two AR88's.

Nowadays, with a home and family to look after, he has only a limited time available for radio, which explains a preference for Contests, for, as he explains "in this way one can obtain maximum results for minimum expenditure of time." However, he also enjoys the social side, especially Mobile Rallies, and is at present rebuilding his mobile equipment for SSB.

NEW QTH'S

G3PLQ/MM, J. F. Walton, c/o Officers' Department, P. & O. Lines Management Ltd., Beaufort House, Gravel Lane, London, E.1.

G3WGY, H. V. Ashford, 33 Broadlands Drive, Malvern, Worcs.

G3WPN, S. K. Bennellick, 1 Breakfast Close, Ham Estate, Plymouth, Devon.

G3WQK, Southdown Amateur Radio Society, c/o L. E. Taglioferro, 9 Tugwell Road, Hampden Park, Eastbourne, Sussex.

G3WQW, F. G. Stewart Sims, 71 Lambley Lane, Burton Joyce, Nottingham, NG14 5BL.

G3WTM, P. Barron, 7 Barden Grove, Whingate Road, Armley, Leeds 12, Yorkshire.

G3WTN, R. W. Limehouse, 5 Argyle Road, Whitby, Yorkshire.

G3WUH, W. E. Dufton, 54 Stirling Road, Shortstown, Bedford.

G3WUN, D. M. Holden, 27 Hembs Crescent, Great Barr, Birmingham, 22A.

G3WWP, W. M. Nicholas, 123 Anchorway Road, Coventry, Warks. CV3 6JH. (Tel. Green Lane 2558.)

G3WXX, A. Gumbrell, 50 College Road, Blandford, Dorset.

G3WXY, F. P. Page, 62 Gainsborough Avenue, Maghull, Liverpool. (Tel. Maghull 3912.)

G3WYX, Exeter Contest Group, *pse QSL via G3RUV. (QTHR.)*

G3WZN, F. A. Norris, 11A Cranmore Avenue, Great Crosby, Liverpool 23.

G3WZT, J. R. Matthews, 3 Daniels Cottages, New Pound, Billingshurst, Sussex.

G3XAJ, R. H. Hinde, 59 Hollington Road, Aspley, Nottingham. NG8 3HB.

G3XAP, A. P. Ashton, The Green, Stowupland, Stowmarket, Suffolk.

G3XBB, D. E. Latimer, 127 Ashby Road, Loughborough, Leics. (Tel. Loughborough 3325.)

G3XBC, Havering Technical College Amateur Radio Society, c/o M. G. Foster, 42 Ardleigh Green Road, Hornchurch, Essex.

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

G3XBE, A. F. Walton, 39 Oakdale Drive, Wrose, Shipley, Yorkshire.

G3XBR, B. J. Broughton, Hi-Beams, St. Tudy, Bodmin, Cornwall.

G3XBU, C. F. Withall, 8 Sumpter Pathway, Hoole, Chester, Cheshire.

G3XBW, M. S. Weils, 2 Hanbury Close, Ware, Herts.

G3XCO, D. S. Meldrum, M.B., B.S., D. Obst. R.C.O.G., 32 Crofton Road, Ipswich, Suffolk.

GW3XCR, C. Phillips, 40 Castle Drive, Cimla, Neath, Glam. (Tel. Neath 4998.)

G3XCS, C. J. Squires, 5 Frith Road, Saltash, Cornwall. (Tel. Saltash 2045.)

G3XCT, D. Dade, Park Wood, Lodge Road, Bromley, Kent.

G3XCW, G. G. Winter, 68 Sheringham Road, Kings Norton, Birmingham, 30. (Tel. 021-458-1898.)

G8BEH, D. W. Hill, 3 The Orchard, Kings Langley, Herts.

G8BFQ, F. R. Blake, 63 Nathans Road, Wembley, Middlesex. (Tel. 01-904-0896.)

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G2MA, D. D. Marshall, Dore Cottage, Shrogs Wood Road, Rotherham, Yorkshire.

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G3NBR, T. R. Ashby, 51 Churchfields, Townstal, Dartmouth, S. Devon.

G3NWQ, M. J. Caplan, 252 Signal Squadron, B.F.P.O. 1.

GI3OIC, I. L. Croxford, 10 Greenburn Way, Lambeg, Lisburn, Co. Antrim.

G3PMM, A. M. Johnson, 19 Kings Road, Fareham, Hants.

G3PNM, P. D. Smith (*ex-DL5XY*), 11th Signal Regt., Catterick Camp, Yorkshire.

G3PNM/A, P. D. Smith, 19 Horsforth Avenue, Bridlington, Yorkshire.

G3PXF, A. Petts, 1 Sunnybank Street, Ossett, Yorkshire.

GD3RFK, D. C. Dodd, Kionlough Cottage, Bride, Isle of Man.

G3RIR, N. Ackerley, 269 Cromwell Lane, Burton Green, Kenilworth, Warks. CV8 1PN.

GM3SBB, C. Ridge, 53 Slade Gardens, Kirriemuir, Angus.

G3SVK, F. L. Curtis (*ex-GM3SVK*), 144 Chandos Road, Stratford, London, E.15.

G3TJD, N. A. T. Hardy, High Knowle, Muttersmoor Road, Sidmouth, S. Devon.

G3TJY, D. R. H. Jolly, D.S.C., Little Russel, Lytchett Minster, Poole, Dorset. (Tel. 0201-22-142.)

G3TLV, G. C. Wynes, 20 Cross Lane, Middlewich, Cheshire.

G3TUW, P. J. Moore, 41 Shenstone Gardens, Gallows Corner, Romford, Essex.

GW3TYI, D. J. West, Dept. of Electrical Engineering, University College of Swansea, Singleton Park, Swansea, Glam.

G3UCQ, J. Farrar, Elm Cottage, Ventonleague, Hayle, Cornwall.

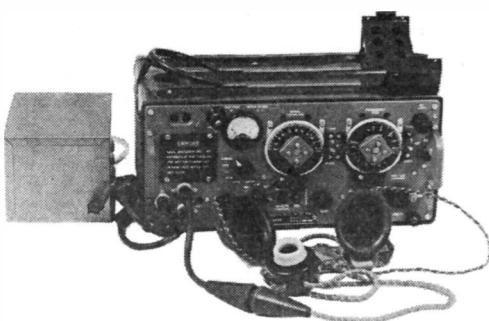
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G3WSN, K. A. M. Fisher, Plot 79, Longmead Avenue, Linkdale, Great Baddow, Chelmsford, Essex.

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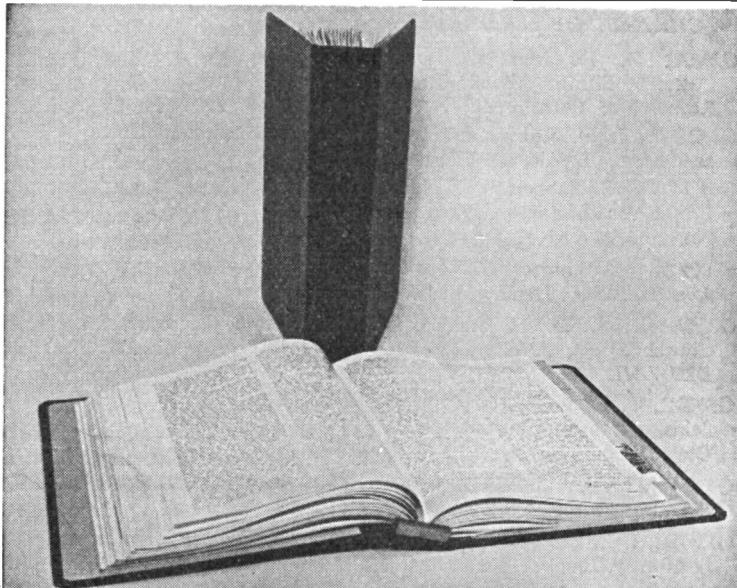
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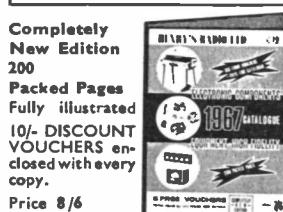
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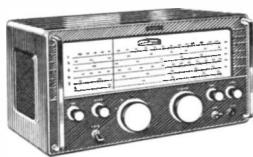
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WANTED: B2 complete. Please state condition and price.—Box No. 4592, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—continued

SELLING: Du-Mont 304A oscilloscope, 110/230v., £40 or offer? Heathkit Two'er, with Nuvistor front end, £18. Green Mk. V two-metre FET converter, £12. Command receiver, 1.5 to 3.0 mc, with built-in AC/PSU and speaker, £4. Three 6146's, brand new and boxed, 25s. each.—G3HUA, QTHR.

FOR SALE: Leak Stereo 30 amplifier, Leak Trougline 3 VHF tuner, Garrard turntable with B. & O. head, all in unmarked GKD cabinet in teak Formica; also two Wharfedale Super-8 RSDD speakers in column enclosures. The lot for £150. Going abroad.—G3UZI, QTHR.

WANTED: Manual circuit and any information on Tiger/Tigress. Please write, stating price.—Jenkins, GW3VTW, 17 Royal Crescent, Penydarren, Merthyr Tydfil, Glam., South Wales.

SELLING: Minimitter 150-watt AM/CW Tx, 10 to 80m., good transmitter, for £35 cash. Also AR88D, well used but a good receiver, £25 cash. Buyer collects after demonstration.—Boyce, G6DK, Lottenham, Rookery Road, Staines, Middlesex. (Ring Staines 52063 after 6.0 p.m.)

ACCOMMODATION Offered: Learner-amateur with Guest House offers ideal holiday accommodation; satisfaction assured; brochure.—Hyett, Penquite, Trevia, Camelford, Cornwall.

FOR SALE: DST-100 receiver, in excellent working order, with 100 kc crystal calibrator, green hammer-finish panels, price £25. Also a TCS-12 Rx, fitted noise limiter, £6. Both these receivers less PSU and speaker.—Drinkwater, G3RHR, QTHR. (Marple, Cheshire. Tel. 061-427 5340.)

SELLING: Amateur-band receiver, with Electroniques front end, 2nd IF at 85 kc, with Eddystone 898 dial and S-meter, price £20. Buyer collects.—Leger, G3UBL, 1 Conholt Road, Andover (2766), Hants.

SALE: Eddystone 940 receiver. Pse include s.a.e. with enquiries.—Vallance, 12 Chestfield Close, Rainham, Gillingham, Kent.

OFFERING: Property of an elderly SWL, a Hammarlund HQ-170A receiver, with matching speaker, in mint condition and very little used. Price £90. buyer to collect (London area).—Box No. 4593, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Heathkit RG-1 receiver, with speaker, £20. BC-221, including stabilised PSU, £15. Teletype 14 tape teleprinter, £8. PSU for T/P, 100v. at 0.5 amp., 60s. DL6EQ-type terminal unit, with all power supplies, £12. VFO at £4. Two Command Tx's, £4. Box of various components, many new, including meters, valves, etc., 40s. Or take £50 to clear the lot. All carriage extra. (North Wales).—Box No. 4594. Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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WANTED: One megacycle xtal mounted in octal metal base for LM-14 Frequency Meter. **FOR SALE:** Relav Tyoe 78A and T.C.C. high-pass filter. 10s. each. Two DA41 and two KT88. 15s. each. Also 5R4GY, 6AC7, 6V6M, 6AC7M, 6L6M and 6SJ7M at 6s. each. Postage extra. Stamp pse with enquiries.—Stead, G2UZ, 2 Cliff Road Gardens, Leeds 6. Yorkshire.

PART-EXCHANGE or Sell: Sommerkamp FL-1000 Linear Amplifier. **WANTED:** A good used Transceiver. Best offers.—Jack, R.N.F., Kinton Lindsey, Lines.

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SMALL ADVERTISEMENTS, READERS—continued

WANTED: Eddystone EB-35, with PSU, in Exchange for 2in. Centric Lathe, 6in. centres, motorised, complete with accessories and tools, also a "Sprayit" 400-1 series compressor, 250v., with spray gun and brand new. Write for further details. — Griffiths, Kenwyn, 21 Summerhill Road, Coseley, Nr Bilston, Staffs. (Tel. Tipton 2905.)

WANTED: Labgear LG.50, Heathkit DX-40U, Minimitter 2-7. For Disposal: Lafayette HE-40, £11 15s., and a Transmitter/Receiver Type A, Mk.III, £4. (Berkshire).—Box No. 4595, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: Collins 75A-1 receiver, with Collins matching speaker; Collins 32V-2 Tx with two spare 4D32 valves, and full instruction manuals. Asking £175, or offer? Prepared to separate. Prefer buyer collects.—Girvan, GM2FVV, Barnsdale Villa, Fairhill Road, Whins-of-Milton, Stirling, Scotland. (Or ring Bannockburn 2637, evenings.)

BARGAIN: At £15 collected, 150-watt transmitter complete in enclosed rack assembly. Write for details.—Rayer, G3OGR, Reddings, Upton-on-Severn (244), Worcs.

EXCHANGE or SELL: An SSB rig for 20 metres, comprising HW-32 transceiver, complete with AC/DC PSU's, and in mint condition. Interested in obtaining some commercial two-metre equipment, such as T.W. "Communicator" or W.H.Y.?—Eckley, G3UFQ, 24 Fernwood Road, Sutton Coldfield, Warwickshire. (Tel. ERDINGTON 6642.)

SELLING: R.C.A. AR88D, overhauled and in re-sprayed cabinet, £35. 2DAF-type receiver, half completed, with Eddystone 898 dial, Electroniques coils and crystals, 90% of the kit, £18.—Cutler, G3MXF, QTHR. (Tel. Poole 4571.)

INTERESTING! Experimenter, changing to photography, offers (for a moderate sum) complete 3,400 mc (9-centimetre) rig, previously used for aerial research. Also 100 kc SSB filter, meters and a 1 mH standard inductance. For details, send s.a.e.—Whitton, Balliol College, Oxford.

FOR SALE: Eddystone S.750 receiver, complete with matching speaker, S-meter and mounting blocks, in fine condition, £30.—Cartwright, 1 Pats-hill Road, Albrighton (2611), Wolverhampton, Staffs.

DISPOSING: Set of metal valves for an HRO, 60s., or offer? Minimitter converter, coverage 1.75 to 30 mc, IF 1.5 mc, £14. A Type 9 Rx, 60s. T.W. Nuvisitor two-metre pre-amp, 70s. New TCS ATU, 20s. Silicon rectifiers, DDT16A, 400v. 35A, 15s. Coax sockets, BN 5/5B 50-ohm, 4s. each. Rectifier Type 19, input 100/250v., output 12/24v. at 3A, £4, or offer? Type 50 two-metre CW Tx, 20s. Teleprinter maintenance handbooks and parts lists for Type 7 and 8 machines, and auto-transmitters, best offer? Red blob ceramics .001 mF, three a shilling, or £80 for £1. Mullard LP.1155 RF/IF modules, three-transistor, MW/LW, 20s. each.—Davies, G3PHL, 16 Mulkern Road, London, N.19.

WANTED: Urgently, SSB Transceiver, HW-32 or similar. Also a K.W. transmitter for AM/CW, and a Pye "Dolphin" or "Hamble" radiotelephone. **SELLING:** Unused Redifon 100-watt transmitter, with PSU, £16; and CR-100, £14.—Cain, G3DVF, 18 Oaky Balks, Alnwick, Northumberland.

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FOR SALE: Minimitter mobile installation, comprising mobile Tx for 40-80-160m., with control box, transistor PSU, and 160m. whip with base mounting. The lot for £23. Write for further details. — Whitaker, G3IGW, Rose-Dene, Wood Lane, Hipperholme, Halifax, Yorkshire.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Home-built receiver, 80 + 20 metres, with 7360 front-end, McCoy xtal filter, Eddystone dial, grey hammer cabinet, wiring a bit rough, but FB, £15. Golf clubs, putters and No. 1 wood, in bag, £12 10s. Stereo amplifier, 4 watts per channel, less knobs, 50s. B.S.R. record player and deck, 50s. Jap player arm with Deram cartridge, 20s. Three high-power RF transistors (will run red hot!). 30s. A very large junk box, 40s. PSU's: 250v. plus LT's, 20s.; 750v. with LT's, old but OK, 30s.; 500v. + screen bias and LT's, would suit 6146 linear, 60s. Fifty copies "Short Wave Magazine", "QST" and other magazines, 40s. Also the 16th Edn. of Editors & Engineers Handbook, "The Radio Handbook," 40s. And valves, crystals, meters, relays, everything to start a good junk box. It must all go, as am emigrating to VK in March.—Grant, 11 Milton Avenue, Wellingborough, Northants.

SELLING: National HRO, complete with PSU, all coils in rack, S-meter, speaker, miniature valves to 1st IF stage, in good working order, £17 10s. Transmitter, almost completed, incorporating Geloso VFO, Eddystone PA tuning capacitor and PA coil switch. H.D. chokes and capacitors, Woden UM3, 650-0-650v. 250 mA and heater transformers, three 3in. meters, all in two-rack cabinet, price £12 10s. —Cross, G3OZD, 38 Doncaster Road, Hatfield, Nr. Doncaster, Yorkshire.

FOR SALE: Well-built Heathkit SB-300E and SB-400E, complete. Both in excellent condition, less than 300 hours' use. £200 the pair.—Lt. M. G. Taylor, HQ. Mess, Blandford Camp, Dorset. (Tel. Blandford 2581, Ext. 203.)

SALE: K.W. Vanguard Tx, incorporating mod. for Top Band, in excellent condition, £40. Partly-built G3HTA-type Rx, with cabinet, Electroniques front end and IF's, £17. Pye Reporter, no mods., £5.—Savage, G3SCU, 72 West Garth Road, Exeter (77714), Devon.

OFFERING: National HRO-MX, with four band-spread and three general-coverage coil packs, manual, sound but needs PSU, at £18 or near. Could deliver in the West Riding.—Tong, 1 Alderton Crescent, Leeds 17, Yorkshire.

FOR SALE: CSE Tx, with p-tt mic., in perfect condition, £32. Sell or Exchange the following for Test Equipment or W.H.Y.? Unfinished 10-80m. AM Tx, Geloso 4102 VFO, 6146 PA, UM2 mod. with p/p-807's, requires switch wiring to complete, £12 (suitable PSU given to buyer). Geloso two-metre VFO, less dial, 50s. 'Scope tubes, 5in., 5UP7 and 5HP1A, with screens and bases, 20s. each. Reference cavity for 2400 to 3400 mc, with plugs and mounting, 30s. Type 726C klystrons, with bases, 15s. each. Table-top cabinet with rounded corners, new, 15s. Telescope, rack and pinion focussing, 15-30-45 magnification, £4. Also many valves, transformers, wide-spaced variables, etc. Requirements, p.s.e. All items buyers collect or pay carriage.—Ring Willets, G3UGE, West Bromwich (Staffs.) 0409.

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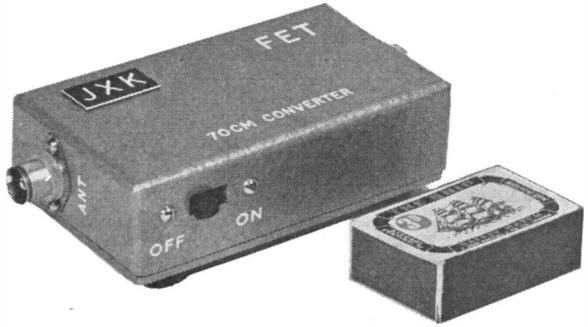
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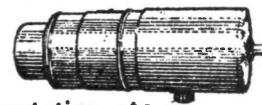
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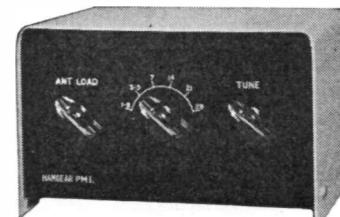
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