

The SHORT WAVE Magazine

VOL. XXXV

JANUARY 1978

NUMBER 11

TRIO R-300

Eavesdrop on the world



LISTEN TO THE WORLD

Short wave radio is by far the fastest and most convenient type of communications for spreading the news about what is going on in the world. And for this reason TRIO's R300 is the right rig for those who'd like to listen to a live report of the Indianapolis Grand Prix, to Radio Peking or to follow the progress of a Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for many journalists, engineers and technical representatives working abroad. They all want a reliable and sturdy multiband receiver for home use and travel, a receiver working from mains voltage or batteries. And just such a receiver is TRIO's new R-300.

Six Wavebands—LW (710-410 kHz), BC (525-1250 kHz), 4 x SW (160-10m). The four shortwave bands continuously cover the frequency range from 1.25—30 MHz with separate calibration for the commercial (75—11m.) and radio amateur bands (80—10m.) of the large drum-type main tuning and bandsread dials.

Outstanding Input Sensitivity—The dual-gate MOSFET front end assures excellent cross-modulation and spurious characteristics, as well as high input sensitivity. Between 18 and 30 MHz the R-300 operates as a double superhet, giving sensitivity of $1 \mu\text{V}$ for AM and $0.5 \mu\text{V}$ for SSB. For full details, contact the sole importers of the exciting TRIO range.



NEW. CL22 Antenna Coupler
for the SWL.

Only £14 inc. VAT and postage

FULL CATALOGUE 50p from

LOWE ELECTRONICS
Cavendish Road,
Matlock,
Derbyshire

LOWE ELECTRONICS LTD

PRICE LIST — JANUARY 1978

	Price inc. VAT	Carr. £		Price inc. VAT	Carr. £
T5280 160-10m. HF transceiver 200W P.E.P. ...	£645.00	3.00	JAPAN RADIO COMPANY		
VFO820 External VFO ...	112.00	3.00	NRD505 Professional communications receiver c/w		
DG1 Digital readout to 100Hz ...	127.00	3.00	matching speaker ...		
DS1A 12v. DC inverter ...	40.00	0.86	1800.00	3.00	
YG88C CW filter 8 pole ...	36.00	0.28	CRYSTALS		
SPS20 Matching speaker 8 ohm ...	19.00	0.86	We stock FM channels 50, S10 to S25, S32 (145-80)		
TV502 2m. transverter all solid state ...	178.00	3.00	and all current repeater and reverse repeater		
HSS Communications headphones, tailored response ...	22.00	0.67	channels for the equipment we sell.		
TS520 HF transceiver 12v./240v. 80-10m. ...	402.00	3.00	Price per single crystal ...		
TR200 240v. external VFO ...	405.00	3.00	Price per pair ...		
VFO520 External VFO ...	72.00	3.00	Special offer on crystals for TR2200GX, TR7200, TR3200		
CWS20 CW filter 8 pole ...	36.00	0.28	and TR8300 ONLY. 3 pairs for £10.00 ...		
SPS20 Matching speaker 8 ohm ...	19.00	0.86	100 kHz marker crystal ...		
TV502 2m. transverter all solid state ...	178.00	3.00	KF430 70 cms. 10W. mobile transceiver fitted 9		
HSS Communications headphones, tailored response ...	22.00	0.67	channels. Auto T8. The ultimate mighty midget ...		
DK520 Conversion kit—allows use of DGS with TS520	12.00	0.40			
TS520S 1.8-28 MHz SSB transceiver 200W P.E.P. ...	489.00	3.00			
DS1A 12v. DC inverter ...	40.00	0.86			
VFO520S External VFO ...	94.00	3.00			
SPS20 Matching speaker ...	19.00	0.86			
DGS Digital display/40 MHz frequency counter ...	132.00	3.00			
YG3399C CW filter ...	36.00	0.40			
HSS Communications headphones, tailored response	22.00	0.67			
RS99D 160-10m. all mode Rx, CW/USB/LSB/AM/FM ...	403.00	3.00			
TS599S De luxe HF Tx—80-10m. CW/USB/LSB/AM ...	383.00	3.00			
SS99 Matching speaker 8 ohm ...	19.00	0.86			
CC29 A 2m. converter for RS99 for internal fitting ...	20.00	0.28			
HSS Communications headphones, tailored response	22.00	0.67			
TS700G 2m. transceiver. CW/USB/LSB/FM/AM.	426.00	3.00			
240v. AC/12v. DC ...	19.00	1.06			
VOX3 Matching VOX unit (free with TS700G) ...	18.00	0.86			
SP70 Matching speaker ...	18.00	0.86			
TS700S 2m. mode digital readout transceiver.	542.00	3.00			
Simply the best ...	83.00	3.00			
VFO700S External VFO ...	18.00	0.86			
SP70 Matching speaker ...	189.00	3.00			
TR7010 2m. SSB/CW mobile transceiver 10 watts	58.00	3.00			
output ...	2.5	0.15			
PS5 Matching AC power unit/digital clock	189.00	3.00			
Spare 2 pole power plug ...	58.00	3.00			
TR7200G 10w. FM mobile fitted 10 channels, auto tone-	2.5	0.15			
burst etc. ...	189.00	3.00			
VFO30G Matching VFO with repeater shift ...	92.00	3.00			
PS5 Matching AC power unit/digital clock ...	58.00	3.00			
TR7400A 2m. FM 30w. mobile transceiver 800 channels	329.00	3.00			
TR7500 2m. FM mobile 10w. transceiver. PLL with all	225.00	3.00			
40 FM channels programmed ...	139.00	3.00			
TR2200GX 2m. FM handy transceiver c/w battery	169.00	3.00			
charger, microphone, carrying case, fitted 3 channels	6.30	0.15			
TR2200GX 2m. FM handy transceiver c/w battery	9.70	0.15			
charger, microphone, carrying case, fitted 12 channels	1.25	0.15			
RA1 Gelical rubber antenna ...	9.72	0.36			
MB1A Matching mobile mount (also fits TR2200/G) ...	45.00	0.86			
Spare power lead ...	1.90	0.15			
Pack of 10 ni-cad batteries ...	227.00	3.00			
VB2200GX 10w. mobile A with SWR protection. All	182.00	3.00			
leads supplied ...	9.70	0.67			
Spare whip for TR2200GX. (Also available for	9.72	0.36			
2200/2200G) ...	184.50	3.00			
TR8300 70cm. FM mobile 10w. transceiver fitted	22.00	0.67			
4 channels ...	1.25	0.15			
TR3200 70cm. FM handy transceiver fitted 3 channels	9.70	0.67			
MB1A Matching mobile mount ...	1.25	0.15			
Spare power lead ...	9.72	0.36			
Pack of 10 ni-cad batteries ...	95.62	3.00			
VB3200 10w. PA with Rx pre-amp. Same case size	170.00	3.00			
as TR3200 ...	184.50	3.00			
R300 General coverage receiver. 170 kHz-30 MHz.	22.00	0.67			
B/S for broadcast bands ...	1.25	0.15			
HSS Communications headphones, tailored response	27.75	0.67			
SPS AC lead ...	22.00	0.67			
TL922 HF linear amplifier 160-10m./2kW. PEP input.	57.00	3.00			
2x 3-500V tubes ...	56.00	3.00			
HC2 World time clock. 24 hour time zone clock.	15.50	0.67			
Invaluable aid ...	9.00	0.28			
MC10 Hand microphone. 50K impedance (also avail-	25.00	0.86			
able in 500 ohm) ...	17.00	0.67			
MC50 De luxe desk microphone dual impedance. PTT	27.75	0.67			
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LF30A HF low pass filter 1kW. 90dB stop band rejection	27.75	0.67			
BPF2A 2m. band pass filter 144-146 MHz. 50W. rms.	27.75	0.67			
100W. P.E.P. ...	57.00	3.00			
HSS Communications headphones, tailored response	56.00	3.00			
PS6 Power supply. Matching PSU/speaker for TR7500	27.00	3.00			
AT200 1.8 to 30 MHz antenna tuner ...	270.00	3.00			
TRIO OSCILLOSCOPES					
CS1570 Dual trace DC to 30 MHz ...	464.40	3.00			
CS1560A Dual trace DC to 15 MHz ...	324.00	3.00			
CS1562 Dual trace DC to 10 MHz ...	270.00	3.00			
The price includes two matching full bandwidth X10					
probes) ...	64.80	3.00			
PF810 In line power meter. 3 power ranges. 1.8-200	129.60	3.00			
MHz. 2 way antenna switch ...	108.00	3.00			
CO1303G Station monitor scope (as CO1303D but fitted	48.60	0.86			
in line RF monitor and 2 tone oscillator) ...					
CO1303D Single trace DC to 5 MHz. Ideal small service					
scope ...					
DM800 Dip resonance meter ...					

LOWE ELECTRONICS LTD

	Price inc. VAT £	Carr. £		Price inc. VAT £	Carr. £
VHF/UHF "J" BEAMS					
5Y/2M 5 element yagi ...	7.70	3.00	5W-110 SWR/power meter 1.8-150 MHz. Two power rangs 0-20 and 0-200 watts ...	25.92	.86
8Y/2M 8 element yagi ...	10.00	3.00	CS-201 Coax switch (SO239 sockets) Two way ...	11.25	.44
10Y/2M 10 element yagi ...	21.31	3.00	CS-201N Coax switch (N type sockets) Two way ...	15.75	.44
PBM14/2M 14 element para beam ...	31.16	3.00	ACCESSORIES		
5XY/2M 5 element crossed yagi ...	1.97	3.00	Trio H55 Communications headphones ...	22.00	.67
8XY/2M 8 element crossed yagi ...	19.91	3.00	Trio Low impedance padded headsets ...	4.68	.67
10XY/2M 10 element crossed yagi ...	26.32	3.00	Mæden Accessory speakers ...	2.52	.28
Q4/2M 4 element quad ...	16.31	3.00	Morse keys HK708 ...	8.10	.67
Q6/2M 6 element quad ...	21.71	3.00	EK150 Katsumi keyer. 240v. AC/12v. DC operation. Built in monitor ...	60.75	.67
D5/2M 5 over 5 slot fed yagi ...	13.61	3.00	EK1024 Electronic keyer with 1024 bit memory ...	118.12	.67
D8/2M 8 over 8 slot fed yagi ...	18.22	3.00	Trio MC10 Hand microphone. Available in 50 K ohms or 500 ohm impedance ...	9.00	.28
UGF/2M Unipole ground plane ...	7.03	3.00	Trio MC50 Dual impedance table microphone ...	25.00	.86
MBM48/70 cms. Multi beam ...	21.65	3.00	RW151D Kuranishi watt meter/dummyload 0-5-25- 150W-DC-500 MHz ...	75.60	.86
MBM88/70 cms. Multi beam ...	28.96	3.00	EW1 Wave meter ...	16.20	1.06
12XY/70 cms. 12 element crossed yagi ...	29.70	3.00	DL20 20W dummy load ...	3.67	.24
TAS 2" 2m. whip ...	13.05	3.00	Trio HC2 Ham clock ...	15.50	1.06
CS/70cm. Colinear ...	30.93	3.00	Hansen SWR3 Single meter ...	9.50	.67
C8/70cm. Colinear ...	39.37	*3.00	Hansen SWR25 Twin meter ...	10.80	.67
D15/1296 23cm. antenna ...	23.06	3.00	F5301 Through line watt meter 3.5 to 30 MHz ...	32.40	.86
PHASING HARNESS					
PMH/2C for 2m. circular polarisation ...	5.06	.28	Hy-Gain CI Centre dipole insulator ...	3.82	.44
PMH2/70 for 70 cms. ...	5.90	.28	Hy-Gain BN86 Balun. 2kW P.E.P. 3-30 MHz ...	13.33	.67
PMH4/70 for 70 cms. ...	12.26	.28	Microphone plugs 4 pin for Trio, Yaesu ...	.67	.15
CDE ROTATORS					
AR40 (5 core cable required) ...	51.75	3.00	Microphone sockets 4 pin ...	.67	.15
CD44 (8 core cable required) ...	106.87	3.00	PL259 plugs ...	.51	.15
Ham-2 (8 core cable required) ...	145.12	3.00	Reducers for PL259 plugs ...	.17	.15
RAK ANTENNAS					
A-8XL 80m. dipole 4kW rating ...	12.15	.86	SO239 sockets ...	.51	.15
AL-48DXN 80/40m. trap dipole. Length only 28 metres 2kW P.E.P. ...	25.43	1.06	PL259 in line connectors ...	.82	.15
Midy VN 80m. to 10m. trap dipole. Length 23 metres. 1.5 kW P.E.P. ...	40.50	1.16	PL259 angle connectors ...	1.03	.15
Listener III 5WL antenna. Double dipole. 24 metres overall ...	25.43	.86	Standard jack plugs 2.5 mm. ...	.20	.15
Listener I 5WL antenna. Loaded wire ant. Only 5m. long ...	9.54	.66	Standard jack plugs 3.5 mm. ...	.20	.15
HD-26A Extendable dipole. Tunable from approx. 70 cm. to 4m. ...	6.75	.44	Screened phono plugs ...	.25	.15
HY-GAIN ANTENNA—HF beams					
TH2Mk3 2 element yagi for 20-15 and 10m. 1 kW rating ...	117.56	3.00	Standard 3 pole jack plugs ...	.20	.15
TH3Jnr 3 element yagi for 20-15 and 10m. 600W. P.E.P. ...	121.50	3.00	Standard 2 pole jack plugs ...	.20	.15
TH3Mk3 3 element yagi for 20-15 and 10m. 1kW. ...	167.62	3.00	Cigar lighter plug ...	.50	.15
TH6DXX 6 element total 20-15 and 10m. ...	201.37	3.00	PUBLICATIONS		
Hyquad 2 element quad. 8.5 dB gain on 20-15-10m. ...	182.25	3.00	Log book ...	50p	including postage
HY-GAIN ANTENNAS—HF Verticals					
12AVQ Trapped vertical self support for 20, 15, 10m. ...	39.93	3.00	Full catalogue ...	50p	for postage
14AVQ/WB Trapped vertical self support for 40, 20, 15, 10m. ...	56.19	3.00	*—By B.R.5.		
18AVT/WB Trapped vertical self support for 80, 40, 20, 15, 10m. ...	81.45	3.00	PLEASE ADDRESS ALL MAIL ORDERS TO MATLOCK LOWE ELECTRONICS LTD		
VHF MOBILE WHIPS					
Bantex B5/GF 2m. 2 whip c/w single hole base mount ...	8.16	3.00	HEAD OFFICE AND SERVICE DEPARTMENT		
Magnetic mount for all Bantex whips ...	10.40	.66	119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE		
Bantex UCL 70cm. colinear 2 over 2 wave whip with base ...	9.62	3.00	DE4 3HE		
Bantex BUG 2m. colinear ...	29.53	3.00	Telephone : 9 a.m. to 9 p.m. Matlock (0629) 2817 or 2430		
"J" Beam TAS 4" 2m. whip ...	13.05	3.00	Telex : 377482 LOWLEC G		
Daiwa MA41 2m. 2 wave gutter mounting with whip, clamp and cable ...	8.44	.86	Southern Sales Peter, G3ZPB, Communications House, 20 Wallington Square, Wallington, Surrey. Tel. 01 669 6700.		
Gutter clamp. Accepts most whips ...	2.81	.67	Midland Sales Peter, G3XWX, 5oho House, 362-364 Soho Road, Handsworth, Birmingham. Tel. 021 554 0708.		
70cms. UCL colinear whip 2 over 2 wave whip with base Revco 1/2" whip ...	16.28	.67	Northern Sales Tom, G4DVZ, 27 Cookridge Street, Leeds. Tel. 0532 452657.		
Revco—base only for 1/2" whip ...	18.50	3.00	In addition to the above shops which are open from 9 to 5.30 Tuesday to Saturday (Wallington shop closed Saturday afternoon) we have part-time agents who are available at evenings and weekends :		
Revco—whip and coil only ...	13.50	.66	John, G3JYG 16 Harward Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071.		
Revco—whip and coil only ...	5.00	.44	Sim, GM3SAN 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041 771 0364.		
CABLE (prices per metre)					
5 core rotator cable for AR40 ...	Please	Up to 20m.	Alan, GW3YSA 35 Pen Y Waun, Efail Isaf, Nr. Pontypridd, Glamorgan. Tel. Newtown Llantwit 3809.		
8 core rotator cable for CD, HAM 2, TR44, HAM-M ...		80p	So, wherever you are, we have a branch or part-time agent not too far away. At Matlock, the branches, or our agents you will see and can try out the very best in new and secondhand HF or VHF equipment, together with every conceivable aid or accessory for the complete station.		
12 core rotator cable—Heavy duty ...	Add		With new products coming along all the time, it is difficult to keep a price list up to date. If you send 50p, you will receive all current brochure price list up to date. If you send 50p, you will receive all current brochures, catalogues, prices and the antenna booklet that everyone is talking about.		
UR43 50 ohm coaxial cable. 4.3dB/100ft. at 100 MHz ...		above 20m.			
UR67/RG8U 50 ohm coaxial cable. 2 dB/100ft. at 100 MHz ...		VAT			
Twin feeder 300 ohm ...		20m.			
Twin feeder 75 ohm ...	at 8%	£1.00			
Twin feeder 75 ohm heavy duty ...					
DAIWA ACCESSORIES					
CI-22 Aerial tuner unit. 1.8-30 MHz ...	13.50	.66			
CSW-216 ATU with built-in 5WR meter. 80m.-10m. 500W. P.E.P. ...	103.50	3.00			
CI-666 High power ATU. 160-10m. 2kW. ...	175.00	3.00			
CI-65 ATU 80-10m. 500W. P.E.P. 200W. CWV ...	54.00	3.00			
AT-400X Stepped attenuator ...	41.04	.86			
5WX-777 De luxe 5WR/power meter with "cross over" metering ...	110.16	1.06			
5W-410 5WR/power meter 144 MHz/432 MHz ...	48.60	.86			



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THE ROLLS-ROYCE OF TRANSCEIVERS

ARE YOU: OPERATIONAL ON HF OR VHF, ACTIVELY LOOKING FOR AN HF TRANSCEIVER, OR WAITING UNTIL THE RIGHT ONE—THE ONE WITH EVERYTHING, AT A REASONABLE PRICE ARRIVES? HAVE YOU EVER SAT BACK AND DRAFTED OUT THE SPECIFICATIONS OF YOUR DREAM MACHINE?

10-80m? No, lets have 160 as well, reception of WWV would be a nice addition.

SSB and CW are a necessity, AM for top band, FSK for RTTY, how about FM (with receiver squelch) for a 10m. net and for use with a transvertor.

Digital readout, of course (to a 100Hz), for accuracy but an analogue system to say, 1 kHz would give one a "feel" of position in the band, we are only dreaming, lets have both.

Mains or battery? Both, two power supplies and the transceiver? Messy! The power supplies must be built in.

Sensitive receiver, with a switchable attenuator (just in case), crystal filters for CW, SSB, AM—how about a tunable IF system with overlapping filters for continuously variable selectivity. A deep notch filter, and an audio peak filter, to complete our specifications.

RF speech processing, VOX, noise blanker, transmitter output level, and microphone gain as front panel controls. How about disabling the PA if we require a low level output only.

Tune up is always a problem, a button that with a single push gives full power transmission for 10 seconds is an interesting solution.

A clarifier of some sort is necessary, a potentiometer with zero in the centre? An on/off switch at one end or how about two push switches to bring the rotary into operation for any desired shift on RX and/or TX.

For CW, how about the latest in technology—a Curtis memory keyer actually built into the equipment.

Its got to be clean, of course, RF derived feedback and to eliminate out of band spuri, what about a phase locked loop VFO—good idea? Why not then build in a memory that will hold any transmit, receive, or a transceive frequency and recall it in a moment.

STOP DREAMING OF TOMORROW'S TRANSCEIVER TODAY, IT IS HERE. THE FT901. FROM YAESU THROUGH SMC ; THE PEOPLE YOU CAN TRUST

THE HF MOBILE YOU CAN TRIUMPHANTLY FIT TO YOUR ROLLS-ROYCE OR MINI



With insight into the needs of HF mobile in '78 Yaesu offer the FT7, in stock in Totton around the end of February. This is a 10-30m. transceiver, VFO controlled (to 1 kHz accuracy) and with that useful crystal control facility. Selectable sidebands, CV, crystal calibrator, clarifier and an advanced noise blanker are some of the features packed into a cabinet only a few inches high, but through careful design the front panel remains remarkably uncluttered. Designed for a linear 10W. output consuming only a few Amps it eliminates; 30A cables from the passenger compartment and the cooling problems of a massive heat sink. Need more power for a difficult contact? Flick in a FL110 (a 200W. PIP linear) installed in any suitable place in your car.

FOR VHF MOBILE THE FT227R

The new FT227R uses a "single knob" tuned digital synthesizer employing a photoelectric sensor or an optical coupled system which eliminates both noisy, unreliable rotary switches, and crystal banks. Full coverage of 2 metres in 5 kHz divisions with a ± 600 kHz shift plus a memory feature which permits recall of any entered frequency or particular offset. Bright, large, digital readout gives unequivocal readout of the frequency in use. The receiver offers 0.3 μ V (for 20dB S+N/N) sensitivity into a ± 6 kHz (at 6dB) bandwidth whilst maintaining a remarkable immunity to overload and image problems. The 20W. DC input transmitter features Hi/low power outputs, AFP. tone burst on repeaters and an out of band inhibition trip, etc.



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GM8DOX B. of Allan (078683) 3223 Ian McKechnie
GW3TMP Pontybodkin (035287) 846 Howarth Jones
G13WVY Tandraee (0763) 840656 Mervyn Anderson

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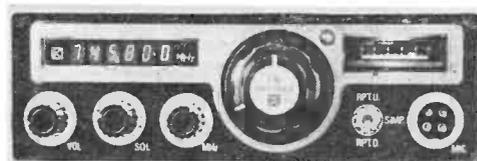
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DIGITAL II from KYOKUTO SCANNER AND CRYSTAL T.B. OPTIONS

The Digital II offers complete 5 kHz step coverage across 2 metres and now with the Scanner 40, 25 kHz channels from 145 MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 7 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs.

Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (rx to 149 MHz) from a tiny 6 1/2" x 2" x 7 1/2". Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.

For strong handling, and low noise the R.F. mixer, first IF (16.9 MHz) second mixer* (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (± 8 kHz at -6dB ± 15 kHz at -70 dB) Ceramic filter. LED lamps indicate if the serviceability and screening). Selective calling socket.



DIGITAL II £235; CRYSTAL T.B. £10.00; SCANNER £49.50
All prices exclude VAT at 12 1/2%

ROTATOR? FOR THE RANGE CONTACT SMC FOR QUICK DESPATCH (+ VAT 12 1/2%)

AR20	£34.00	AR40	£47.50	CD44	£95.00	2030	£48.00
AR30	£41.00	AR33	£59.00	HAM 11	£129.00	CD562	£5.00
AR22	£43.00	BT1	£79.50	2010	£43.50	RZ100	£10.00

ANTENNA? FOR THE RANGE FOR THE CHOICE SMC OF COURSE

JAYBEAM 70 (4m), 144 (2m), 432 (70) (Carr. £1.25)

D5/2m	5 over 5 slot feed	£12.10	PBM10/2m 10 ele. Para	£22.55
D8/2m	over 8 slot feed	£16.20	PBM14/2m 14 ele. Para	£27.70
5Y/2m	5 ele. crossed	£14.20	DB/70 8 over 8 slot feed	£13.45
5XY/2m	8 element crossed	£17.70	PBM18/70 18 ele. Para	£16.50
10XY/2m	10 ele. crossed	£23.40	MBM48/70 46 ele. Multi	£19.25
5Y/2m	8 ele. yagi	£6.85	MBM88/70 88 ele. Multi	£25.75
8Y/2m	8 ele. yagi	£8.80	12XY/70 12 ele. crossed	£26.40
10Y/2m	10 ele. long yagi	£18.95	4Y/4m element yagi	£11.25
14Y/2m	14 ele. long yagi	£24.25	PMH/70 2 way harness	£5.25
Q4/2m	4 ele. yagi	£14.50	PMH2/C Circ. phasing	£4.50
Q6/2m	6 ele. quad	£19.30	PMH2/2m 2 way harness	£6.05

BANTEX VHF WHIPS (Carriage 90p) VAT 12 1/2%

BGA FG 2m. fibreglass	£8.75	BSU 1/2 432 MHz	£5.00
70 1/2 70 MHz fibreglass	£4.00	UCL Mid loaded	£8.00
144 1/2 145 Fc or 55	£3.50	TLM Trunk lip mount	£5.75
BS 1/2 145 MHz FG	£7.20	MB Magnetic base	£9.05
BGA SS 2m. s/less steel	£8.50	Unwanted base deduct	£0.50

CABLES RF FEEDERS (Carriage Extra) VAT 8%

UR67 50 ohm Heavy	yd. 39p	UR39 75 ohm Medium	yd. 24p
UR57 75 ohm Heavy	yd. 42p	T3278 ohm Distribution	yd. 20p
Carriage £2-£7 ex-stock VAT 8%		UR43 50 ohm Solid Cent.	yd. 16p
300 ohm Ribbon	yd. 12p	UR76 50 ohm 5Strand Cent.	yd. 16p

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TELOMASTS	HAMTOWERS	TELETOWERS	VERSATOWERS
10' telescopic heavily galvanised steel mast supplied with guy rings etc. or c/w full rigging kit.	Galvanised lattice 10' sections. Free standing with climbing steps.	Carriage and rigging (RK) extra	Standard P40
Carriage £2-£7 ex-stock VAT 8%	Carriage £3-£20 ex stock 8% VAT	42' ... £121.00 (RK £28)	Standard P60
30' £25.00 or £43.85 c/w rigging	30' c/w base grillage	57' ... £174.00 (RK £28)	Heavy Duty P40
40' £32.50 or £56.85 c/w rigging	40' c/w base grillage	79' ... £224.50 (RK £49)	Heavy Duty P60
50' £42.00 or £74.50 c/w rigging		101' ... £303.50 (RK £76)	

Telescopic (20' sections) with full tilting facilities allows for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resort to concrete. Full scale efficient production offers you a wide range of towers at a minimum cost. See far right for line drawing and above right for typical prices.

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North Lane, Headingley, Leeds.
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SOUTHAMPTON SO4 4DN

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HANSEN WATTMETERS (P&P 85p)

Flat 50-150 MHz. SWR $\pm 3\%$ (to 3:1)
Power 20 & 200W. FSD ($\pm 10\%$), $\frac{1}{2}$ " x $4\frac{1}{2}$ "

FS302M £22.50 + 8% VAT



QUARTZ CRYSTALS LOW PRICE

FT75(B), FR101(S), FT200(B), FT301(S),
FT221(R), FT220, MS2, MR2, Converter,
£2.20 each (+12½%), FT2F, FT2FB, FT2 Auto,
FT224, FT223, KP202, Multi 11, TR220(G),
C146A, £3.75 pair (+12½%), (P&P 20p)



2M. PRE-AMP WITH RF SENSING

Car or mast head mounting. Typically 12 dB
gain. Bandpass characteristics. Handles
30V RF. 12v. operation. SO239 sockets
 $5\frac{1}{4}$ " x $2\frac{1}{4}$ ".
RB-145, £22.50 (+12½%), post free.



BOOM MICROPHONE HEADSET

600 ohm magnetic lightweight boom mic.
Ideal for mobile or contests, etc. (Post free
but VAT + 12½%).

Microphone only £9.75

Footswitch only £5.95

MD35 complete £14.75



LEADER WATTMETERS

LPM885 Through line (illustrated).

1.8-54 MHz. 20-200-1000W FSD
(P&P 75p) £41.50 + 8%

LPM880. Absorption. 1.8-500 MHz.
5-20-120W. FSD (P&P 95p) £64.00 + 8%



TRANSISTOR DIP OSCILLATOR LDM815

1.5-250 MHz on fundamentals battery c/w
earphone and 6 plug-in coils 2 kHz modulation.
1-15 MHz Crystal facility.

post free £38.50 + 8%

LIM870
Antenna impedance meter 1.8-150 MHz.
0-1Kohm direct reading c/w load.
post free £38.50 + 8%



COAX SLIDE SWITCHES

Up to: 1kW, 1.5 GHz, 0.3dB loss, 1:2:1 VSWR,
50dB isolation, 50 ohm "N" or "PL" fittings.
Ex-Stock P. & P 30p (VAT + 8%) EX STOCK

TWS120 1 in 2 out nickel SO239 ... £5.40

TWS150 1 in 5 out nickel SO239 ... £9.35

TWS220 2 in 4 out nickel SO239 ... £9.35

SWR METER TYPE SWR 25

With Power Indications

SWR25

Twin meter. Up to 160 MHz.

calibrated to 3:1 SWR SO239

Connectors.

£10.00 (+8% VAT) (P&P 40p)

COAX SWITCHES

ANTEX (KURANISHI) (P&P 20p)

1.05:1 VSWR, 0.2dB loss, 40dB

isolation, 200W. handling all 150 MHz.

KSW1 3 SO239 sockets £7.70 + 8%

KSWIA 2 SO239, 1 PL259 plug,
£8.20 + 8%



FM BOOSTER T203

88-108 MHz low noise pre-amp. Fitted
flying leads (car plugs) up to 20 dB gain. 12
volts with LED indicator $1\frac{1}{2}$ " x $3\frac{1}{2}$ " x $2\frac{1}{2}$ ".
T203 £7.75 (+12½%) (P&P free)

CUSHCRAFT Colinear (illustrated right) EX-STOCK

RINGO RANGER: 6 dB gain over $\frac{1}{2}$ ground plane. Uses 3 x $\frac{1}{4}$ in
phase and 1/8" stub. Ultra low angle radiation. Extremely low weight,
ARX450 432 MHz Ringo Ranger £21.50 (+12½%) (post 65p)
ARX2 144 MHz Ringo Ranger 9 $\frac{1}{2}$ " 1 $\frac{1}{2}$ lbs £21.50 (+12½%) (post 85p)



HANSEN REMOTE RF HEAD WATTMETERS (50-150 MHz)

Separate Directional Coupler $3"$ x $2\frac{1}{2}"$ x $1\frac{1}{2}"$
and illuminated indicator $5"$ x $2\frac{1}{2}"$ x $1\frac{1}{2}"$ c/w
brackets etc. Power 20 & 200W FSD
($\pm 10\%$) SWR to 3:1 ($\pm 3\%$). (P&P 85p)
FS711/V ideal for mobile £23.50 (+8% VAT)



CRYSTAL FILTERS (P&P free VAT 12½%)

Wide range, small selection below.
YF30F350 350 Hz F*101 CW 6 pl £16.20
YF30H350 350 Hz F*101 CW 8 pl £19.85
YF30F12 12 kHz F*101 FM 6 pl £15.90
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ULTRA BAL 2000

Ferrite Balun 3-30 MHz 50/75 ohm 9 ozs.
Body $6\frac{1}{2}"$ Long x $1\frac{1}{2}"$ diams. Rated to
2000V PIP. SO239 socket UBI 1:1.
£9.00 + 12½% (P&P 40p).



MFJ ANTENNA TUNERS

10-160m., 200W, 12 postn. Inductor.
16010 2 variables SO239's $3\frac{1}{2}"$ x $3\frac{1}{2}"$ 4"
50LD OUTI £29.50 + VAT
16010ST 3 variables SO239's and Binding
posts ... post free £49.50 + VAT



LEADER ANTENNA COUPLER

LAC895. 3.5-30 MHz. 50/75 coax (SWR
>5) and single wire (10-250 ohms) feed
transformed to 50 ohm. Wattmeter 20 and
250W. FSD. (SSB 500W. PIP.)

post free £72.00 + 12½%



12 VOLT POWER SUPPLY

12v. DC from 240v. AC 3 amps. (5A peak)
 $3\frac{1}{2}$ lbs. $3"$ x $4\frac{1}{2}"$ x $6"$. £12.95 + 8%

Binding post terminals with 4mm socket,
inbuilt. Mains neon indicator ODR I23C.
Post Free £12.55 + 8%



COAX RELAYS

12v. DC 50 ohm, Silver plated.
P. and P. 30p (VAT + 8%)
Power crosstalk (at 500 MHz)
CX120 50W 35dB Cable entry £9.50
CX230 300W 40dB BNC sockets £17.90
CX600N 600W 40dB N sockets £21.50

MICROWAVE MODULES post free

(World-wide). TRANSVERTERS—10W
output sensitive etc. (full converter and
counter range stocked 5Ae).
MMT144/28 £79.00 (+12½%)
MMT432/28 £119.00 (+12½%)
MMT432/144 £151.00 (+12½%)



MORSE KEYS FROM HI MOUND

HK707 (illustrated left) (P&P 60p)
Hand key 0.5 Kg ex-stock £7.90 (+12½%)
BK100 (P&P 60p) (+12½%)
Mechanical Semi Auto Bug key £12.15
HK808 (P&P 80p) (+12½%)
Hand key marble plinth (1-1 Kg) £26.15



LINEAR AMPLIFIERS AMPERE

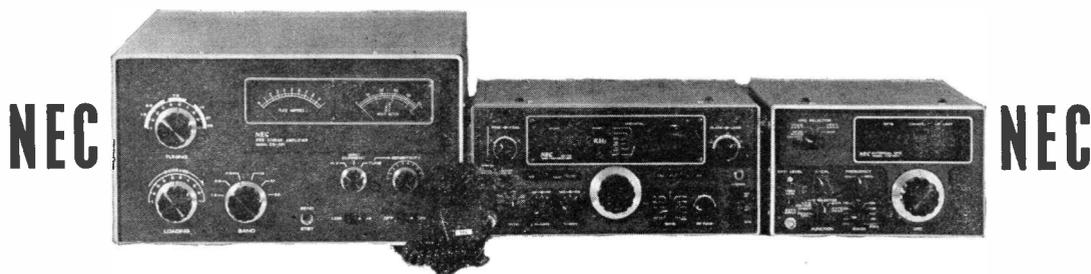
2 or 70. SuperB RF sensing and dc bias arrange-
ments for all modes. C/w mounting bracket
12v. dc 10W drive $2\frac{1}{2}"$ x $5\frac{1}{2}"$ x $7\frac{1}{2}"$ (8.5")
(+ VAT at 12½%), free delivery
APB82A 145 MHz 80W out ... £102.15
APB57A 432 MHz 45W out ... £102.15
APB87A 432 MHz 80W out ... £216.95

HY GAIN Vertical (illustrated right)

18AVT/WB—10-80m.—wide band, 50 ohm, 1kW. Self supporting,
25" trapped $\frac{1}{4}$, roof or ground mounted, low radiation angle, vertical.
18AVT/WB, £72.40 + 12½% (+£1.15 BR5 Delivery).
FULL HY GAIN, HF RANGE IN STOCK

WILLIAM MUNRO (INVERGORDON) LIMITED

DISTRIBUTORS FOR NEC AMATEUR RADIO EQUIPMENT



CQ301

CQ110E

CQ201

CQ110E Transceiver (ex stock), £645 plus VAT £80.63, total £725.63
(Price includes Securicor Delivery)

Frequency Range 10M — 15M — 20M — 40M — 80M — 160M
and 11M and WWV 15 MHz on receive only.
Mode LSB — USB — CW — AM — FSK — FAX/SSTV.
Power Requirements 100/110/117/200/220/234 volts AC or 13.5 volts DC.
Input Power 280 watts PEP (240 watts on 28 MHz).

Digital Readout—Separate Crystal Filters for each of LSB, USB and CW.
AC and DC power units are built in. Switched metering for "S" meter, Relative Output, Plate Current and ALC for setting MIC Gain.

The following accessories are supplied with the Transceiver—Microphone, DC Power Cable, AC Power Cable 5 RCA Plugs, 2 Spare Fuses, 2 Jack Plugs, 2 Allen Keys and a 60-page instruction book. Built-in speaker with 3 watts output.

A hybrid design utilising the best features of valves and semiconductors is used to give a high performance. 7 Valves—49 Transistors—19 FETs—128 Diodes—25 ICs. The use of the RCA low noise beam deflection valve (7360) as receiver mixer gives the CQ110E high sensitivity combined with remarkable crossmodulation characteristics.

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CQ301 2kW Linear Amplifier—10 to 160M with built-in power supply and 2 EIMAC3-500Z Valves.
(Ex stock) £760 plus VAT £95, total £855 (Price includes delivery)

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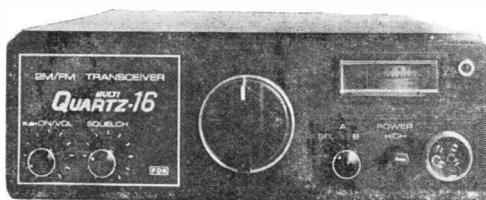


WATERS & STANTON

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GREAT VALUE - - GREAT PERFORMANCE! THE 2 METRE FM TWINS

FDK **QUARTZ-16**
NOW £149.75 inc. VAT!
FITTED 7 CHANNELS



IN STOCK NOW H.P. DEPOSIT £30
THE MOST ECONOMICAL CHOICE!

25 channel capability, 144-146 MHz with 12 watts output—automatic tone-burst—true "R" and "S" channel dial readings—2 priority channels—remote vfo/synthesise socket—microphone, power cord, mobile mount, fuses, plugs, etc., and English manual plus 12 months guarantee. Channels fitted : S2, S20, R3, R4, R5, R6, R7. Additional channels S21, S22 and S23 available at special price of £7.50 inc. VAT (6 xtals). No wonder more people are turning to the Quartz 16 as the non-nonsense, functional and economical transceiver. Buy now at these special ex-factory prices.

FDK **NEW MULTI-800D 25 WATTS!**
2M FM SYNTHESIZED TRANSCEIVER



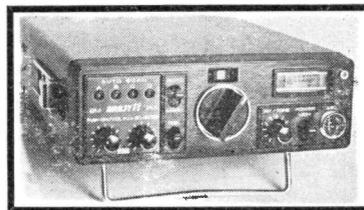
The Multi-800D covers all channels from 144-148 MHz in 5 kHz intervals and there is no guessing what frequency you are transmitting or receiving on. Many views have been voiced as to the good and bad points of digital displays, but let's face it, with digital readout there is only one display that is not ambiguous—readout of the true transmit and receive frequencies. The 800D overcomes all criticisms levelled at other models by giving true readout. Thus on S20 TX/RX indicates 145.500. Flip to the repeater mode and R7 reads receive 145.775 changing to 145.175 on transmit (makes sense doesn't it!). For reverse repeater operation simply flip the mode switch to reverse repeater and you are listening on the input channel with the display changing to 145.175. No cranking of dials with the 800D.

25 WATTS OUTPUT AND A MEMORY
Trust FDK to add a few extras. This husky transceiver runs 25 watts output but power is continuously variable by front panel control from 1-25 watts. The Multi-800D is the most powerful rig on the market and is ideal for punching through the QRM and increasing one's range. And what a memory—you can programme any two frequencies into the Multi-800D and it doesn't forget even if it is switched off for long periods. In addition, any frequency shift (i.e. 1.6 MHz) can be instantly programmed at the flick of a switch and tone-burst is automatic.

TUNING—AUTOMATIC AND EFFORTLESS
No cranking of knobs with the Multi-800D. You can QSY smoothly from one end of the band to the other in seconds. The first position of the tuning knob nudges the frequency up or down 5 kHz. Thereafter, the tuning is automatic. The further you rotate the knob the faster the tuning rate. The tuning control is spring loaded for instant return to the centre position. And, as an additional tuning aid, each time a 100 kHz point is passed, a beep is heard from the receiver.

£239 inc. VAT. Remote Display £15

FDK **MULTI-11**
23 CHANNELS + 4 AUTOSCAN
12 WATTS & THE HOTTEST RX



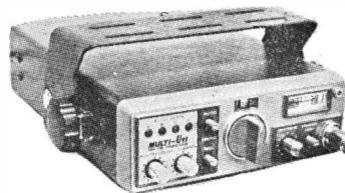
IN STOCK NOW H.P. DEPOSIT £40

This is it, the hottest little rig around. No hidden extras or add-on units. Auto-scan is included for safer driving and a two-stage RF amplifier for superb weak signal reception. Its features are endless, tx monitoring, centre zero meter, RIT tuning, automatic tone-burst, wide/narrow filters, high/low power, APC, all necessary accessories and a 12 months guarantee. Act now and avoid price increases. 4-page brochure available. Channels fitted S2, S20, R3, R4, R5, R6, R7. Additional channels S21, S22, S23 available at special price of £7.50 inc. VAT (6 xtals).

£199 inc. VAT (fitted 7 channels)

FDK **70 cms FM!**
MULTI U-11 OF COURSE
Now £129 inc. VAT! (fitted 2 channels)

or £249 fitted 10 channels



IN STOCK NOW

Now's the chance to join the fun on 70 cms. With the ever-growing number of 70 cms. repeaters coming on the air, it makes sense to consider 70 cms. as the ideal mobile band. Good strong signals (aided of course by the U-11 hot front end and 12 watts output!), no QRM and a lot of new friends to meet. The U-11 has led the way from the start and is now regarded as THE rig for 70 cms. We can supply the U-11 fitted with any of the following channels:

RB2, RB2, RB4, RB6, RB10, RB14, SU8, SU16, SU18, SU20
at £5.90 per channel.

ELECTRONICS

**FAST
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SERVICE
& EXPORT**



TELEX 897406



MULTI-2700 MkII DUAL VFO CONTROL!

MULTI-2700—THE COMPLETE STATION

The FDK Multi-2700 is a front-line all-mode transceiver that incorporates every conceivable feature to ensure maximum enjoyment. In fact, apart from a mains plug and an aerial, there is little else we can sell the owner of a Multi-2700. All in all it is an unbeatable transceiver at an unbeatable price.

ALL MODES — ALL OCCASIONS

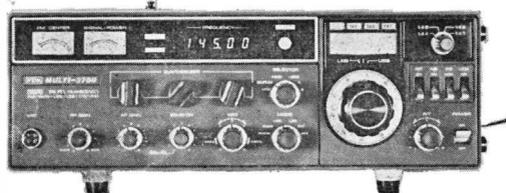
All modes are provided AM, FM, SSB and CW. For SSB operation VOX is included and for CW, fast break-in is provided with completely adjustable side tone. The 2700 can be used at home with its internal 240v. AC PSU or taken out to the local high spot and run from 12v. DC. This really has to be the QSO machine that you will never tire of.

BEAUTIFUL TO OPERATE — BEAUTIFUL TO HEAR

The transmitted audio quality of the 2700 is second to none. Its crisp, clear quality reflects the manufacturers knowledge that a clean signal sells more products! The Optimised 16.9 MHz 9 pole crystal filter gives clean SSB signals and good selectivity. On FM, direct modulation of the VCO gives smooth but penetrating audio. Typical power output is 16 watts but the flip of a switch and you have 1 watt on all modes. (An internal adjustment permits the power to be adjusted from approx 1 watt to 6 watts for driving lines or transverters.) The Multi-2700 has a built-in receiver RF pre-amp—no problems here with a deaf receiver.

DUAL VFO CONTROL

Until you have handled the Multi-2700 you cannot appreciate the advantages of dual vfo control. The conventional analogue VFO with its dual speed silky smooth feel, permits accurate tuning on all modes with 1 kHz readout. It also covers a complete 1 MHz segment at a time, resulting in minimum band switching. The flip of a switch and you have full synthesized control of your transceiver. The bright LED display allows the transceiver to be immediately set to any 2 metre channel. A VXO control ensures the synthesiser can be used equally well on SSB,



IN STOCK NOW

CW or FM. The versatility of dual vfo control is quite amazing. For example :-use the analogue vfo at the SSB end of the band and the synthesiser on the FM channels + set the synthesiser to the "sked" frequency and continue normal operation on the analogue VFO ; set analogue VFO to DX frequency whilst continuing normal tuning of the adjacent frequencies on the analogue VFO—the combinations are endless. Repeater shifts are completely taken care of. The Multi-2700 has \pm 600 kHz shifts and 1.6 MHz for 70 cms. operation.

ITS VERSATILITY IS ENDLESS

Inter-continental contacts are possible via OSCAR. Press the OSCAR button on the front panel and you bring in the 28 MHz downlink receiver converter to enable true transceive operation through the satellite. An audio SPEECH PROCESSOR can be switched in to permit extra punch. The amount of compression being adjustable to suit the operator. RIT operates on all modes and both vfo's. A NOISE BLANKER is included for really excellent suppression of ignition pulses. The receiver section covers 143 to 149 MHz (Tx covers 144-146 MHz + 1.6 MHz shift). Apart from the two existing repeater offsets one further shift may be programmed. AGC control is continuously variable, as is the VOX DELAY and ANT-VOX etc. All pre-set controls are easily reached through the top hatch of the transceiver. Separate centre zero and rx S-meters are provided. We could go on but if you have read this far perhaps it is time you sent off for the 4-page brochure giving full details of this beautiful transceiver at a really competitive price.

£489 inc. VAT and SECURICOR DELIVERY.

TM56B AMATEUR VHF MONITOR RECEIVER

230 volts AC 12v. DC 10 Channels fitted

12 CHANNELS
+
4 AUTOSCAN



IN STOCK NOW

Tune into the exciting World of Amateur Radio with this advanced monitor receiver. Listen to your local amateur radio stations both fixed and mobile, direct or through your local repeaters. From the comfort of your fireside chair using the built-in 230 volt AC power supply, this receiver will open up the whole new World of VHF Amateur Radio for you. . . Alternatively the necessary hardware supplied enables you to power the TM56B from your car radio battery for true mobile operation.

GREAT VALUE

Little wonder that the first shipments of these beautifully engineered receivers were sold out within weeks of the advertisements appearing. We really are amazed at their superb performance at such a low price.

SOUND DESIGN

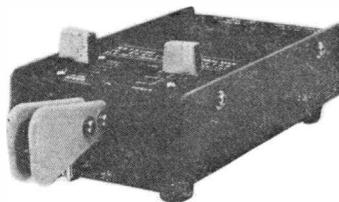
The design is well and truly tried and tested, and the circuitry is almost identical to the receiver section of the FDK mobile transceivers. Both sensitivity and selectivity leave nothing to be desired and the auto-scan enables the popular calling channels to be continually monitored for activity.

NO HIDDEN EXTRAS

The receiver is supplied complete with all leads, circuit diagram, crystals for channels 50, 20, 21, 22, 23, R3, 4, 5, 6, and 7 plus space for a further 6 channels making 16 in all. An additional matching desk top aerial is also available at £2.50 extra.

£85 including delivery and VAT.

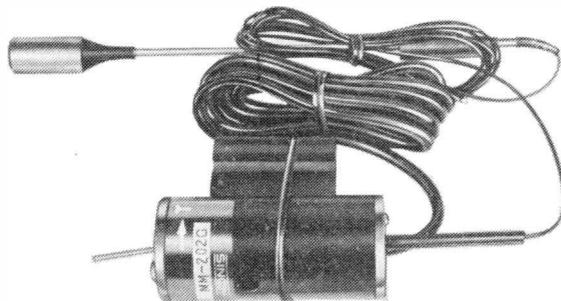
EK-121 DELUXE ECONOMIC ELECTRONIC KEYS



**ONLY
£29.95
inc. VAT**

MOBILE SAFETY MICROPHONE

Clips on lapel, sun visor, safety belt, etc. Weighs 5 grams and complete with gear lever Tx/Rx control box—keep both hands on the wheel in future!



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with the

Western 70TV 432MHz TRANSVERTER



this will be the new pacesetter !

Ex-Stock Now—ONLY £178.87 inc. VAT

We have designed and built the 70TV up to a high standard. Not down to a price ! Don't buy a 70TV if you're looking for a cheap unit. BUT if you want to hear signals that some others can't . . . the 70TV is the answer !

- ★ Fully stabilised AC and DC PSU
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- ★ Double conversion to minimise spurious outputs.
- ★ Noise figure 2.5 dB typical
- ★ Built-in 28 MHz attenuator 30 : 1
- ★ Built-in relays
- ★ Matches Yaesu styling
- ★ Withstands infinity mismatch
- ★ All units aligned on Hewlett-Packard Spectrum Analyser
- ★ Can be driven by most 28 MHz Transceivers

★ ALL MODES (YES - EVEN FM) on ALL HF BANDS and 70 cms

WITH YOUR **Western 70TV**

and the NEW

FT901DM from



The FT-901DM provides unique features far ahead of any other transceiver of its kind on the market today.

Price £842.62 inc. VAT

FEATURES

- ★ Variable-bandwidth IF passband tuning. Not "IF shift," this feature superimposes two filters upon each other, then tunes one to make the bandwidth as wide or narrow as desired.
- ★ Rejection tuning for elimination of particular interfering signal.
- ★ Audio Peak Frequency tuning provides a narrow audio peak with steep skirts for single-signal CW reception.
- ★ Built-in Curtis 8043 IC electronic keyer.
- ★ PLL frequency derivation. Digital plus analogue readout.
- ★ Unique memory circuitry allows storage of a frequency with recall for instant control of transmit, receive, or transceive frequency.
- ★ VOX, semi break-in CW with sidetone, 25 kHz calibrator, advanced noise blanker, RF speech processor, receiver 20 dB RF attenuator and TX/RX clarifiers are built-in.
- ★ Rugged 6146B final tubes. Toroidal output circuitry and RF negative feedback for maximum reliability and purity of emission.
- ★ Plug-in printed circuit boards for ease of maintenance
- ★ TUNE button provides 10 seconds of "key down" condition, then automatic return to receive for protection of final tubes.
- ★ All band (160 through 10 metres plus WWV/JJY receive) and all mode (LSB, USB, CW, FSK, AM and FM) coverage.
- ★ Choice of supply voltages of 100/110/117/200/220/234 VAC or 13.8 VDC with no external power supply required.
- ★ Diecast front panel and heavy-duty steel case for maximum protection from shock or vibration damage while travelling.

Electronics (UK) Ltd

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with

WESTERN'S NEW PM200!

WESTERN—the firm who gave you the PM2000—the first direct PEP reading HF wattmeter—now proudly present the PM2001 . . . the first direct PEP reading VHF wattmeter!



- ★ Direct measurement of SSB PEP output from 50 to 150 MHz
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- ★ Forward or reflected power readings at the flick of a switch
- ★ Full-scale ranges from 5 to 200 watts (RMS or PEP)
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- ★ No calibration dials to set
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- ★ Can be left "in-line" at all times
- ★ Styled to match the WESTERN PM2000 HF PEP meter

These superb instruments are now available ex-stock at £52.92 inc. VAT

CHRISTMAS PRESENT MONEY TO SPEND? TRY THESE . . .

OSKER SWR-300

All the facilities of the long-established and well-known Osker SWR-200, but now with optional add-on couplers for accurate (10%) power and SWR measurements in the 2 metre and 70 centimetre bands. Basic instrument for HF—add couplers for VHF and/or UHF. Couplers not usable without basic instrument.

	SWR-300	SPC-2B	SPC-07A
Freq. range (MHz)	3.5-30	144-148	420-450
Power ranges (W)	0-20, 0-200, 0-2000	0-20, 0-200	0-2, 0-20
Accuracy	±15% FS	±10% FS	±10% FS
Impedance (Ω)	50	50	50

PRICES (Inc. VAT, carriage free)

SWR300	£43.20	OR . . . ALL THREE
SPC-2B	£15.12	FOR
SPC-07A	£19.98	£75.00

OSKER SWR-200

Almost too well known to need description. Power and SWR measurement 3.5 to 150 MHz. Accuracy ±15% FS; 50 or 75 ohms; ranges to 2 kW.

Price: £38.88 inc. VAT, carriage free

ACCESSORY CORNER

Yaesu YH-55 phones	£9.00
Yaesu QTR-24 World clock	£14.62
Yaesu YD-846 hand microphone (50k)	£9.00
Shure 526T desk microphone	£33.69
Vibroplex "Original" Standard key	£38.81
Katsumi CW101 Audio CW filter	£15.75

PAYMENT: Cash or cheque, ACCESS (Mastercharge), VISA (Barclaycard),
GIRO TRANSFER (A/c 288 6154) HP and Credit arranged DINERS' CLUB

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LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58662).
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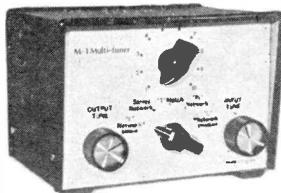
STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, TELEPHONE
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G3MCN



Midland and North West distributors for the XCR30 unique crystal controlled receiver. This receiver is designed to provide precision frequency tuning over the full short wave spectrum up to 30 MHz with exceptional frequency stability for both AM and SSB. Separate tuned whip antenna.
 XCR-30 FM Receiver with FM band 87-5 to 101 MHz.
 £145.00 inc. VAT
 £170.00 inc. VAT



Mk. 1 MULTITUNER. Designed and manufactured by us. 50 tunable switched positions for antenna lengths over 5 metres in the 2-30 MHz range. Five different circuits to give an excellent match between your receiver and antenna. Now in use in over 35 countries.
 Price £17.50 including VAT and Postage

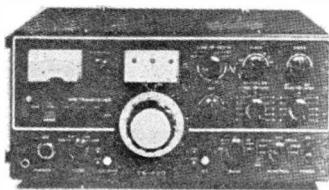
Mk. 2 VERSION, £23.00. Covering S50 kHz to 30 MHz. Send S.A.E. for full information and Test Report.

Happy New Year



YAESU FRG-7 RECEIVER. Mains and battery operated receiver 0.5 to 30 MHz. Solid state. Advance circuitry offers excellent performance for the DX listener at a moderate price.
 Price £162.00

TR2200GX PRICE £139.00 (3 ch.), £160 (12 ch.) inc. VAT Ex stock
 This is the definitive 2 metre FM portable rig which has won praise from all over the world. Over 2W, transmitter output with switched reduction to 400 mW for local contacts. High gain receiver with double IF filtering at 10.7 MHz and 455 kHz for razor sharp selectivity. The TR2200GX is supplied with all accessories including the battery charger for the optional Nicad battery pack, the removable telescopic antenna, the carrying case, the shoulder strap, external power lead, microphone and handbook. Fitted with 12 channels, the price is only £160 inc. VAT. If you wish to start out at a lower price, we can supply the rig fitted 3 channels for only £130. With all its performance, the TR2200GX is a must for the portable operator. At the price, it has to be the best around. Just look around at the next rally and see how many operators are carrying them.
 Also available is a mobile mounting bracket at £9.45, a matching 10 Vwatt amplifier for £45 and a flexible antenna. Send for full details now.



TS520 PRICE £432.00



TR7500 PRICE £225.00

Secondhand Equipment

Drake R4C Receiver	£400.00
Drake T4X with AC Psu	£425.00
KW2000E Transceiver	£325.00
KV202 Receiver	£185.00
Drake R4C + 2 filters & N. Blanker	£475.00
Sommerkamp FT250 Transceiver	£225.00
Atlas 210X Transceiver	£375.00
Atlas 180 Transceiver	£285.00
Barlow Wadley XCR30 Receiver	£115.00
Heathkit SB230 Linear Amplifier	£325.00
Liner 255B Transceiver	£120.00
Yaesu Friois Receiver	£275.00
Eddystone 940 Receiver	£140.00
Drake R4C Noise Blanker	£30.00
Yaesu FT221R Transceiver	£295.00
Yaesu FL101 Transmitter	£265.00

We have over 50 secondhand items in stock. Send SAE for full details.

TR3200 PRICE £171 inc. VAT. Ex stock

The newest FM handy transceiver from the ever expanding TRIO range. Superb performance for the 70 cm. operator with all the advantages of portability and TRIO reliability. 12 channel capability in the range 432-436 MHz with three channels fitted (SUB, 1B, 20). Transmitter output switched 2W/400 mW and incorporating the exclusive TRIO 1750 Hz tuning fork access tone generator (does that mean you can ring for credit?) High gain S/B wave antenna for enhanced performance on transmit and receive. Supplied complete with all accessories as for the TR2200 GX and including the all important battery charger.

We have just received the first shipment of the VB 3200 10W amplifier for the TR3200. Rather more complex than the VB 2200, the VB3200 also includes a switchable receive preamplifier. Price £95 inc. VAT. Send for details now.

Other TRIO Models available

TS820 HF Transceiver	£645.00
DGI Digital Display	£127.00
TS520S HF Transceiver	£489.00
TR7000 VHF Transceiver	£426.00
TS7000 VHF Transceiver	£542.00
TR7010 SSB VHF Transceiver	£189.00
TR8300 70cm. FM Transceiver	£227.00
PSS PSU with clock	£58.00
PS6 PSU	£57.00
RSS9D All mode HF Receiver	£403.00
VB220GX Mobile Amplifier	£45.00
HC2 World Time Clock	£15.50
DM-850 GRID DIP Meter Absorption Wavemeter	£45.37

PLUS CRYSTALS AND ACCESSORIES

Accessories

Single Meter SWR	£10.00
Twin Meter SWR	£12.00
50 ohm Dummy Load	£21.93
Twin Yaddle Keys	£15.75
Yaesu YO100 Monitorscope	£138.00
B.W. Antenna Switch	£16.75
3 way Antenna Switch	£5.00
Standard Morse Keys	£2.75
UR43 Co. Ax. Cables 18p metre.	
TN2R56 2m Fm Receiver	£54.00
Antenna Insulators	17p
PL259 Plugs	51p
SO239 Sockets	51p
Cable reducers 17p	75p
Aluminium Co-Ax plugs	15p
Hy-Mount Morse Keys	£8.75
Nye King Morse Keys	£6.75
Junkers Heavy Duty Morse Key	£29.85
Bauer Keing Paddle	£10.86
Katsumi Electronic Keyet	£60.75
Microphone plugs 4 pin	70p
Microphone sockets 4 pin	70p

Postage extra. Min. postage charge 25p.
 All items despatched same day as order received.



COMTEK 2m. Linear Amplifier
 Modes: SSB - CW - FM - AM
 Input: Up to 15 watts SSB
 Up to 5 watts FM
 Power output: 100 watts PEP SSB
 60 watts FM

Receiver Pre-Amp I2-18dB. QWV06-40A.
 RF switching for easy control.
 Price £140.62 inc. VAT

We carry a stock of products by over thirty of the world's leading manufacturers. For the caller we have a wide range of mobile antennas, test equipment, valves, publications, aluminium tubing, cables, plugs, etc.

We carry a large range of stock which we cannot advertise in the space available. Send 25p in stamps or postal order and we will forward you our latest price list and equipment information available. We shall credit your first order over £5 for this amount.
 Shop Hours: 9.30 till 5.30 Monday to Friday,
 9.30 till 5 p.m. Saturday.
 ACCESS and BARCLAYCARD facilities available
 instant on spot HP facilities

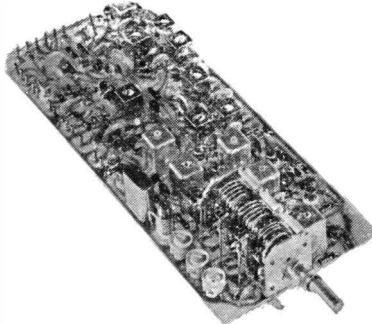
We are always looking for good clean equipment and spot cash will be paid for receivers, transmitters, transceivers, etc. If you have equipment surplus to your requirement we would be pleased to sell this for you on commission. Our secondhand stock changes daily. If you require a specific piece of equipment send us a SAE and we will let you know as soon as we have the model available. All our secondhand equipment is covered by three months guarantee.
PLEASE NOTE ALL OUR PRICES INCLUDE VAT at the current rate. Carriage, postage is extra
 We can quote for delivery in any part of the world
 We are located on the AS74. Turn at the GREYHOUND MOTEL on the AS80 (East Lancs. Road) 5 1/2 miles from the M6; 6 miles from the M62. Easy access from North, South, East and West. NO PARKING PROBLEMS.

S.T.E. MILAN VHF EQUIPMENT

As sole distributors for the STE range of equipment for four years despite rising prices, we have maintained prices stable for over two years. Surely the finest value for money on the market. With the opening of the 28 MHz band the AR10 Receiver module is now one of our fastest selling lines. Demand for these is growing every month.



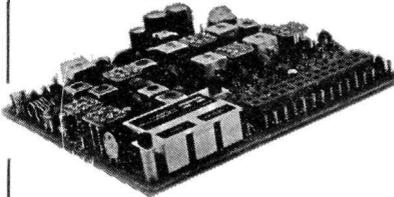
ARAC 102 receiver, 28-30 MHz, 144-146 MHz. AM-SSB-FM-CW. Price £100.00



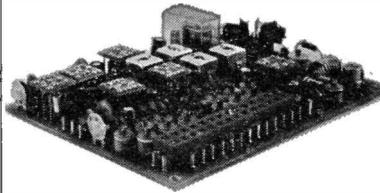
AR10 Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.

PRICE LIST including VAT and postage

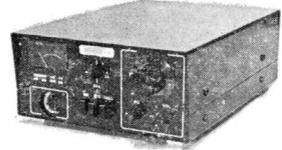
AK20 FM Transceiver	...	...	£165.00
AK20 FM Transceiver Kit	...	...	£105.00
ARAC 102 Receiver	...	...	£100.00
ARAC170 Receiver	...	...	£127.50
ATAL 228 Transmitter	...	...	£127.50
ASAP IS4 AC PSU	...	...	£37.50
AR10 Receiver Module	...	...	£37.50
AA1 Audio Amplifier	...	...	£4.10
AD4 FM Discriminator	...	...	£5.00
AT22 Transmitter	...	...	£50.00
AG10 Tone Generator	...	...	£4.50
AR20 C.C. Receiver	...	...	£45.00
AT23 C.C. Transmitter	...	...	£50.00
AS15 Stabilised DC PSU board	...	...	£10.00
AL8 Linear Amplifier	...	...	£27.00
AB40 Mobile 40 Watt FM Amplifier	...	...	£55.00



AR20, 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0.2uV AF output 3 watts. 12v. DC operation.



AT23, 12 Channel PM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.



AK20, STE. Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 3 watts output. Sensitivity 0.2 uv R.I.T. tone burst. Complete with microphone and mobile bracket.

We are also acting now as distributors for another Milan manufacturer—Novel. This company is now producing one of the finest range of SWR power meters we have seen. All built to professional specifications but sold at an Amateur price. All units are built in solid diecast boxes and the finish is in a "Commando Green."

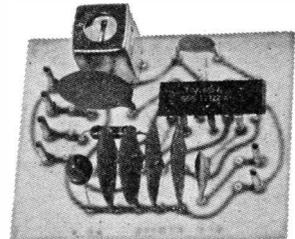
SWR200B. Switched 50 and 75 ohm. 3 to 200 MHz. 2000 watts at HF. 2-200 watts at VHF. £36.25

SWR 400B. Impedance 50 ohm. 144 and 432 MHz. 20 and 200 watt range. Insertion loss 0.2dB. £55.90

PW120B. Dummy Load Wattmeter. Impedance 50 ohm. 5-20-120 watt. Frequency 3-500 MHz. £38.25

DL120. 50 ohm Dummy Load. 50 ohm to 500 MHz £20.48

CRS 110-B. 4-way Co-axial switch £37.91



55 kHz FM Discriminator Amplifier. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 200-300mV frequency deviation + or - 3 kHz.



NEW MODEL ELECTRONIC KEYSER
Jambic operation—Weighted transmission—Three memory lengths up to 1024 bits. Internal monitor. Transmitter keyed through internal relay. Silver plated contacts. 220v. AC operation. Price £106.00

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THE IC-240 IS NOW £179 inc VAT*

*Prices marked thus have been reduced because of an extremely favourable rate of exchange at the time of purchase.

Sorry to have to bore you with even more comparison lists, but we have had so many phone calls that we felt that we should at least give you one more to compare with the rest! We still think, though, that the best way to choose a rig is to ask the owner of one for his opinion. Remember that ease of use and after sales service are probably the most important parameters.

Try this one :—

	FT-227R	TR-7500	IC-240
Mean number of clicks required to QSY...	100*	10	6
Need to remember to press extra button for all odd channels	YES	NO	NO
Channel spacing (normal use requires 25 kHz)	5 kHz	25 kHz	25 kHz
Instant reverse repeat on all repeater channels without re-tuning	NO	YES	YES
Ability to remain on frequency last used when set is switched off then on again	NO	YES	YES
Position of tone burst switch	REAR	FRONT	NONE
			(Automatic select)
			FRONT
Position of low power switch	REAR	FRONT	
Supplied with all those channels in the FM portion of the band which are used 98% of the time**	YES	YES	YES
Scanner available to cover all 40 FM channels plus electronic tuning outside this range	NO	NO	YES
Can be arranged to have the most frequently used channels next to one another	NO	NO	YES
Price (seems to vary a bit)	180/189	225	179

* or 50 if you confine yourself to the band
** our guess, but it may be nearer to 99.5%

So there you are folks—the decision is up to you, but if you do buy ICOM from us we will guarantee you the best after sales service we can possibly give.

All data is correct to the best of our knowledge and is collected from adverts and other enquiries.

DON'T FORGET THE PORTABLE TWINS

IC-215	IC-202
3w FM	3w SSP
8Ch *£149	*£162

Both provide the best in portables in their field, with crisp, clear modulation, a healthy 3 watts of output, large sensible batteries and an excellent receiver.

Introducing 'SLIM JIM' SJ2

144-146 MHz — HIGH EFFICIENCY 2 METRE OMNI-DIRECTIONAL VERTICAL

An omni-directional 2 metre aerial developed by T & T from a design by F. C. Judd (G2BCX). Derived from the "J" the SJ2 is a free space aerial with better than 50% greater efficiency than conventional ground plane types due to the very low angle radiation field. The aerial is slim and compact (58 inches long) and as there are no radials it is unobtrusive and has low wind resistance. Supplied complete with mast clamp. £15.50 inc. VAT (carriage 70p).

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FROM

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HERNE BAY
(02273 63859)



THE LEADERS IN SYNTHESIZED TRANSCEIVERS



YOU CAN HAVE IC-211E

—Giving you FM/CW/USB/LSB all produced from the amazing ICOM synthesizer and patent LSI chip. Frequency read out is to the nearest 100 Hz and it is amazingly stable and accurate. You can use the two frequency stores as separate VFOs or for any repeater shift required. The tone burst is automatic, of course, and reverse repeat is available at the flick of a switch. Add a keypad (we will give you the circuit to make your own or you will be able to buy one shortly) and find a new facility which is quite impossible with old fashioned rigs. The original waiting list has now been dealt with and you can now have one from stock.

AND THE IC-245E

This truly amazing little box get you mobile on FM, USB or (if you really think it a good idea) CW! The synthesizer is the same as the IC-211E and can be tuned to the nearest 100Hz, again with amazing accuracy. Of course such a versatile little box will often be used as a base station and facilities such as keypad operation can be added. They are now ex-stock—but only just!

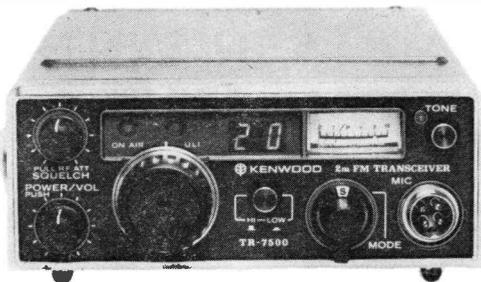


IC-701

BUT NOT THE IC-701 (YET)

—Because there is only one in the country at the moment—as far as we know—and it's here at Herne Bay being put through its paces. This is going to be the HF rig to beat them all and is going to be bought by the man who wants the best. These are some of the features which you get with the BASIC rig: There is a full synthesizer with digital read-out to the nearest 100 Hz to amazing accuracy. This has two frequency stores which enable you to store a frequency in one while tuning the band with the other—yes, you CAN even look at and tune another band while waiting for the juicy DX to finish his QSO and then switch straight back to his frequency, or alternatively you can work split frequency either way round providing they are in the same band. There is an RF speech processor built in of course, AND a CW filter, pass-band tuning to help cut down the QRM VOX, semi break-in CVT, self cancelling RIT, AGC and a noise blanker. There is no PA tuning and loading to do—just find your man, press the button and talk. (Think of the extra contacts you would make if you didn't have to waste precious time tuning up!) The PA is solid state and will run 100 watts of R.F. out all day continuously. (How many valve rigs will do that?). A quiet little fan discretely comes on if it gets a bit hot. There is PA protection of course for the man who is incapable of providing it with a proper aerial (though this is sacrilege with a set like this). A double balance schottky diode mixer is used for both transmit and receive and, just to finish the perfection, ICOM have decided to supply an electret desk microphone with each set. Of course it will run from either 12v. DC or the mains, and an external mains PSU is included. This makes it compact and light for use when mobile. For the keen top band man that bit of the spectrum is covered also. The extras to come will be things like a key-pad to key in any frequency, any band, and a few spare memories. We have had great fun testing our Demo model and have received extremely complementary reports on the mod which is so crisp and clean that it sounds more like ICOM's famous clear FM than SSB. Like the Rolls Royce this sort of quality will not be cheap—it may well top the £1K mark! If you seriously think you may want one put your name down now. For those who collect letters contacts so far, barefoot, include ZL, VK, W6, PY, JA, KA6, and a few other locals.

TRIO at Radio Shack Ltd.



TR-7500 The Sensible One!

TRIO PRICES

TRIO EQUIPMENT		inc. VAT	TR2200GX		inc. VAT
TS820	160-10 metre HF transceiver. 200W. pep	£645-00	TR2200GX	2 metre FM handy transceiver CW battery charger, microphone, carrying case, fitted three channels	£139-00
VFO820	External VFO	£112-00	TR2200GX	As above but fitted twelve channels	£169-00
DGI	Digital readout unit. 6 digit display	£127-00	RA1	Helical rubber antenna for TR2200GX	£6-30
DS1A	12v. DC inverter	£40-00	MB1a	Quick release mobile mount (also fits 2200 and 2200C)	£9-70
YG88C	CW filter. 500 Hz 8 pole	£36-00		Spare external power lead for 2200G and 2200GX	£1-25
SP520	Matching speaker unit. 8 ohm impedance	£19-00		Pack of ten rechargeable batteries	£9-72
TV502	2 metre transverter. All solid state	£178-00	VB2200GX	Mobile 10W amplifier with SWR protection	£45-00
HS5	Tailored response communications headphones	£22-00		Spare whip antenna (also available for 2200 and 2200C)	£1-90
TS520	HF transceiver. 240v. AC/12v. DC. 80-10 metre.	£432-00	TR8300	70cm. FM mobile transceiver. Fitted 4 channels, auto TB etc.	£227-00
TS520	For 240v. AC supplies only	£405-00	TR3200	70cm. FM handy portable fitted 3 channels. All accessories supplied as for TR2200GX	£182-00
VFO520	External VFO unit	£72-00	MB1a	Quick release mobile mount	£9-70
CW520	CW filter. 500 Hz 8 pole	£36-00		Spare external power lead	£1-25
SP520	Matching speaker unit	£19-00	VB3200	Mobile 10W amplifier with receiver preamp. Case size as TR3200	£95-62
TV502	2 metre transverter. All solid state	£178-00	R300	General coverage receiver. 170 kHz-30 MHz. Bandspread for the international broadcast bands. 240v. AC or battery operation	£184-50
HS5	Tailored response communications headphones	£22-00		Spare AC mains lead for R300	£1-25
DK5	Conversion kit for use of DG5 with TS520	£12-00	HS5	Tailored response communications headphones	£22-00
TS520S	160-10 metre HF transceiver. 200W. pep	£489-00	TL922	HF high power linear. 160-10 metres. 2kW from a pair of 3-500Z	tba
VFO520S	External VFO unit	£94-00	HC2	World time clock. Instant readout of time anywhere in the world. Invaluable accessory for amateur or SWL	£15-50
DS1A	12v. DC inverter	£40-00	MC10	Hand microphone with PTT. 50K impedance. Available in 500 ohm	£9-00
SP520	Matching speaker unit. 8 ohm impedance	£19-00	MC50	De Luxe dual impedance desk microphone. 50K/500 ohm	£25-00
DG5	Digital display/frequency counter to 40 MHz	£132-00	LF30A	HF low pass filter. 1kW rating. 90dB stop band rejection	£17-00
CW520	CW filter. 500 Hz. 8 pole	£36-00	BPF2A	2 metre band pass filter. 144-146 MHz. 100W. pep	£27-75
HS5	Tailored response communications headphones	£22-00	HS5	Tailored response communications headphones	£22-00
R599D	160-10 metre all mode receiver. CW/USB/LSB/AM/FM	£403-00	TRIO TEST EQUIPMENT		
TS99S	De Luxe HF transmitter. 80-10 metre. CW/USB/LSB/AM	£383-00	CS1570	Dual trace oscilloscope. DC-30 MHz	£464-40
SS99	Matching speaker unit. 8 ohm impedance	£18-00	CS1560A	Dual trace oscilloscope. DC-15 MHz	£324-00
CG29A	2 metre converter for R599D	£20-00	CS1562	Dual trace oscilloscope. DC-10 MHz	£270-00
HS5	Tailored response communications headphones	£22-00	<i>(The prices include two matching full bandwidth X10 probes)</i>		
TS700G	2 metre transceiver. CW/USB/LSB/FM/AM. 240v. AC/12v. DC	£426-00	PF810	Station power meter. In line measurement with three ranges. Accurate SWR readings. Two way antenna switch	£64-80
VOX3	Matching vox unit (free with TS700G)	£19-00	CO1303D	Single trace oscilloscope. DC-5 MHz. Ideal small service scope	£108-00
SP70	Dew matching speaker unit	£18-00	CO1303G	As above but including station monitor and two tone oscillator	£129-60
TS700S	De Luxe 2 metre all mode digital transceiver. The best	£542-00	DM800	Dip resonance meter	£43-60
VFO700S	External VFO unit. Full facilities for split frequency	£83-00	SM301	FM stereo generator for workshop use	tba
SP70	New matching speaker unit	£18-00			
TR7010	2 metre 5SB/CW mobile/fixated station transceiver. 10W	£189-00			
PS5	Matching AC power supply/digital clock	£58-00			
	Spare 2 pole DC power plug	25p			
TR7200G	10W FM mobile fitted 10 channels, auto tone burst etc.	£189-00			
VFO30G	Matching VFO with repeater shift	£92-00			
PS5	Matching AC power unit/digital clock	£58-00			
TR7400A	2 metre 30W. FM mobile transceiver. 800 channels PLL	£329-00			
TR7500	2 metre 10W. FM mobile transceiver. 40 channel PLL	£225-00			
PS6	Matching speaker and AC power unit	£57-00			

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YOUR ROUTE TO 70cm REPEATER OPERATION

We are extremely happy to announce a new version of our 144 MHz to 432 MHz double conversion linear transverter, the MMT432/144R.

The MMT432/144R, based on its predecessor, features a 1.6 MHz shift, specifically included for U.K. repeater operation.

The 1.6 MHz shift is achieved by the inclusion of two separate local oscillators (101 MHz and 101.4 MHz), which produce two ranges at 70 cms. (LOW RANGE : 432-434 MHz, HIGH RANGE : 433.6-435.6 MHz), both for an IF of 144-146 MHz.

The switching of these ranges, which is accomplished by appropriate linking of the 5 pin DIN power plug, may be wired to allow standard repeater operation, reverse repeater operation etc.

Please note that a suitable toneburst signal must be generated by the 144 MHz transceiver to allow repeater access.



FEATURES

- ★ 1.6 MHz REPEATER FACILITY OR SIMPLEX
- ★ HIGHLY STABLE REGULATOR-CONTROLLED CRYSTAL OSCILLATOR STAGES
- ★ PIN DIODE AERIAL CHANGEOVER RELAY WITH LESS THAN 0.2 dB THROUGH-LOSS
- ★ EXTREMELY LOW NOISE RECEIVE CONVERTER
- ★ BUILT-IN AUTOMATIC RF VOX WITH OVERRIDE FACILITY
- ★ SEPARATE INTERNAL PA COMPARTMENT ENSURES EXCELLENT ELECTRICAL AND THERMAL STABILITY
- ★ USE OF LATEST STATE OF THE ART POWER AMPLIFIER TRANSISTORS PROVIDES RELIABLE 10 WATTS CONTINUOUS POWER OUTPUT

SPECIFICATION

FREQUENCY COVERAGE	432-434 MHz (LOW RANGE)
	433.6-435.6 MHz (HIGH RANGE)
SELECTABLE OFFSET	1.6 MHz
INPUT FREQUENCY RANGE	144-146 MHz
INPUT MODES	SSB, FM, AM or CW
INPUT DRIVE FOR FULL OUTPUT	10 WATTS NOMINAL
POWER OUTPUT	10 WATTS CONTINUOUS RATING
OUTPUT IMPEDANCE	50 OHM
RELATIVE 404/405.6 MHz OUTPUT	BETTER THAN -65 dB
OTHER SPURIOUS OUTPUTS	BETTER THAN -65 dB
RECEIVE CONVERTER GAIN	10 dB TYPICAL
RECEIVE CONVERTER NOISE FIGURE	3 dB MAXIMUM
FIRST OSCILLATOR	101 MHz or 101.4 MHz
SECOND OSCILLATOR	116 MHz
FIRST IF	28 MHz
D.C. POWER REQUIREMENTS	11-13.8 VOLTS, 12.5 V. NOMINAL
CURRENT CONSUMPTION	2.1 AMPS. PEAK
RF CONNECTORS	50 OHM BNC SOCKETS
POWER CONNECTOR	5 PIN DIN SOCKET
SIZE	187 x 120 x 53 mm.
WEIGHT	975 g.
PRICE	£151 + VAT (£169.88 inc. VAT)

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SHORT WAVE MAGAZINE

(GB3SWM)

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The
SHORT-WAVE
Magazine

EDITORIAL

Pleasure

Over the years, we have had occasional correspondence first with SWL Luxton, then with Jesse Luxton, G8GMI, and now with Jesse Luxton, G4GOF. Jesse is an invalid member of RAIBC, and to pass that Morse test he listened to the stuff for two hours daily over four solid years, logging over 3000 stations in 1977 up to the time of his letter. So what, you may ask. Just this: Jesse had asked if at North Foreland Radio there was somewhere his wife, who had to accompany him, could wait while he did his test. The result was that the examining officer from North Foreland came to the railway station in his car to collect them, gave them a cup of tea after the test, and then drove them back to the station—courtesy going far beyond the call of duty.

It is a pleasure to hear that in the midst of all the turmoil and politics that is amateur radio today, North Foreland Radio have shown us a bit of what we used to call the Spirit of Amateur Radio. We have a lesson to learn from it in most cases.

As soon as he has got his AR88D and DX-100 pasted together, the eighty-metre gang will be able to welcome G4GOF and know a little of the history which led to him being on the air.

J. J. Williams
G3KFE.

VHF BANDS

NORMAN FITCH, G3FPK

High Power

IT is no secret that for many years some amateurs have been licensed to run one kilowatt input on VHF when wishing to conduct *E-M-E* experiments, for example. A letter received recently by a reader holding such a licence seems to suggest that the Home Office will not consider any further applications of this nature. Its reasoning is that the new, comprehensive licences are sufficiently "liberal" to obviate the need for any further special requests of this kind to be considered.

One reason appears to be the amount of time taken up by consideration of individual applications. It does seem illogical, therefore, that a recent announcement on the GB2RS News Service asked listeners wishing to take out special event callsigns to send their requests to the RSGB as the Home Office was prepared to issue these again.

Several *E-M-E* experimenters are very keen to attempt such contacts on the 2m. band and the use of something more than 150 watts input would enable a less monstrous aerial system to be employed. That a few radio amateurs are prepared to go to the immense trouble of engineering a system to attempt such communication would suggest that they really are acting in the spirit of using their stations, "... as part of the self-training of the Licensee in communication by wireless telegraphy ..." to quote from clause 1.(1)(c).

The tone of the aforementioned letter suggests a scant understanding of *E-M-E* power budgets and another reply to an earlier request from another reader bears this out. Amateurs in many other countries are able to carry out *E-M-E* research unfettered by the low power restrictions of the U.K. and with the

active encouragement of their national societies.

Assuming there is somebody in the amateur licensing department in the Home Office who could actually understand what some amateurs wish to attempt and why, then it seems high time a meeting was arranged with those highly responsible amateurs as a group. There seems to be an idea that the Home Office will only deal with a couple of RSGB council members on these matters. That is so much rubbish since we are all licensed *individually*. Perhaps it is time for those genuinely needing to run high power for *E-M-E* work to band together and insist on dealing directly with technically qualified Home Office engineers. They would be best qualified to present their case rather than two amateurs, neither of whom has expressed any enthusiasm for this most challenging facet of our VHF hobby.

VHFCC Awards

Archie Hoggan, G8ASX, from Bournemouth has won 2m. VHFCC certificate no. 290 and found the return QSL rate "very grim." He was licensed in 1966 when the G8's were restricted to 427 MHz and above. The first station was an all valve affair employing crystal controlled AM. The present station comprises a *Trio* TS-700 with a 14-ele. *Parabeam* at 35ft. Archie's interests include RTTY using both FSK and AFSK with a home built ST5 terminal and a *Creed* 47 tape printer. A VDU is planned for the future.

2m. certificate No. 291 was awarded to David Mappin, G4EDR, from Filey in N. Yorks. who submitted a list of cards from DL, F, PA, ON, OZ and SM stations only. David was first licensed in 1973 as G8HWQ after two years as an *s.w.l.* The first station consisted of a "G8AEV2" watts AM Tx, *Solid State Modules* converter and an *Eddystone* EC-10 tunable IF. A *Belcom* Liner-2 was used for a time but the present station comprises a *Yaesu* FT-200 transceiver with an *SSM* Europa transverter to a 5-ele. Quad aerial.

Beacon News

The 10.1 GHz beacon GB3IOW on the Isle of Wight is off the air indefinitely due to gale damage. The

2m. French beacon FX0THF in AI46h has now changed its frequency to the more appropriate one of 144.895 MHz. During October, Peter Mathews, G3BPM, pen recorded its strength at his Sunbury-on-Thames QTH. Usually it was 1-3 dB above the noise, occasionally 8 dB over.

Satellite Topics

The launch date for *A-O-D*, which will become *Oscar 8*, has been confirmed as March 5, 1978. It has now passed all its environmental and electronic tests and is ready for blast off. Looking more to the future, the model of the casing for the first Phase 3 satellite is undergoing vibration tests.

The 1978 Orbital Predictions for 0-7 should be available now from G3AAJ. AMSAT life members need only send a large *s.a.e.* AMSAT members should send a remittance of £1.50 (mentioning their membership number with a large *s.a.e.* for their copy to:—R. Broadbent, 94 Herongate Road, London E12 5EQ. The calendar is available to non-members for £2.00 plus *s.a.e.*

For much of the time now, 0-7 has been in Mode "A" i.e. 2m. up, 10m. down, due to the possible potential damage to the batteries caused by anti-social QRO Mode "B" vandals. From Jan. 1, the operating schedule will be revised to: Jan. 1, Mode "B," Jan. 2 Mode "C" (this is Mode "B" QRP, 10 watts *e.r.p.* maximum); Jan. 3 Mode "A" and so on. As before, every Wednesday is reserved for special experiments authorised by AMSAT. Please *do not* use the satellite if you hear it on as you will likely interfere with an experiment.

New stations heard/worked recently include EA8FB on 29.480 MHz CW; EL2FE on 29.459 MHz SSB and OH0JN on 29.450 MHz SSB and 29.478-29.490 MHz CW. Don't forget the new band plans for the downlinks from January 1—see last month's issue, page 612.

Some satellite noises have been heard on 435.9702 MHz lately. These originate from a non-amateur satellite in a sun-synchronous orbit of 120 minutes period and are harmonics from a lower frequency.

Super DX

Some quite incredible distances are being spanned on 2m. by

stations in the Caribbean and South America. The fact that these possibilities are now being realised and exploited is a direct fall-out from the amateur space programme since the folk involved are QRV on 2m, primarily for satellite operation. On Oct. 29, YV5ZZ in Caracas worked LU1DAU, 50 kms south of Buenos Aires. The first QSO over this 4,446 kms path was on CW at 0230 GMT followed by an SSB contact at 0310. 2 minutes later LU7DJZ made it with the Venezuelan.

Now we have a report that on Nov. 17 LU3AAT in Buenos Aires heard KV4AD on 145.9 MHz while the latter was operating on 0-7 Mode "A." The distance is about 5940 kms! It seems that at last we have evidence of Class-2 trans-equatorial propagation at 146 MHz. The geomagnetic equator is midway between KV4 and LU's in Buenos Aires in these longitudes, and peak occurrences are between 2000 and 2300 local mean time. TEP is a seasonal phenomenon and the maximum number of occurrences is around the equinoxes. Regular tests between KV4AD, KV4FZ and the LU's are being set up. It is a pity that we in the U.K. are too far north to ever be likely to enjoy contacts propagated by this mode. To put this distance in perspective, it is the equivalent of a London station working into Gabon in West Africa!

Contests

"This year's VHF RTTY contest was acclaimed by many of the British competing stations as 'the best yet!'" Thus begins the letter from G3OZF enclosing the results of the September event. Clear winners were the Martlesham Radio Society, G4BPO/A, led by Alan Melia, G3NYK, with 363 points from 45 contacts, all on 2m. Their best DX was 563 kms. G3PLX was second with 197 points from 30 QSO's and G8AWN/A was third with 191 points from 24 contacts. 22 stations submitted entries and a further 43 stations were active. There was considerable activity from F, ON, SM, LA and YU, as well as from PA and DL. G3PLX was using 30 watts output to an indoor aerial at sea level!

The next contest is the 70 MHz

CW event on January 22. When our scribe telephoned RSGB headquarters to ask the times, nobody could help. One assumes it may be 1000-1500 GMT as last year.

News from the Azores

A most interesting letter has been received from David Jarrell, CT2BS, concerning VHF propagation from the Mid-Atlantic. Dave confirms many U.K. FM stations in Band 2 via E-layer reflexion being received, "... many able to completely capture the receiver and cover up the local station." Although the local station is only three blocks away, its 100 watts was no match for these foreign FM stations.

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G8FUF	2	84	207	293
G3JXN	26	63	82	171
G8HVY	—	48	96	144
G3COJ	16	52	68	136
G8GML	8	47	87	142
G2AXI	1	47	79	127
G8LEF	4	37	79	120
G8EOP	8	36	38	82
G4BAH	—	32	92	124
GD2HDZ	10	32	59	101
G3OHC	4	31	98	133
G4DKX	5	30	68	103
G8IWA	—	29	77	106
G3FIJ	—	27	62	89
I4EAT	—	26	192	218
GM4CXP	—	25	125	150
G4BWG	—	25	110	135
G8HH1	—	24	81	105
G4FCD	—	22	88	110
GJ8AAZ	—	22	66	88
G8GII	—	22	63	85
G4AEZ	2	22	57	81
G4GEE	—	22	41	63
G3XCS	—	21	110	131
G3BW	1	21	47	69
G4ERX	1	20	53	74
G8IFT	7	18	45	70
G8BKR	1	17	92	110
G8ITS	—	10	50	60
GD3YEO	—	8	59	67
G8KUC	—	7	60	67

9H1CD	—	6	120	126
G4FBK	—	5	72	77
GM8NCM	—	2	52	54
G8LHT	—	1	70	71
G8KLN	—	1	62	63
G8LLG	—	1	38	39
G8JAH	—	1	35	36
G3POI	—	—	204	204
G3CHN	—	—	148	148
G3FPK	—	—	140	140
G4DEZ	—	—	98	98
9H1BT	—	—	94	94
G6UW	—	—	85	85
9H1C	—	—	83	83
G4AWU	—	—	80	80
G8JJR	—	—	79	79
G8JHX	—	—	74	74
G4GET	—	—	69	69
G4CIK	—	—	62	62
G4GCQ	—	—	61	61
G3KPU	—	—	60	60
G8KGF	—	—	60	60
G8KSP	—	—	60	60
G8JEF	—	—	58	58
G8KSS	—	—	58	58
GW4FJK	—	—	57	57
OZ9IY	—	—	53	53
G4EYL	—	—	41	41
G8JGK	—	—	34	34
G8JAJ	—	—	24	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" 70 cm.

He goes on to say, "The local people have informed me that the DX VHF stations and TV are enjoyed on an everyday basis here during the summer. I have watched several programmes on the BBC TV, including Monty Python, a horse show, etc." On Sept. 4 at about 1200 GMT, he noticed some weak signals on the 2m. band. By 1430 they had built up to S3. At 1447 he worked CT1PQA through the Lisbon repeater. Dave writes:—"What followed was a pile-up that sounded like the yearly 'CQ World Wide' contest. I continued to work stations as fast as I could log them." This continued till 2253 GMT when he went to bed. Signals were peaking 20 dB over S9.

At 0400 GMT the following morning the 2m. band seemed dead but Dave found he could access at least half a dozen repeaters. Between 0852 and 1209 there occurred, "... another pile-up to shame Field Day." The total for 24 hours operation was 186 QSO's, some through repeaters, some direct using FM and SSB. The gear was a Yaesu FT-221 and a KLM 14-ele. Yagi, and Dave never thought to switch on his 200 watts amplifier.

CT2BS ran a programmed beacon during the summer but only received one reception report—from West Africa. Dave is to be stationed near Brechin in Tayside this January, leaving only two Azores stations on 2m. CT2BB on FM and CT2BU on FM SSB. CT2BD is buying a transverter.

Twenty-three Centimetres

Bill Hodgson, G3BW (Cumbria), has at last got planning permission for his tilt-over *Versatower* now bearing a Quad Loop device for 23 cm. along with a 68-ele. *Multi-beam* for 70 cm. and a 10-ele. long Yagi for 2m. But he admits that 23 cm. is a bit of an unknown quantity at present since he cannot hear any beacons. His three QSO's have been with three countries, however:—GD2HDZ, GM8BJF/P and GI3VPK/P, not even one G yet! Bill queried the 23 cm. beacons. GB3AND (ZL63b) on 1296.87 MHz runs 50 watts *e.r.p.* omnidirectionally; GB3DD (ZL08e) on 1296.89 MHz and GB3WRN (YM28g) on 1296.91 MHz both run 2 watts *e.r.p.* beaming due north.

Seventy Centimetres

Jeremy Royle, G8ACN (Essex), sent along a picture taken by a Dutch TV enthusiast who received a good picture on October 15. G8ACN uses a 4CX250B amplifier running 150 watts peak synchronising level to a 64-ele. stacked array, horizontally polarised on 436 MHz. Transmissions are standard 625 line BBC/ITV monochrome.

G3BW found conditions during the last three weeks of November, "simply abominable—even the *Cumulatives* were not really very outstanding." Jack Hum, G5UM (Leicester), reports an enormous increase in activity now that the

THREE BAND ANNUAL VHF TABLE
January to December 1977

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G2AXI	48	7	55	21	43	8	182
G3OHC	51	7	60	15	32	9	174
GD2HDZ	41	5	59	14	42	10	171
G8HBQ	—	—	70	14	54	10	148
G8GML	—	—	66	14	54	12	146
G4BYP	25	5	57	12	31	9	139
G3XCS	44	6	53	19	10	4	136
G3FIJ	37	5	52	11	24	6	135
G4FCD	36	2	69	19	3	1	130
G8LEF	—	—	66	17	36	11	130
G4ECQ	44	4	65	15	—	—	128
G4GEE	—	—	54	15	41	10	120
G8BKR	—	—	70	16	28	6	120
G8HHI	—	—	57	15	36	11	119
GM4CXP	18	2	55	21	14	8	118
G3BW	—	—	54	13	41	8	116
G4DWZ	26	3	52	13	17	4	115
G8HQJ	—	—	58	17	28	10	113
G8IFT	—	—	61	13	31	5	110
G4AEZ	29	6	37	12	17	4	105
G4ERX	3	1	50	13	29	7	103
G3FPK	—	—	77	23	—	—	100
G4CMV	—	—	73	18	7	2	100
G4DEZ	—	—	71	21	—	—	92
G4FOR	—	—	62	16	7	2	87
G4FBK	—	—	58	14	12	1	85
G8ITS	—	—	48	10	23	4	85
G8LHT	—	—	66	16	2	1	85
G4DKX	7	1	37	11	19	6	81
G8JHX	—	—	61	18	—	—	79
G8KSS	—	—	57	18	—	—	75
G8JJR	—	—	58	15	—	—	73
G8GII	—	—	31	5	28	6	70
G8MKW	—	—	51	12	—	—	63
G8JGK	—	—	47	12	—	—	59
G4GCQ	—	—	45	9	—	—	54
G4GET	—	—	40	7	—	—	47
G8IZY	—	—	38	7	—	—	45
G4FKI	—	—	21	5	4	1	31

three local repeaters are in service since mid-October. They are GB3DY (ZN73e) on RB10, GB3LE (ZM24j) on RB4 and GB3NM (ZM05a) on RB6 and give coverage along the M1 from south of Leicester to north

of Derby. Jack reports a high standard of operating. Although most contacts are through repeaters, there are some simplex QSO's. In Edinburgh, GB3ED on RB14 came into full service on November 2.

Two Metres

Kevin McMahon, G8JJR, advises of an "AM Revival" in the Doncaster area. Calls are welcomed from AM addicts on Wednesdays and Sundays at 2230 GMT on 145.65 MHz. Chris Baker, G8JGK, has found it hard going lately from his QTH in central Chelmsford. He is really pleased with his 6-ele. Quad on the 60ft. tower so may put up another. In a letter which missed last month's deadline, Ken Osborne, G8KSS (Bristol), mentions the tropo. opening of Oct. 26 when he worked OZIBUR/BUO in 5Q54h, OZ1CTC in EP06c and OZ9RU in FQ51g. But best of the lot was when SM6GUS (GR11g) answered a CQ call, a QRB of 1168 kms.

Arthur Breese, GD2HDZ (Laxey) is quite amazed at the reports of the mid-October DX worked by some readers, none of which penetrated as far as GD. All Arthur managed was a solitary Frenchman for a new square. But he has now worked all the English counties on 2m. except for the Scillies. John Hill, G18HUY, is on a spell of duty in Co. Armagh (WO57b) using his Icom IC-202 and solid state amplifier giving 80 watts output. The aerial is a 10-ele. Yagi at 25ft. and the QTH some 200ft. *a.s.l.* He was in on the big *aurora* of October 27 and worked G, GM, GW and EI best DX being GW4CQT in YL25d on SSB. It started about 1715 GMT and faded out at 0035.

John would like to thank the 47 GI's already worked for showing him such a warm welcome and tells us that there are about 170 GI's on 2m.

He is QRV every night after TV hours and can arrange to get on in daylight hours for skeds provided there is sufficient warning. The address is:—Sgt. J. C. Hill, 48 FD SQN, BFPO 803.

Derrick Dance, GM4CXP (Borders), also missed last month's deadline and reports on some tropo. DX worked on Oct. 15/16, the best of which was EI square in Germany. Oct. 14, 18, 19 and 22 produced auroral signals from GB3LER. On the 18th, between 2113 and 0026 GMT, he worked G, GM, LA and SMØ stations at QTF 045° plus or minus 10° but on the 19th, although Lerwick was auroral for over an

hour from 1425 GMT, nothing else was heard. The opening on the 27th was in progress when Derrick got home at 1727. The first phase ended at 1930 during which period G's, DL, GM, GW and SM6 were worked at QTF 045-050°. The second phase began at 2310 and was still in progress at 0110 GMT, this producing QSO's with PA, ON and G stations at 070-080° and with GM's at 045°. GB3LER was again auroral at 1657 on the 30th for a few minutes.

The Grafton Radio Society's three hour contest on Nov. 20 attracted some activity but some participants reckoned the James Bond film on TV was a rival attraction! Conditions were pretty flat and the scoring fairly low. Bryn Llewellyn, G4DEZ (Oxon.), made 58 QSO's worth 198 points. Steve Marsh, G4BWG (London), had 31 contacts and George Zitterstein G8ITS, (City of London) managed 21 QSO's.

Activity was quite high in the four hour, 2m. leg of the Verulam ARC's contest on Nov. 27. Ian Offer, G4FDX (Beds.), scored 4408 points and John Lemay (Hornchurch), G8KAX, had 57 exchanges with 19 counties. At G3FPK, 29 counties were worked including Antrim and Grampian, Cornwall and Durham so conditions could not have been all that flat. An unexpected *aurora* happened on Dec. 2 which apparently began around 1757 GMT but your conductor did not realize it until a phone call from G4FRX. SM5FRH was worked at 1850 RST57A on QTF 025° in HT80f. SM4AIQ (HT51j) was 56A at 1847 and G3BW at 53A was called at 1906 a few minutes before fade-out.

There was only time for a little listening on the Fixed Contest on Dec. 4. John Nelson, G4FRX, and Steve Low, G8FEO, took John's TS-700 and big amplifier to "The Langham" and put G8BBC on the air concluding 216 QSO's. Other high scoring stations included G8HCL (Weybridge); G4ASR (Essex); G3YEG (Bucks.); G4BWG (London); G4FBK (London) and G8AHK (Guildford). Some signals were a bit rough but several, although tremendously strong at G3FPK, were exceptionally clean and narrow, including G8BBC and G4AVV.

Conditions seemed rather poor to the north with GM8FFX barely detectable at the usual noon sked time, but a number of participants were working PA's.

Four Metres

Jack Hum, G5UM, reckons Class "A" men are missing a lot by neglecting 4m. which provides nationwide coverage under any conditions more reliably than 160m. and without all the noises. Sunday mornings on 70.2 MHz will find cross mode SSB/CW QSO's along with AM and some FM. A Yagi beam is very helpful in increasing the *e.r.p.* and it would seem that an *HB9CV* design would provide a very compact means of getting a few dB gain.

Moon Bounce

The big, fixed *rhombic* at G3PIA (Harwell) has pulled in signals from W6PO in San Mateo, California. Bob uses 1 kW to a 160-ele. colinear array. W7FN has also been copied and he uses sixteen 7-ele. Yagis. All this on 2m. It is unlikely that any precise measurement of the gain of the G3PIA *rhombic* can be made but it is probably over 20 dBd.

Final Miscellany

Angus McKenzie, G3OSS, mentioned a crazy proposal for an SSB repeater with an *output* around 144-175, in the Sheffield area. As there is active consideration now to utilise this part of the SSB allocation for meteor scatter use, it is suggested that indignant readers communicate their opposition to the whole idea of *any* repeaters in the exclusive section of the 2m. band to the RSGB VHF Committee.

Deadlines

Sorry the deadline for copy for this issue had to be brought forward. All your copy for the February column by January 5 please along with your final claims for the Three Band Annual table. The March deadline will be Feb. 2, rather early. Everything to:—"VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. *Happy New Year and 73 de G3FPK.*

A WARBLING FREQUENCY STANDARD

G. C. DOBBS, G3RJV

HOW does your frequency measuring equipment measure up to the recommended requirements of the Home Office? In the Leaflet "How To Become A Radio Amateur" Appendix F, Frequency-Checking Equipment in Amateur Stations, section 4(b) reads:

"Hetrodyne wavemeters and crystal calibrators. When used in conjunction with a general coverage receiver, a 100 kHz crystal is usually sufficient for checking frequencies up to 4 MHz. For higher frequencies the spacing between 100 kHz marker points is too small for accuracy, and a crystal of 500 kHz, or preferably 1 MHz should be used in addition."

An amateur with such a receiver, therefore requires 1 MHz and 100 kHz points for "sufficient" accuracy. This calibrator provides both, with the addition of 10 kHz points.

A conventional, and convenient, way to provide such market points is to use a 1 MHz oscillator with digital divider circuits to give the smaller spacings. The circuit shown in Fig. 1, provides such an arrangement, although one problem about such a circuit is that it is often difficult to differentiate between the calibrator "pips" and other signals present on the frequencies being checked.

This circuit provides for modulation of the output to give a distinctive warbling tone to the required signal.

The circuit uses the inexpensive 74 range of TTL IC's, and the oscillator is a multivibrator based upon two gates from a 7400. Feedback is controlled at the required frequency by the 1 MHz crystal X1 with a series trimmer Ct. Ct may be in the order of some 20 to 30pF and a 3-30pF beehive trimmer was used with good results in the prototype. Ct should be large enough to maintain reliable oscillations, but small enough to enable X1 to oscillate at the exact frequency. A method of checking this is described later.

IC1(C) acts as a simple buffer and the 1 MHz output is taken to S1B to give the 1 MHz points. IC1(D) acts as an output buffer. It will be seen that IC1 alone will produce a simple 1 MHz standard if this is all that is required.

The division of the signal is performed by 7490 IC's. The 7490 is a versatile IC which is normally used to

Table of Values

Fig. 1.

IC1 = 7400	R4 = 33K
IC2 = 7490	R5 = 15K
IC3 = 7490	C1 = See Test
IC4 = NE555	C1 = 0.01 μ F
R1 = 2.2K	C2 = 1 μ F Tant.
R2 = 2.2K	C3 = 0.01 μ F
R3 = 680 ohms	C4 = 0.1 μ F
	C5 = 100pF

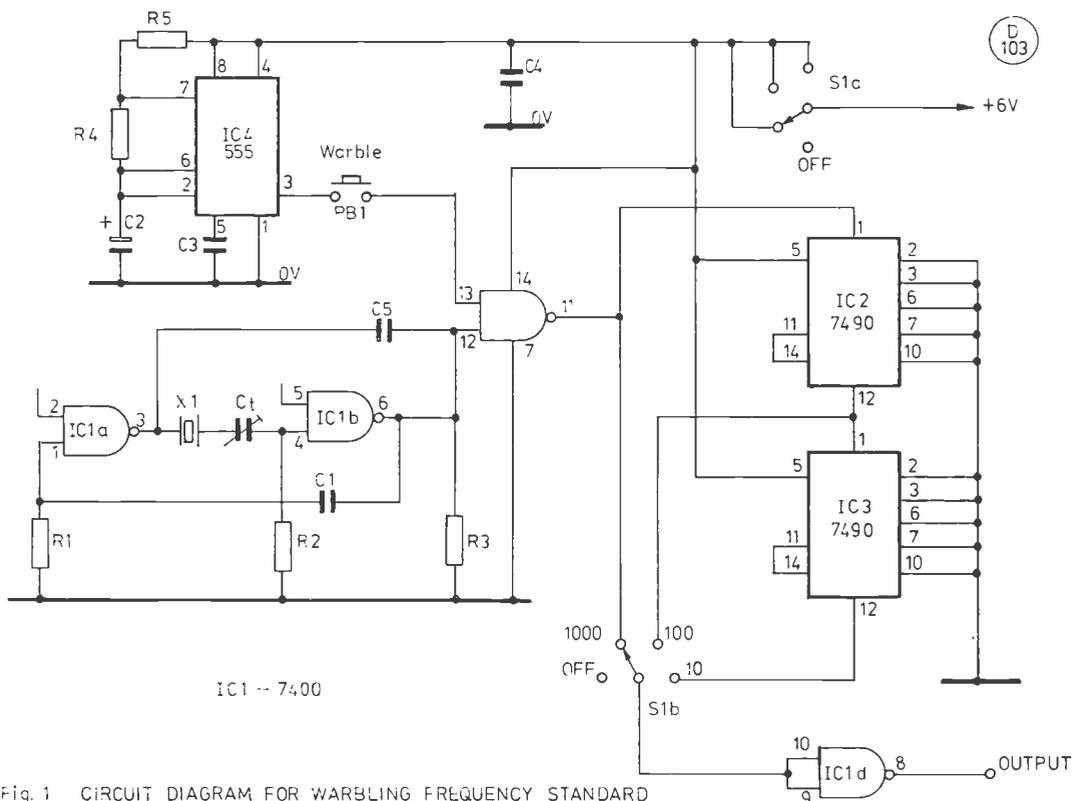


Fig. 1 CIRCUIT DIAGRAM FOR WARBLING FREQUENCY STANDARD

THE MONTH WITH THE CLUBS

BY "Club Secretary"

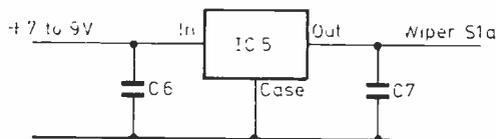


Fig. 2 REGULATOR CIRCUIT

D
1C4

Table of Values

Fig. 2.

IC5 = LM309K
C6 = 0.22 μ FC7 = 0.4 μ F

divide an input by 10, but can also be used to divide by 2 and by 5. In this circuit, two divide by 10 units are used: IC2 and IC3 are both wired in a divide by 10 mode. The usual quoted upper frequency limit for the 7490 is some 20 MHz, but in practice outputs were found to go beyond the top end of the 28-30 MHz band.

The divided outputs appear at pin 12 of each divider IC and go to the 100 kHz (IC2) and 10 kHz (IC3) contacts of S1B. S1A provides a simple on-off facility in one common switch action with the required calibration points. All outputs are buffered by IC1(D).

The modulation is provided by a single 555 timer IC in the astable mode. The 1 MHz signal and the warble tone are mixed at IC1(C) to give a modulated output at pin 11; the frequency of the modulation could be changed by altering R4 and C2, but the named values gave a pleasant and distinctive tone.

The unit requires a nominal 5 volts for operation; this may be reduced to 4.5 volts by using a cycle lamp battery. In the prototype a three terminal regulator type LM309K was used to provide the power source, which in this case was a PP9 battery, but any voltage from 7 to 10 volts fed into the LM309K would be suitable; the arrangement for the regulator is shown in Fig. 2.

Because of the high speed switching of the dividers, a high harmonic output is produced. These harmonics may extend well above the desired frequencies and the prototype out of its case produced patterns on a UHF TV screen. It is therefore important to mount the unit in a screened case with a suitable screened output socket. It may be desirable to decouple each IC: this may be done by adding a 0.1 μ F capacitor between the positive supply pin of each IC and the earth rail; the capacitors should be mounted as close to the pin as possible. Capacitors on pin 5 of IC2 and IC3 should provide protection in this way.

The exact frequency of the output may be adjusted using Ct to beat against a suitable standard frequency. An obvious standard is the Radio 2 signal which provides an accurate 200 kHz point; it should be sufficient to beat the output to zero beat, with Ct against Radio 2 on a broadcast receiver.

The final unit provides the amateur with a simple unit which can either be built on 0.1in. pitch board or a PCB may be made to any convenient layout. It is also important to have good mechanical stability in the mounting of X1 and Ct.

SOME of our space this time has had to be taken for the MCC report elsewhere in this issue so we must not waste words needlessly; we hope the result of this constraint will be readable without too much taste of sawdust—and we wouldn't object to some feedback on the matter, come to think of it!

Help!

We have a letter from a gentleman who writes on behalf of his son who is disabled and home-bound, but spends a lot of his spare time tinkering around with radio. If there is anyone within contact distance of *Aldborough, near Hull*, willing to help, will they please write to your scribe as a matter of urgency. One senses that a little theory and a little practical plus a lot of encouragement would be the task.

The Mail

The top of the pile this time is UK FM Group (London), which is notable for containing in its Newsletter an Editorial which is by way of a direct attack on G6JP and G2BVN in their respective capacities in the RSGB organisation. Now, as we have said so many times before, we don't hold *any* briefs for other people; but in this case, we hope that at least the editor concerned (G8CKT) will have had the decency to send a copy to the people concerned. If the guts of his moan is simply that these two have acted when they have felt it necessary, and that he doesn't agree with what they have done, then the worst crime he can accuse them of is trying to use initiative to keep things rolling; if every decision was referred to a committee, and left to lie till that committee had got around to meeting, debating, maybe referring back, and so on, then *nothing* would ever be done. On the other hand, it could just possibly be read another way, in which case some hard facts are called for.

South Manchester have every Friday at Sale Moor Community Centre, Norris Road, Sale, and in addition every Monday night sees them occupying the club shack at Greeba, Shady Lane, Baguley.

First Tuesday and third Thursday each month at Lancastrian Boys School, Basin Road, **Chichester**. The main item of note in their Newsletter was an obituary, that of Tom Streeter, G5CM, a real OT who will be much missed in the area.

The programme at **Sutton & Cheam** gets a bit complicated out of term-time, and so for January we find but one meeting laid down, this one being January 12, at Sutton College of Liberal Arts, Cheam Road, Sutton.

Its a case of "every Friday" at **Coventry**, says the new Hon. Sec. whose address appears in the Panel. The venue is Baden Powell House, 121 St. Nicholas Street, Radford, Coventry.

Harrow are another "every Friday" type group, the venue being the Roxeth Community Centre, Scott Crescent, West Harrow, Middx. Incidentally we notice January 20 is the AGM date.

Over to **Reigate** where they have Natter sessions at

the Marquis of Granby, on January 5 and 31st; in between is the main meeting on January 19, for which we are told G3RZP is the speaker, but not where the venue is—so, refer to the Hon. Sec. at the address in the Panel.

Bristol (Shirehampton) have surfaced again, and seem in good heart; they have Hq. at Twyford House, High Street, Shirehampton, where they may be found on any Friday evening. The programme is still, it would seem, being made up so no doubt by the time of your visit, they will have something fixed up.

On to **Verulam**, where the main meetings are in the Market Hall, St. Albans, on fourth Thursdays, in this particular case January 26—Slow-Scan TV by G3KRC is the entertainment mentioned. They also have an informal at the R.A.F.A. Hq. on the second Thursday in each month—go to Victoria Street to find this venue.

Now to **Nottingham** where the venue is the Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham; they will be there every Thursday with *Lowe Electronics* giving them the talk/demonstration on 26th. If you want to attend the National-Westminster Bank Computer Centre visit in February, you had better get on to the Hon. Sec. *quickly* as he has to give them a list of names before the date.

At **UK FM Group (Western)** the main interest is FM and repeaters, naturally, and it seems they have well over 500 members now; which seems to imply the Legh Arms is going to be a bit crowded on January 5—the venue, by the way, is in Knutsford.

It is Eltham United Reformed Church Hall, 1 Court Road, if you want the **Cray Valley**, where the pattern seems to be to take the meetings on the first and third Thursdays; usually the first date is the "main" meeting while the other one is the informal or natter session; but on occasion they may reverse the order if it helps to get a stranglehold on a specially wanted speaker!

Now to **Chiltern** where the date is January 25, for the AGM, the Hq. address at which this is to be held being 42 Castle Street, High Wycombe, in the conference room.

A.R.M.S. this time carries an Obituary notice of Sylvia Margolis who died in September; we recall that while she and Maurice, G3NMR, often caused a certain amount of dismay within the amateur radio fraternity, one has to say that Sylvia put into Amateur Radio an enormous amount more than she ever got out of it, as indeed did Maurice in his lifetime. She will certainly be missed by those who recall her work for ARMS. As to ARMS itself, this is the group for the /M operator or enthusiast, wherever he may be in the world.

Newsletters

They come in all sorts, shapes, and sizes; from the single duplicator sheet which the Hon. Sec. welds on the kitchen table and containing almost nothing save the essential information—which type are usually the most long-lasting—right through to the really professional-

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 HARWICH: A. J. Free, G4EYE, 3 Litchfield, Dovercourt, Essex CO12 4TT. (*Harwich 4960*).
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).

IRTS Region 1: J. Ryan, 23 Dollymount Avenue, Clontarf, Dublin 3.
 KIDDERMINSTER: B. Hutchins, G4CTU, 12 Parkland Avenue, Kidderminster, Wores. DY11 6BX.
 MIDLAND: A. L. Walton, G3ZKU, 243 Barnes Hill, Birmingham B39 5UJ. (*021-427 3088*).
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill (3552), Sussex.
 NORFOLK: P. W. Forster, G3VWQ, 12 Thor Road, Thorpe-St.-Andrew, Norwich NR7 0JG.
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 REIGATE: F. H. Mundy, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.
 SOUTH BIRMINGHAM: Mrs G. Apperley, G8KPA, 35 Denise Drive, Harborne, Birmingham 17.
 SOUTH MANCHESTER: W. L. Seddon, G3VIV, 12 Barwell Road, Sale, Cheshire M33 5FF. (*061-973 3355*).
 STOURBRIDGE: A. Dewsbury, G4CLX, 10 Rectory Road, Oldswinford, Stourbridge (3530), West Midlands.
 SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Crondon CR2 8PB. (*01-657 3258*).
 SUTTON & CHEAM: J. Korndorffer, G2DMR, 19 Park Road, Banstead, Surrey.
 TORBAY: M. Yates, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.
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 U.K. FM GROUP (Western): G. L. Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB.
 VERULAM: B. Pickford, G4DUS, "Netherwood," 130 The Drive, Rickmansworth (77616), Herts.
 WALSALL: K. Boucher, G8KML, 22 Emery Close, Walsall.
 WESSEX (Bournemouth): G. D. Cole, G4EMN, 6 St. Anthony's Road, Bournemouth BH2 6PE. (*0202 20027*).
 WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent. (*0732 56708*).
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

looking job turned out by a member who is a frustrated journalist at heart. Most of them could do to see the results of others' efforts, and the **Amateur Radio News Service** is one of the props for many of the better newsletter efforts, containing as it does so much useful material with which to fill out the pages when the locals can't or won't stump up with some news of their own doings. Although it is an American organisation, ARNS is international in scope, and G3FPK is Vice-President International; Norman in fact handles the U.K. end of things, so any club scribes who would like more information can get in touch with him at the address in the Secretaries Panel.

Back to the clubs again now; to **Echelford** at their Hq. address, The Hall, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. As for the dates, the pattern is the second Monday and the last Thursday of each month.

For **Surrey** one gathers they have their dates booked on the first and third Wednesdays in each month; and on January 7 in addition they have the Annual Dinner, at "The Grapes," High Street, Sutton. The normal Hq. is at T.S. *Terra Nova*, 34 The Walldrns, South Croydon.

Ever since they have been reporting in, your scribe has wondered about the same of the Hq. of the **Walsall** group—"The Hame-Maker" inn in Blue Lane, where the lads can be found on alternate Tuesday evenings; this is one club that reckons to cater for the BC listeners on the SW bands.

On down to **Cornwall**, where they have a booking on the first Thursday in each month, usually at the SWEB Clubroom, Pool, Camborne, starting at 7.30.

At **Acton, Brentford & Chiswick** the Annual General Meeting is on January 17, at the usual Chiswick Trades & Social Club address, 66 High Road, Chiswick. It will be followed by a general discussion.

The informal for **Crawley** will be on January 17, *chez* G3SYD, but the main meeting, as always, is down for the United Reformed Church Hall, Ifield—and oddly enough it is again an AGM, this time on January 25.

Another club to have the informals at members' homes is **Crystal Palace**; January 10 at G8HAX. As for the main meeting, this is at Emmanuel Church Hall, Barry Road, East Dulwich, speaker G4AVV. One would feel that if you are in either of these last two clubs areas and intending to pay a visit to the informals, it would be courteous to contact the Hon. Sec. first—see Panel.

Its the first and third Fridays in every month at **Hereford**, but the Newsletter we have to hand at the moment doesn't give details far enough ahead. However we can say that they usually try to fix up something on one or other of the meetings in a given month; the Hq. is at County Control, Civil Defence Hq., Gaol Street, Hereford.

Brighton have a Newsletter in which there isn't an indication of the Hq. address, so we have to steer you in the direction of the Hon. Sec. at the address in the Panel. As to dates, from here it rather looks like the first and third Wednesdays.

Mid-Sussex have their place at Marle Place Further Education Centre, Leylands Road, Burgess Hill, and for them it looks to be the first and third Thursday.

Now to **Grimsby**, where they have dates of January 5

and 19, the first being to G3RGC on PCB's, and the second, provisionally at the date this is being written, for a Dinner. However, again the snag is the lack of details as to the Hq., for which we must refer you to the Hon. Sec.—see Panel.

One of the few twice-weekly groups is at **South Birmingham**, where they have Fridays for Construction and Morse classes, plus Thursdays for HF operation from the Shack, at Hampstead House, Fairfax Road, West Heath.

Deadlines for "Clubs" for the next three months—

(For February issue—December 30th)

For March issue—January 27th

For April issue—February 24th

Please be sure to note these dates!

The same "fist" passes on the news from **Midland**, who have a Construction and Shack session at Brass-house Centre, Broad Street, Birmingham on January 10, but go to Room 110 at Aston University, Gosta Green for an evening of "New Year Resolutions."

On November 7 last, an old-timer and respected member of **Torbay** passed on: Frank Wadman, G2GK was a founder-member of Torbay in 1946, and in the pre-war years he was a member of the Thames Valley group. Eight of the club members were at the funeral, the memorial service being at All Saints, Babbacombe. To turn now to the club's affairs, we see their next date is for January 28, when there will be a lecture, details of which were awaiting confirmation at the time of their letter. The Hq. address is at Bath Lane, rear of 94 Belgrave Road, Torquay.

"Its all happening" is the word from **York**, who are to be found on every Friday except the third one in each month, at the United Services Club, 61 Micklegate, York. We might note in passing that January 27 is an important date, it being set down for the AGM.

Peterborough have their place at the Scout Hut in Occupation Road, on Friday, January 20.

As will be read elsewhere, the **Cheltenham Association** had been in being just two days when they set out after fame and fortune in MCC, using the call G5BK. The new arrangements are that the combined outfit now have two meetings each month, on the first Thursday and the third Friday. There is a proposal for a dinner in late January, of which no doubt details may be obtained from the Hon. Sec. The address for all normal meetings will be the Old Bakery, Chester Walk, off Clarence Street.

January in **Stourbridge** means an informal at the Shrubbery Cottage pub., in Heath Lane, Oldswinford on January 4. The evening before is down for a constructional session, and on January 17 they have the annual constructors contest; both these two dates at Longlands School, Brook Street, Stourbridge.

New Formations

We have a couple of these to mention this time. Our first comes from the East Coast, namely **Harwich**. The

club foregather at the home of G4BBH, 8 Marine Parade, Dovercourt; his telephone number is Dovercourt 4000. The routine is "every Thursday" and we would feel it would be a good thing to contact either G4BBH or the Hon. Sec.—see Panel—for the go-ahead to join before actually turning up; houses are such un-elastic places!

The Youth Centre, Bromsgrove Street, is Hq. for the newly formed Kidderminster group. On January 4 they have a demonstration of the use of lecher lines for frequency measurement, and on 18th they have an "on the air" night.

Turning back to the old-established customers, we have Northern Heights, who have Hq. at the Peat Pitts Inn, some four miles North of Halifax Town Centre, where they are "in residence" on alternate Wednesdays. January 4 and 18 are the normal sessions, but in addition this month they have the West Yorkshire Dinner and Dance, on January 28, at the Laithe Restaurant, Ogdon. And, while we are with this group, we have to congratulate G3UI, the Minutes Secretary, who has received the Queen's Silver Jubilee Medal for services to the ATC; and also to G3USH, Paul Allen, for his very fine model fair-organ (electronics inside, of course!) that was one of the major exhibits at the Bradford Model Engineering Exhibition.

Down to Bournemouth, where they have bookings on January 6 and 20; the former was down for a talk on Coast Guard Communications, but this has had to be postponed, and G4EMN advises he is fixing up some lectures on technical topics instead; the 20th is down for G3MXJ to give a talk on them on the IARU and WARC 1979.

We like some of the things that appear off-the-cuff in the mail now and again—this time it is Bristol City RSGB group, who described their AGM as the "Annual Arm-Twisting!" If you want to watch the fun—or to allow your arm to be twisted—January 30, Queens Building, University Walk, Clifton, Bristol at 7 p.m. If the arms are suitably compliant, there will then be a Bring and Buy Sale.

At West Kent, the main evenings are at the Adult Education Centre, Monson Road, Tunbridge Wells, with a Junk Sale on January 6, followed by G3XPX talking about reflected power on 20th. In addition, on the Tuesdays after the Friday meetings, they have an informal at the Drill Hall behind Marks & Spencers. Incidentally, and as a reminder to all club scribes, one thing we just *can't* do is to "carry over" material for several months at a time—there is too much chance of error and the whole thing becomes too cumbersome to be, as it were in today's jargon, "cost-effective."

It's AGM time for Greater Peterborough on January 26, and to help oil the wheels of election, they will be using up time left over after the AGM to get into the club project of a two-metre FM Portable a bit further. The venue is the Stanground School.

At Edinburgh and District the venue is the Observatory of the Edinburgh Astronomical Society at Calton, on Tuesdays; and it is interesting to note that there is some astronomical activity in the radio context to bind the two groups of hobbies together.

Yeovil have weekly dates, every Thursday evening. The month of January is almost all taken up with talks

on various aspects of aeriels and transmission lines, save for 12th when they will be enjoying a show of the slides of members on subjects connected with radio. The venue is not given this time, so we must refer you to the Hon. Sec. for this.

Next we have Blackwood, who have Friday, January 13 for their date; starting at 2030 at Oakdale Community Centre, near Blackwood, Gwent, they will be hearing from GW4DWN of his recent adventures as GW4DWN/VE8, complete with slide show.

Norfolk are one of the few groups on the East Coast and they have a permanent place at Crome Community Centre, Telegraph Lane East, Norwich, every Wednesday evening. Perhaps the main event is the Surplus Sale on 18th; 11th and 25th are down for informal plus CW tuition.

Finally this month we have the IRTS Newsletter, and in it we find news of various EI clubs and individuals; all sorts of things seem to be happening over there, both in the group and the individual contexts—details from the Hon. Sec. at the address in the Panel.

Wind-Up

Which says we have mentioned all those who wrote in for this month—or overshot last month's deadline! This time the deadline will be December 30—by which time you should have had time to receive and read your January issue. However if you are one of the unlucky ones who have trouble getting your copy, either through postal or newsagent delays (or both), the next date you can make will appear in the "box" in the body of the piece. Address, as always, to Club Secretary, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

MARCONI 75th ANNIVERSARY

The Cornish Radio Amateur Club is setting-up and operating on behalf of the RSGB, an amateur station at the Poldhu Hotel, Cornwall, to celebrate the 75th anniversary of the first two-way radio transmission across the Atlantic on January 18th, 1903—by Marconi.

The station, with the callsign GB3MSA, will be in continuous operation from 1200 hrs. GMT January 14 1978 to 1200 hrs. GMT January 21 1978 and working 20/15/10 metres (A3J and A1), 80/40 metres (A3J and A1) and 2 metres (F3, A3J and A1); it will be manned by shifts of amateur operators supplemented by *any visiting holders of an amateur licence who wish to operate.*

During its operational period the station will contact amateur stations all over the world, including other special stations set up at historic sites linked with Marconi—in particular, one set up on behalf of the ARRL at South Wellfleet, Mass. (the site of the American end of the original link).

It is also hoped to use SSTV and RTTY communication, if possible; in addition, a display of historic items and photographs has been arranged by the Poldhu Hotel in association with Marconi Electronics Ltd.

R.A.E. Q. & A.

SUBJECT NO. 765, MAY 1977—ANSWERING

ALL QUESTIONS

ONCE again we present, as for so many years past, a set of "model" answers to the previous May's RAE. Before a candidate for 1978 looks at them may we add a few, hopefully useful, comments.

While these model answers take a lot more than three hours for us to prepare, the written draft is done in the specified time—we then tidy up the spelling, the drawings, pick out any bad bits and rewrite them if they are felt to be less than clear. For the candidate, the two problems are simple: firstly, he/she is probably out of practice at writing school compositions on specified topics—and that is just what an RAE answer is!—and secondly there comes, in the examination-room, the difficult question of what to tackle and what to leave out. You *must* do both the questions in Part I, as the paper instructs; but in Part II one has the choice of any six from eight questions. Note that if you do seven questions in this part, instead of six, you *won't* get any more marks; so you might as well cross one of your seven out as being poorer than the others—but better still devote the time to doing a firm six questions, carefully chosen when the paper is first opened and you are into exam. time. As to which question to kick off with, it doesn't matter a jot; but if you can contrive to find one which to you looks to be the easiest, then do that one first, while your examination-nerves calm down and concentration takes over.

For the rest, it ought to be superfluous to tell you to take along with you the tools, namely pen (or ball-point) checked before setting off to have enough ink to see you through (indeed a spare is no bad idea), pencil, ruler, rubber, maybe a set-square and compasses, and above all a watch, with which to time yourself to not one minute over twenty for any one question until you have done all that is called for, even if it means stopping in mid-sentence. That way at least you guarantee yourself the best chance of getting most marks, and after this is done and checked, you can always turn back to the one you hadn't completed, write under it "continued on page whatever-it-is" and go back to the end of the paper to add "question whatever-it-is, continued" and get on with finishing it as far as time permits. It is axiomatic that you can do a *perfect* answer to one question but you cannot possibly secure a pass if you only answer one question! Therefore you must at least have a stab at the total number of questions you are called upon to answer.

RADIO AMATEURS' EXAMINATION, MAY 1977

This examination is divided into two parts; failure in either part will carry with it failure in the examination as a whole.

Each question in Part I carries 15 marks; each question in Part II carries 10 marks.

Answer EIGHT of the following ten questions as follows: BOTH questions in Part I, and SIX questions from Part II.

PART I—Answer BOTH questions in this part.

Qu. 1. (a) State the qualifications required by applicants for the Amateur (Sound) Licence A.

(b) Give the form of callsign assigned to a United Kingdom amateur radio station.

(c) State the prefix letters used to indicate EACH of the following countries.

- (i) Channel Islands
- (ii) Northern Ireland
- (iii) Isle of Man
- (iv) Scotland
- (v) Wales.

Answer 1

(a) Applicants must be over 14 years of age, and must provide valid evidence of British Nationality. In addition, an RAE pass is required, plus a pass in the Morse test which must be not more than twelve months old at the time of applying for the licence. In addition the licence fee must be paid, initially and thereafter annually.

(b) A prefix letter, G or as shown below, a number which is currently 4 for an A licence and 8 for a B; plus the actual call-letters of which there will be three, allocated to new licences in alphabetical order.

(c) Respectively, GU and GJ, GI, GD, GM, GW.

Qu. 2. (a) What are keyclicks in a radio transmission?

(b) What effects may they have on other services and stations?

(c) How can they be minimised?

Answer 2

(a) Keyclicks are the signals radiated at the beginning and end of Morse dots and dashes, due to the over-abrupt switching on and off of the carrier, which have significant energy on frequencies other than that of the carrier. They should not be confused with the effects of sparking at the keying contacts which are normally only apparent very locally, whereas the true key-click can be, and often is, a world-wide signal.

(b) Heavy keyclicks cause a signal to be radiated at the beginning and end of each dot or dash which will be heard as interference on signals many kilocycles on either side of the carrier frequency, either CW or telephony reception being affected, particularly if AGC is in use, when other receivers may be desensitised to the point of loss of their wanted signal; more selectivity in the receiver concerned is no solution, and the clicks may be radiated outside of amateur bands.

(c) We require to slow down the *rate of change* of the output signal; zero rate of change equals either a continuous carrier or continuous non-carrier condition, while the keyclick condition approximates the other extreme of an infinite rate of change. We require to reduce the rate of change such that the click-level is acceptable and yet the dots-and-dashes are still clearly readable, at the speed at which they are being sent, by the distant receiver. This slowing of the rate of change is achieved by the presence of a circuit having a time-constant, either L and R, or C and R, as may suit the keying method used. Fig. 1 shows a typical keying method and the circuit required to cut the clicks to an acceptable minimum; values may best be found by trial and error to achieve the best compromise on the individual transmitter.

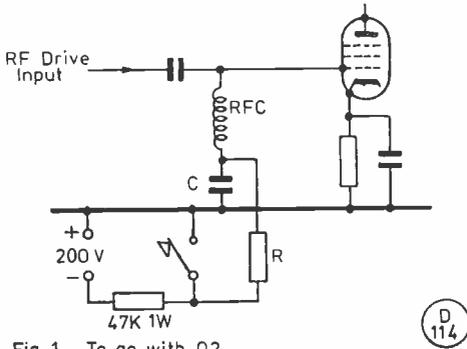


Fig. 1 To go with Q2

"Grid-block" keying. Resistor R1 has the normal value for the grid resistor of such a stage. C serves, with R2, to determine the keying characteristic; the product $R1 (K\text{-ohm}) \times C (\mu\text{F})$ should be from 5 to 10, and will determine the "make" characteristic. R2, shown as nominally 47 K-ohm, may be adjusted to alter the "break" characteristic. The nominal 200-volt supply must be capable of (a) ensuring the valve is completely cut off, and (b) of delivering the current drain through R2 when the key is down—in this case about 4 mA.

Qu. 3. (a) Explain what is meant by the term "capacitance" in an electrical circuit, and define its unit.

(b) A capacitor of 12 microfarads is connected in parallel with one of 6 microfarads. What is the total capacitance?

(c) What would be the total capacitance when they are connected in series?

Answer 3

(a) Consider Fig. 2. Two pieces of conducting material are separated by an insulating material. If the combination is connected through a switch to a battery, when the switch is closed, current flows in the wires momentarily until one plate carries an excess of electrons and the other a shortage of electrons (*i.e.* a positive charge) such that the potential difference is equal to the battery voltage, when current ceases. Thus energy is

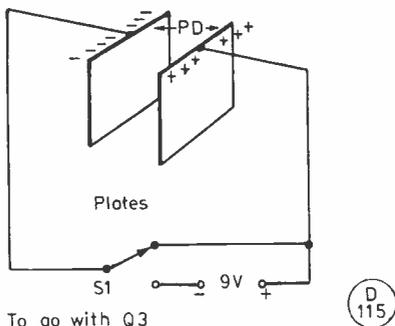


Fig 2 To go with Q3

Two "plates" are separated by a "dielectric," the plates being joined in the circuit shown. S1 is shown shorting the plates, when electrons will flow from the left-hand plate to the right-hand one. S1 at centre leaves the plates uncharged and disconnected, and S1 down connects the battery which forces electrons to the left-hand plate and a positive charge (lack of electrons) to the right. A current flow therefore occurs momentarily in one direction when S1 is turned down, and in the opposite direction when S1 is turned up.

stored in the capacitance, the amount being dependent on the area of the plates, the nature of the insulation between them (the dielectric), and the voltage impressed on the capacitor. The capacitance is given by the relationship $C = KA/d$ where K is the *dielectric constant* of the insulator ($K = 1$ for air, up to several thousands for certain ceramics), A is the cross-sectional area of the plates, assumed to be equal on both sides, and d is the spacing between the plates. For a given capacitor, the energy stored in joules is equal to $\frac{1}{2}CV^2$ where V is the voltage between the plates. The unit of capacitance is the Farad (usually microfarads or picofarads in practice), where a capacitor of one farad will have a voltage of one volt between the plates when charged by one coulomb of electricity or 6×10^{18} electrons.

(b) The relationship is $C = C_1 + C_2$

Thus $C = 6 + 12 = 18$ microfarads.

(c) The relationship is:

$1/C = 1/C_1 + 1/C_2$

Thus $1/C = 1/12 + 1/6$ or $3/12$

Inverting, we get $C = 12/3$ or 4 microfarads.

(Ed. note: It is interesting to note that the farad is not formally defined in either the ARRL or RSGB "Handbooks." The definition given above was taken from Chambers' Twentieth-Century Dictionary; the Shorter Oxford Dictionary is not so clear. However, we feel the question to be quite fair, and thus the "standard reference works" on amateur radio available generally are at fault in not giving a definition.)

Qu. 4. (a) What is meant by "resonance" in an AC circuit?

(b) What value of capacitor would be required in series with an inductor of 100 microhenries in order for the combination to resonate at 1 MHz?

Answer 4

(a) Resonance is the condition which arises in a circuit having inductance and capacitance in series (or for that matter in parallel) when the inductive and capacitive reactances become equal, which will occur at some calculable frequency. At such frequency, since the two reactances cancel out, we are left in a series case with only the residual R of the practical case to stop the current from being infinite; likewise in a parallel case, where a perfect capacitor and perfect inductor at resonance would cause zero input current or infinite resistance.

(b) $X_L = 2\pi FL$ and $X_C = 1/2\pi FC$ (1)

At resonance $X_L = X_C$ and we are given L and F. Transposing Eqn. 1 above we get:

$C = 4\pi^2 F^2 L$ farads (L in henrys and F in farads). Inserting figures we get

$1/C = 4 \times \pi^2 \times (1 \times 10^6)^2 \times (100 \times 10^{-6})$.

Inverting both sides:

$C = \frac{10^{12}}{4} \times 9.86 \times 10^{12} \times 10^{-4}$

cancelling through, we get

$C = \frac{10^4}{4} \times 9.86$ (making $\pi^2 = 9.86$)

$C = 253 \text{ pF}$

Qu. 5. With the aid of a circuit diagram explain the action of a frequency changer stage for a superheterodyne receiver.

Answer 5

See Fig. 3. Essentially, when two frequencies are passed through a stage having non-linearity present, there will be in the output the original frequencies F1 and F2, harmonics of F1 and F2, and products such as $F1 + F2$, $F1 - F2$, $2F1 + F2$, $F1 + 2F2$ and so on. In a frequency changer such as is used in a simple broadcast receiver, let F1 be the signal frequency and F2 the local oscillator frequency. By ganging the output of the local oscillator to the signal frequency such that $F2 - F1$ is a constant, we can follow the mixer with an amplifier resonated at the frequency of the constant ($F2 - F1$), in which we can shape the frequency response to the desired bandwidth, and embody most of the receiver's gain. In order that the input port shall be capable of coping with large unwanted signals without distortion of the wanted (probably very small) input signal, careful attention must be paid to mixer circuit design, and to the relative levels of F1 and F2.

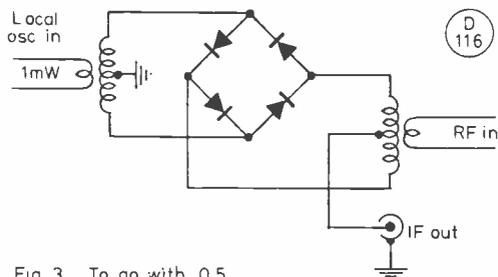


Fig 3 To go with Q5

A good mixer circuit with few components. Note how the diodes are connected—not like a bridge rectifier! The diodes should be matched or, preferably, hot-carrier diodes. Note the high injection at the local oscillator input—this is important for best response and good overload characteristics. This mixer will have a few dB of insertion loss and should be preceded, above 144 MHz at least, by an RF stage.

Qu. 6. Fig. 4 (overleaf) shows the circuit of a low-power transmitter for use in the 144-146 MHz band. (Ed. note: Our Fig. 4 is in fact Fig. 1 of the examination paper itself).

(a) At what frequency could the oscillator operate, and how is this converted to 144 MHz?

(b) What modes of emission are available?

(c) What method of speech modulation is employed?

(d) State the type and impedance of a typical microphone suitable for use with this transmitter.

Answer 6

(a) The oscillator is a harmonic type, using the crystal in its parallel mode. Such a crystal may have a fundamental frequency in the 8, 12, or 16 MHz range; in the first two cases the oscillator tuned circuit could be at 36 MHz, and in the third at 48 MHz. Thus, the second stage would in the first two cases multiply by four and in the third case triple, to give the RF output transistor drive at 144 MHz.

(b) A3 telephony (double-sideband AM) and A1 CW.

(c) Audio from the microphone is amplified and connected to the base and the collector of the RF output transistor, modulating the RF voltages on those electrodes.

(d) A high-output, high-impedance crystal microphone would be suitable.

Qu. 7. With the aid of a block diagram describe the principles of reception of single-sideband suppressed carrier transmissions.

Answer 7

See Fig. 5. The receiver front-end is conventional and not shown. The IF output from the mixer is passed through an IF strip having gain, and bandwidth suitable for an SSB signal to fill the bandwidth, having steep sides (i.e. an IF strip having correct bandwidth and shape factor of 2:1 or better). This gives IF output to a mixer stage (often a so-called "product detector") into which is also applied an RF signal at the frequency of the suppressed carrier in the IF strip. The output of this mixing is at various frequencies, as discussed in Question 5 (q.v.), of which one is at audio and carries the intelligence; this is passed on to the audio stages while the others are decoupled away. (It is of interest to note that the "image frequency" of this detector is the opposite sideband which has been suppressed at the distant transmitter, and is in any case not passed through the IF selectivity, so that a double-sideband suppressed carrier is in fact received as a single-sideband one. If in such a circuit as we have shown, we connect the aerial in place of the IF, and adjust the aerial and local oscillator signal frequency in gang, we have obtained the simple homodyne or direct conversion receiver.)

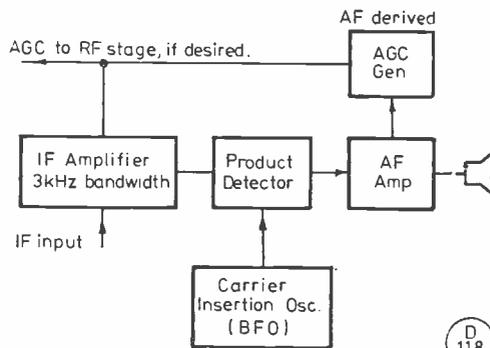


Fig 5 To go with Q7

The front-end of an SSB receiver can be conventional and is not shown. IF signals are amplified in the selective stages before going to a mixer ("product-detector") stage. The AF output goes through an amplifier and AGC may be audio-derived as shown. Carrier re-insertion is by way of the BFO, which is set to be at the "carrier frequency" when the signal is correctly centred down the IF amplifier.

Qu. 8. (a) What is meant by the skip distance of an HF radio transmission?

(b) Describe the part played by the ionosphere in this phenomenon.

Answer 8

(a) When considering an HF radio transmission which is being propagated by way of the ionosphere, there will be a short distance from the transmitter along which the signal can be heard by way of the ground wave. Once this is lost, there will be some—usually quite considerable—distance before the signal again becomes

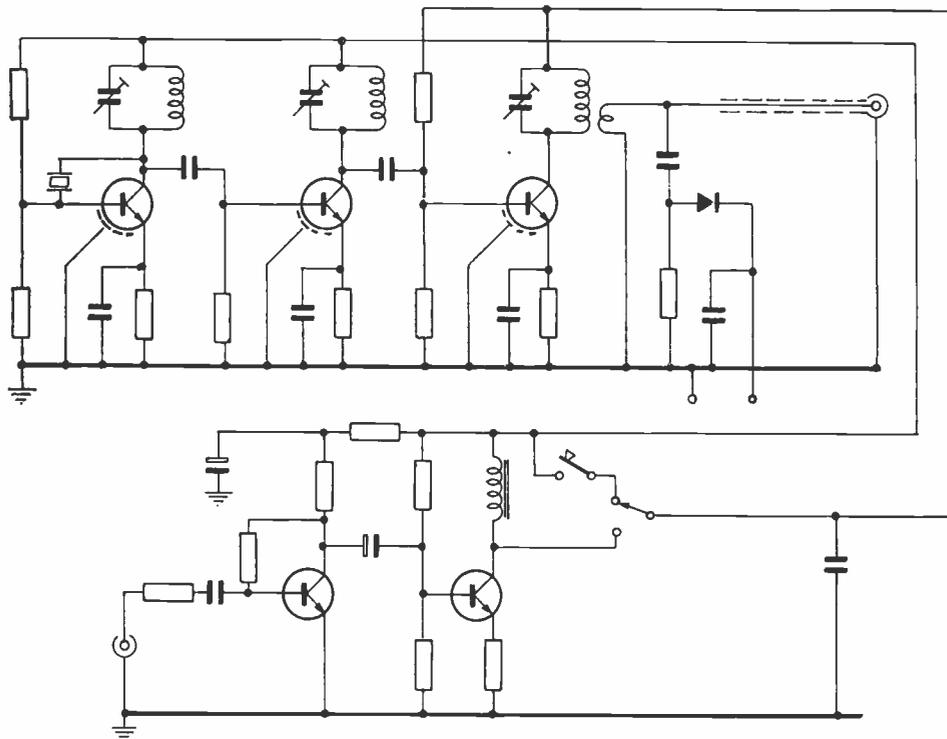


Fig. 4

This is Fig. 1 of the actual examination paper.

audible. This distance, between the end of the ground wave and the nearest point at which the sky wave is heard, is the skip distance. Since the ground-wave range is so small, the skip distance is often taken as the distance between the transmitter and the point of the first return of the sky wave.

(b) Above the earth's surface are several layers of ionised air, the ionisation being due to the presence of the sun's rays. In simple terms the lower D and E layers are only present in daylight and act as absorbers of signals, particularly at the lower frequencies. The higher F (or sometimes F1 and F2 when splitting occurs) are those where refraction of the signal path occurs, and here the ionisation is more long-lived, falling to its minimum just before dawn; when the F1 and F2 layers are both present (during the day) it is the F2 layer which refracts, otherwise the F. Thus, at low frequencies such as 1.8 and 3.5 MHz, ground-wave signals in daylight permit relatively local propagation by ground wave, the longer-distance contacts being confined to darkness paths. On the other hand 14, 21, and 28 MHz tend to be "daylight-only" bands, and indeed at low sunspot levels 28 MHz may behave purely as a VHF band for two or three years, 21 MHz be open only occasionally, and 14 MHz open most days but closing at dusk; 7 MHz under these conditions may show propagation under both dark and daylight conditions. However, when the sunspot count is high, 7 MHz behaves more like 3.5 MHz,

14 MHz becomes on occasion open for all the 24 hours, and 28 MHz open to East-West propagation on most days.

Qu. 9. (a) Describe ONE of the following aerial systems (i.e. aerial, feeder and tuning unit):

- (i) half-wave dipole
- (ii) half-wave folded dipole
- (iii) zeppelin
- (iv) loaded whip.

(b) Describe the polar diagram of the aerial chosen in (a) and state its advantages and disadvantages for use in an amateur station.

Answer 9

(Ed. note: Although we are commenting on each of the aerials in question, a candidate in the examination would not do so, of course.)

See Fig. 6 for a drawing of each aerial. The half-wave dipole will have a length of $468/f$ where f is in MHz and the result in feet, and its feedpoint impedance (nominally 73 ohms in free space) will lie between about 50 and 100 ohms at normal heights, falling considerably as the height drops below about $\frac{1}{4}$ -wavelength. It is in essence a balanced aerial and should therefore be fed either with balanced feeders of 50 or 75 ohms nominal impedance, or by coaxial feeder with a balun having a transformation ratio of 1:1 in impedance. The folded dipole displays a higher feed impedance—around 300

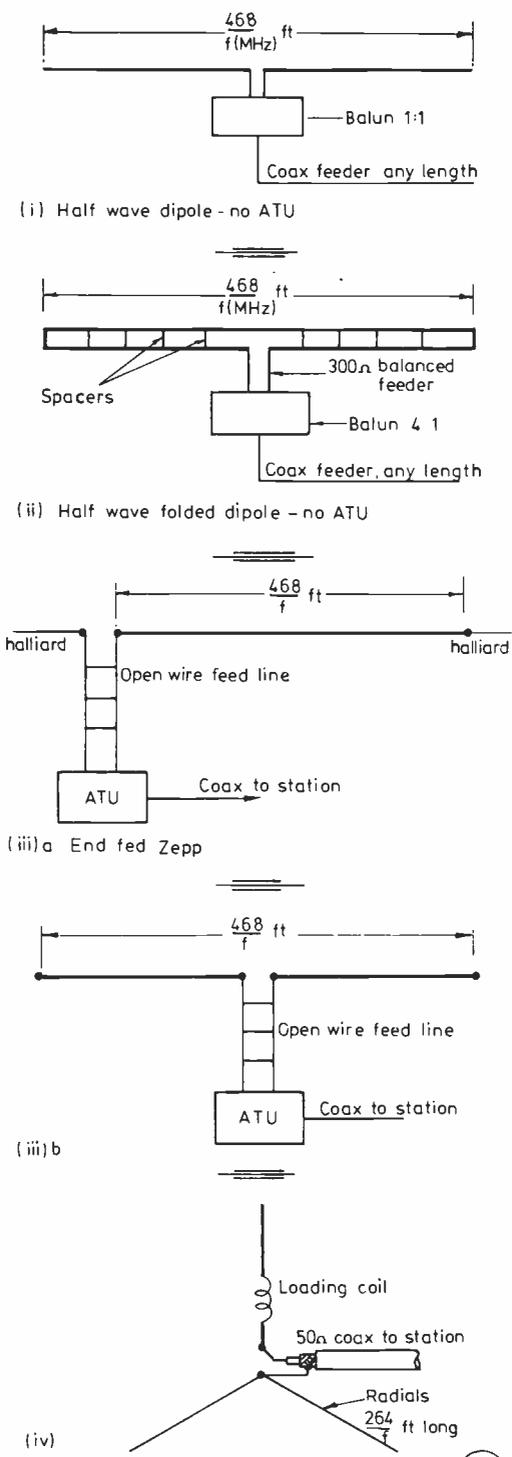


Fig. 6 To go with Q9

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Fig. 6.
 (i) Half-wave dipole—see text. (ii) Half-wave folded dipole—see text. Note that this aerial is made of twice as much wire as the simple dipole, shorted at the ends and spaced by spreaders. A short length of 300-ohm balanced feeder is shown, but in practice the balun in (i) and (ii) would be right at the "eye" of the aerial for mechanical strength. (iii) (a) End-fed Zeppelin. To set up, disconnect aerial and hoist feeders to final position alone. Load Tx into dummy load, then switch to ATU. Adjust ATU for maximum current in each leg with RF ammeter, and note the settings. Connect aerial slightly over length, hoist, check ATU tuning; trim aerial length until maximum current in feeders is at same ATU and Tx settings as already noted for feeders only. On other bands, tune for maximum and equal feeder current. (iii) (b) Centre-fed Zeppelin. Adjust ATU for equal and maximum setting of current up feeders. (iv) Loaded vertical. Loading coil should have enough inductance to make the aerial radial system resonant at desired frequency. If the upper section is an extendable whip use full extension for the LF band-edge, then shorten whip to resonate to frequencies higher up the band.

ohms in free space—and has a wider bandwidth than the simple dipole, which is of use on the lower frequency bands (e.g. 3.5 MHz) where a simple dipole may only cover part of the band with a reasonable VSWR. It is probably best fed with coaxial cable of 50 or 75 ohms through a 4:1 balun at the aerial feedpoint.

With the Zeppelin we come to an entirely different situation; the aerial may be made half-wave length and fed either (a) at one end, with only one feeder wire connected at the top, the other being insulated, or (b) at the centre; in either case, the feeder is operated with a high VSWR and is usually of open-wire construction. The presence of a high VSWR on the open-wire feed line makes the presence of an aerial tuning unit an essential (the first two types, as described, need no ATU). The trade-off is that, against the penalty of high VSWR and the need for an ATU, the aerial system becomes a multi-band device, if the half-wave length is chosen for the lowest band in use; indeed a 3.5 MHz end-fed Zeppelin aerial can be used on 1.8 MHz by shorting the bottom of the feeders and operating it as a Marconi aerial against earth. Reverting to the Zeppelin properly fed, either at the end or the centre, it will almost certainly be found that the feeder length will need to be "trimmed" to some degree if a multi-band aerial tuner is used to make this aerial operate on five or six bands.

The loaded whip is, in essence, a shortened version of the quarter-wave Marconi aerial, used in conjunction with a ground connection to provide the "mirror image" which completes the aerial. The aerial is at ground level (or, if elevated is used with quarter-wave radials to simulate the earth connection) and so is rather prone to pick up man-made interference which is usually of a vertically-polarised nature, as well as suffering from absorption of the signal in surrounding brickwork and buildings; again, the vertical is very apt to suffer from "rain static" as compared with a horizontal aerial. On the other hand, it requires a much smaller investment in real-estate to set up, and as will be seen below, has a different polar diagram.

(b) Assuming the Zeppelin to be of half-wave length, either centre or end-fed, the first three aerals will have a polar diagram as shown (Fig. 7) in plan. A three-dimensional polar diagram may be imagined as a doughnut with the aerial element in the hole in the middle and poking through at each end. The loaded vertical will have an all-round polar diagram in plan, the dimen-

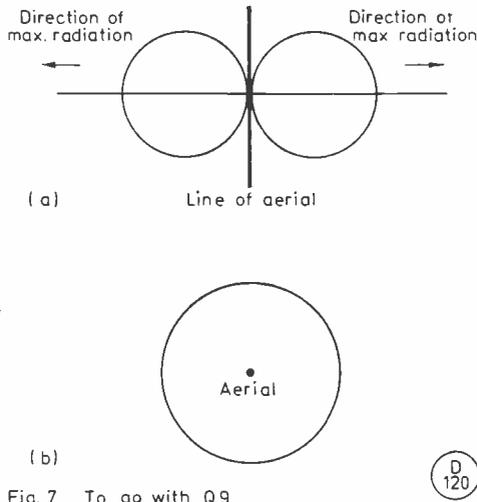


Fig. 7 To go with Q9

(a) Polar diagram of half-wave dipole, folded dipole, centre or end-fed Zeppelin aerials. This shows direction of radiation strongest at right-angles to the aerial. Angle of radiation upwards is a function of height of aerial. (Note: with Zeppelins some distortion due to feeder radiation is likely.) (b) Polar diagram of loaded vertical shows equal radiation all round.

sions of which relative to the polar diagram of a full-size Marconi will be smaller by a factor which represents the loss of radiating efficiency in the loading coil and the lack of length. The all-round pattern still bears a relationship to the doughnut, but this time we may imagine it slit right through, the lower half being the "image" in the ground of the upper half, with the aerial sticking vertically out of it as before.

Qu. 10. (a) Describe the use of a cathode ray oscilloscope for:

EITHER (i) Monitoring depth of modulation of an amplitude modulated wave (including over-modulation) OR (ii) Monitoring the keying waveform of a Morse telegraphy continuous wave transmitter.

(b) Why is monitoring advisable?

Answer 10

(Ed. note: we answer both parts of the question here; the candidate will of course not need to do so, only to answer his chosen alternative.)

To "look at" an amplitude-modulated signal on an oscilloscope one can use various methods. Perhaps the simplest requires an oscilloscope with a "Y" amplifier bandwidth a little greater than the frequency in question. A sample of signal is collected and injected into the "Y" amp. input terminal through a 10:1 isolating probe—a convenient method is to fit an extra terminal on the aerial matching unit, with a wire from its rear taken to be close to the coil as a pick-up aerial so that the 'scope does not detune anything. Setting the time-base to repetitive sweep at a convenient speed and talking into the microphone will result in the modulated RF signal appearing on the trace; adjustment of controls and of the pick-up will enable a good trace amplitude without overloading the 'scope. Over-modulation will be shown up instantly by small bright patches along the centre-line of the trace where the modulation has "broken the carrier.

To look at the CW waveform with a 'scope one can use the method already outlined; it may be better to use a triggered timebase rather than a repeating one if such is available. An alternative is to pass the signal from the pick-up terminal through a suitable diode probe, and apply that to the "Y" amplifier input terminals of the 'scope. Set the transmitter to its CW condition, and plug an electronic keyer into the appropriate socket. Set up the speed of the keyer suitably, and run off a string of dots the while locking the trace. Once it is locked, in either case the shape of the dots should show a "rounding-off" of the square wave form at the corners but no tendency for the dots to "run into" each other when the keyer is sending dots at the maximum speed it can sustain.

The diode probe method is also applicable to AM signal monitoring and should be used whenever the 'scope does not have bandwidth to cope with the RF band frequency.

(b) Monitoring is always advisable in practice, in that there is then no reason why a problem on the outgoing signal cannot be noted and dealt with before it can become a nuisance to others or contravenes the terms of the licence. In addition, when keying and using the diode probe, one may often be able to spot mild parasitics in the PA stage; there is not enough feedback to sustain them, but at transients the waveform seen will become blurred, the leading and trailing edges of Morse dots being a perfect example and easiest to examine.

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SHORT WAVE LISTENER
FEATURE

By Justin Cooper

NOWHERE is it as true as in SWL, that "one man's meat is another man's poison." One SWL will insist on general-coverage, another on amateur-bands only, a third will have no interest in anything but the broadcast bands; and the fourth may not be interested in any of the hobby save in the fact that it enables him to hear a language as spoken by a native user, so he can correct his own pronunciation and improve his fluency. All these are listeners—and they don't even take into account the faction who are constructors and often only listen to a receiver when it is completed or to compare it against a standard, or to while away the time listening to the local net while the tin-snips and the soldering iron are doing their work.

Talking of home-brew, one can extend the description to the work of *J. W. Grice (Castleford)* who seems to have finally extracted the gremlins from his dial-drive; this allows him more time for playing with aerials, in which he is most interested. On a different tack, in his letter Jim mentioned that Ken Whiteley was in hospital; let us hope he is fully mended by the time this comes to be read—best wishes from us all, Ken.

Next we have a letter from a happy amateur station, in the shape of *Dr. H. Sqaunce*, who is now G18OJG and doubtless getting to know and work all the locals in *Bangor, Co. Down*.

B. T. Mackness (Dagenham) has set himself a target of 1000 prefixes, at which time he intends to go out and buy a beam aerial—one way of stimulating progress when time is at a premium! Brian of course is still up to the eyes in studies, so SWL activity is pretty rare outside of holiday times.

That DX-pedition to Haiti was heard by *R. Towlson (Nottingham)* and queried. Perfectly OK, it was a gang of *W's* going to a rare spot with a view of "cleaning out" the winning trophies in the CQ WW DX Contest in the Phone leg.

On to *H. M. Graham (Harefield)* who is understandably rather pleased to have at last topped the thousand on the HPX Ladder. Maurice is a bit startled, though, at the number of *W, K, N* and *AA* calls about, followed by only two letters. The main reason is that those who have held a call for a quarter-century over there can apply for a two-letter call. Of course there were more applicants than calls, so the FCC has had to open up the *N* and *AA* series to keep them all happy! It is quite a thing, and there is even talk of listing them all up in a special call-book so we can tell who is who; for instance N4XX is W4UMF as used to be (Ted Cohen the forecaster of conditions). Not too surprisingly after the time he spent on Ten and Fifteen, Maurice reckons that the 14 MHz band was not its usual self—most of the savvy chaps had gone HF!

K. Kyzor (Irchester) seems to have had a good month, with some 85 new ones to add to his tally—but we have to deduct one, for a "G17RG"—possibly a leprechaun, but not a properly licensed one!

R. Griffiths (Ventnor, I.o.W.) only writes in when he is

on the sick-list, at home with time to spend on SWL; which doesn't stop him having an AR88D, an Eddystone 840C, a 640 from the same stable, and a Heath "Mohican," plus VHF converters from T.W. and Microwave Modules, and an NR-56! For 144 MHz the aerials are an eight element Yagi, plus a 4-ele. vertical, and an eight-element broadside array. Bob is also interested in SS/TV the *cheap* way, having been scared out of his wits by the price of commercial gear! Anyone with some "gen" please pass direct to your scribe; he also has a mild interest in the subject and the same feeling about costs. There is of course the possibility of using a SS/TV adaptor for use with an ordinary 'scope, but the problem here is that unless it has a tube which is available with a P7 phosphor you can't get to see the picture, which means you have to improvise a camera on the oscilloscope using black-and-white Polaroid film, developing as you transmit your own tape. With the price of Polaroid film that seems a good way of spending more money, but no doubt one could hook up something which will cut down the cost by using separate segments of one piece of film.

D. W. Waddell (Herne Bay) wants to know how he can do measurements on aerials without a transmitter. This is not too difficult but will *always* result in some radiation from the aerial. Instead of the usual type of reflectometer or VSWR indicator left in line while transmitting, the SWL has to turn to much more sensitive devices: one useful device is the noise bridge. The recipe is simply to take a Zener diode and work it on the noisiest part of its characteristic; amplify the noise with a transistor or two until you get more than enough noise up to the highest frequency in which you are interested. This noise is then used as the excitation to a bridge of which two arms are the centre-tap to either end of a low-value carbon potentiometer of the best quality you can obtain—a cermet pot would be far better. Of the other two arms, one is provided by a resistor (you may switch two or more ranges) and the fourth by the aerial under test. The sensing device is the station receiver. If you set things up, you will find that the noise will give you an S-meter reading or you might use your ear; just twiddle the pot until the noise dips down, hopefully to almost zero, and there you are. Clearly then, if you have a reasonable stack of metal-oxide or a high-stability (*not* wirewound) resistors which can be measured, they can be used to provide a series of points for a scale to be drawn around the knob of the pot. The scale should certainly hold good to around 30 MHz or better, the quality of the null being best if there is little or no reactive component. Another such useful device is an "antennascope" as described by W6SAI in his *Beam Antenna Handbook*, this being usable with a GDO as excitation, provided it is done with care.

Despite all he has said in the past, *A. Glass (Plymouth)* still has to put in a score—he's hooked! Seriously, for Bert it was a great pleasure to hear 28 MHz showing up just like it used to—well, nearly! Certainly it is quite a long time since we have heard North Americans active

on Ten with any frequency.

There seems to be quite an upsurge in amateur activity in *Bangor, Co. Down*, as is demonstrated by *R. Evans* who has a SR-550 receiver which doesn't work on 28 and 21 MHz, although it covers the American 6-metre allocation, and all the lower amateur bands. For an aerial, recourse is made to G3KHC's aerial shown in the January 1977 issue of *Short Wave Magazine*, but considerably modified; it is found to be much better than the old end-fed 60-footer which was used previously. At the moment SWL Evans is in the R.A.E. class locally, so we wish him the best of luck.

E. W. Robinson (Bury St. Edmunds) found a good 'un in VK1FT in Canberra; his first VK1 since he started into the SWL game back in 1968. Another one of interest was CT501AL, claiming to be some sort of special prefix but receiving the frozen mitt in answer to his CQ calls. He subsequently disappeared and was not heard again; probably a pirate disappearing to think up a more enticing call!

Enclosed with *E. W. Robinson's* letter was one from his son, *D. A. Robinson (Felixstowe)* who has an AR88D, used with an end-fed wire or dipoles at HF, and as the tunable IF for a two-metre converter. The beam rotator is made of the tuning drive out of an 1155, which is turned by a worm-wheel which in its turn is driven by a reversible 110-volt motor; indication is by a linear pot driven from the "works" and having its output fed to a one milliamp meter for direction indication. All good stuff and a lot cheaper than a commercial job. Incidentally, reader *Robinson's* HPX list must be unique in that it includes the call of his employer!

A particularly satisfying time for *K. Burch (Plymouth)* in that he heard 9L1SL in the CQ WW contest—Ken is one of the smart lads who realise just how many people try for a top award by going to some rare location as a first step. The query about the *N* callsigns we have already mentioned.

That CT50 call mentioned earlier is also mentioned by *Gerard Brazil (Dublin 11)* who copied it as CT50/1AL, and also found a CTOUA. Like us, Gerard also wonders!

K. Rogers (Ullesthorpe) has been listening on 21 and 28 MHz, activity which has caused him to hear his first /AM station, and also to hear Russian stations using the R series of prefixes, *RA*, *RB* and so on. Ken finds it a little startling that 28 MHz should be regarded in Russia as part of VHF. A good point, but of course it is true to say the border line between the areas of MF, HF and VHF (3, 30 and 300 MHz respectively are the upper limits) is an arbitrary one; it is also true to say that for most of its time, 28 MHz behaves in a manner more typical of VHF than HF.

Another supporter of the idea that there should be some articles on modifications to the 9R59 series of receivers is *H. A. Jones (Dartmouth)*. Harry is a pensioner and doesn't get about any too well, which means his AR88LF is too heavy for him to pull about for re-alignment even if he had a signal generator, so he has to stick with his 9R59DS. Harry knows a bit about the practical side of things, having started with his father in the crystal set days, progressing through various kits, and he would like to hear of any interesting articles on this receiver. One of the snags about such a definite request as this is that one has to find someone who

knows the receiver, has done some useful mods., and then is game to write it up for everyone's benefit. However, if your scribe might interject a word here (from the point of view of a professional engineer who has spent half a lifetime in the design field), he would strongly advise a mite of caution. For example, an article is recalled in which a change of front-end from a 6BA6 valve to an EF183 was offered: one questions whether such a modification would in fact do more than to significantly down-grade the receiver performance, from even a cursory examination of the characteristics of the two types. Again, the addition of a further IF stage, while practicable, is a good way of making the receiver have a lower performance. The only time when any significant modification to a receiver is justified, is (a) when the IF selectivity is lacking and a crystal or mechanical filter can be found to install without too much pulling-about of the works, and (b) if (and only if!) extreme sensitivity is wanted for copying the *Oscar* downlink on Ten, to use a low-noise pre-amplifier, provided the band is closed to anything in the nature of a big signal. An outboard front-end attenuator is of help between the ATU and the receiver, stabilisation of the valve heaters and the HT (either crammed into the receiver, or preferably by taking the PSU out to a separate case); and, most important of all with any valve receiver, a few judiciously-placed holes in the bottom of the case, in the chassis and in the top of the case, as an exercise in getting the whole works to stabilise more quickly and at a lower temperature. Just recall that hot air rises, and ask yourself how does the hot air accumulating under the chassis of a receiver get away—it doesn't, it just heats up all the metalwork, which in turn causes all sorts of funny things to happen.

P. Rooney (Chester) seems to have surfaced after his lay-off, starting with a bash at the CQ WW Phone contest, during which he had a ball on Ten on the Sunday morning. KA6KN, heard at 0908 on the Saturday morning, was the only Far East signal and was suffering from a definite "echo" effect while working Europeans. One would guess that the most likely cause of this was that the signal was being heard at a half and then one-and-a-half times round the world; the simultaneous short and long-path reception theory is hardly tenable if only because of the distance; it would be interesting to know

ANNUAL HPX LADDER

Starting date, January 1, 1977

SWL	PREFIXES	SWL	PREFIXES
D. W. Waddell (Herne Bay)	499	J. W. Grice (Castleford)	383
S. Hammond (Solihull)	499	G. Brazil (Dublin)	341
D. Hill (Crawley)	499	L. Stockwell (Grays)	340
R. E. Thomas (Corwen)	484	G. M. Parker (Peaslake)	331
M. Law (Chesterfield)	477	B. Shepherd (Staines)	305
D. L. Mallet (Maidenhead)	451	M. Turner (Luton)	282
K. Kniveton (Kingswinford)	448	Mrs. S. Waterfall	
G. A. Passmore (Pembroke)	445	(Chacewater)	277
Dr. H. Squance		S. W. Allsopp (Banbury)	270
(Bangor, Co. Down)	445	R. Evans	
K. M. Rogers (Lutterworth)	438	(Bangor, Co. Down)	262
K. Linge (Willington)	415	P. Q. Armitage (Amersham)	205
K. Piper (Bognor Regis)	386		

Starting score 200, in accordance with HPX Rules. All Prefixes to have been heard in 1977. The March issue will be the last showing of the 1977 Table.

if someone heard him around this time on a beam, which would prove or disprove the hypothesis.

S. M. Phillips (*Dukinfield*) enquires whether a PA station heard counts as a new one because he was using the suffix/J—presumably a Jamboree-on-the-Air station. Sorry Stuart—that would involve a very definite bending of the rules, and would set a rather hairy precedent.

Another query to do with HPX comes from H. A. Londesborough (*Swanland*) who opened his copy to find his CW score updated but not the Phone one—shame on us, let's hope we get it right this time!

On now to K. Kniveton (*Brierley Hill*) who has been enjoying all the goings-on on 28 and 21 MHz; he comments on how useful the Geoff Watts Prefix List is for any keen SWL. We couldn't agree more: and the layout, which leaves room for additions for a long time to come, means that a copy can be falling to bits before its usefulness is past, if you keep it up to date.

The Old Maestro, S. Foster (*Metheringham*) and his 9R59 are still at it; when he got back from Leicester (where we never did get round to that natter over a pint we tried to organise!) he spent the next day DXing in the CQ WW Contest, for seven new ones in the day. One small correction Stew points out, is the IK prefix which is being used by any and all the I stations as a special to mark the ARI 50th anniversary between September and December 1977.

A couple of queries from P. Ramsay (*Stevenston*), of which the first is how to send a QSL to VP8PL—try sending it to VP8PL, Stanley, Falkland Is. The second is the question of a S-meter for the AR88D which will work on SSB. Clearly the one in Peter's receiver is not the original, and it may not even be in the original circuit—albeit a check of the wiring would soon show that, if a handbook for an AR88 (not a D or an LF) is to hand; neither the D nor the LF versions had a meter fitted originally. In this case, Peter says his receiver meter was specified as a five milliamp one, connected in the first IF cathode, but he has a 300 micro-amp one with the zero at the "wrong" end of the scale, so if he is using it in the standard circuit it must be shunted by something. Anyway to come to the point, when these older receivers were built, AVC was available by looking at the carrier level, and so meters which responded to the AVC line did all that was required of them. With SSB we've thrown it away at the carrier and put it back with the BFO—so the S-meter only tells us the strength of the BFO, which isn't a great deal of help! The answer is to use some form of audio-derived AGC of the "hang" type—a good read through G3VA's "Amateur Radio Techniques" would provide much food for thought. Perhaps the easiest thing to do would be simply to leave the existing AGC components in place, disconnecting the line from the AVC diode at the switch; then the new AGC circuit could be built up on a tiny bit of *Vero-board* (if you use *npn* transistors the "HT supply" could be taken from across the output stage bias) and take the output of the new audio-derived AGC to the place on the switch just rendered vacant.

G. Passmore (*Stackpole*) built Dr. Sqaunce's ATU as described in the July issue of the *Magazine*, but was somewhat surprised to find that "my JR-310 doesn't like it at all!" Don't blame the receiver, rather go through a routine of tests to see what happens. Grayham

HPX LADDER

(All-Time Post War)

SWL	PREFIXES	SWL	PREFIXES
	<i>PHONE ONLY</i>		
K. Kyezor (Irchester)	1866	D. Taylor (Harborne)	821
S. Foster (Lincoln)	1657	J. Aspinall (Leeds)	807
R. Shilvoek (Kingswinford)	1600	P. Rooney (Chester)	764
B. Hughes (Worcester)	1554	K. Towson (Nottingham)	709
R. Carter (Blackburn)	1510	M. Gibson	
S. Fitzgerald		(Barrow-in-Furness)	661
(Gt. Missenden)	1486	S. T. Bowen (Kippax)	641
K. A. Whiteley (Castleford)	1380	I. Wilkinson	
M. J. Quintin		(Llandudno Junction)	636
(Wotton-u-Edge)	1373	P. L. Shakespeare	
P. C. Jane (East Loos)	1352	(Foulness)	616
H. A. Londesborough		S. M. Phillips (Dukinfield)	573
(Swanland)	1264	M. Shaw (Huddersfield)	557
A. W. Nielson (Glasgow)	1245	D. A. Robinson (Felixstowe)	545
E. G. Robinson		J. G. Ollis (Solihull)	522
(Bury St. Edmunds)	1220	K. A. Burch (Plymouth)	517
M. C. P. Bennett (Datchet)	1179	P. Ramsay (Stevenston)	503
J. H. Sparkes (Trowbridge)	1125		
G. Ridgway (Ardleigh)	1105	<i>CW ONLY</i>	
Mrs. J. B. Jane (East Loos)	1081	N. A. Pnelps (Devizex)	1395
H. M. Graham (Harefield)	1014	A. Glass (Plymouth)	1338
P. Barker (Sunderland)	954	H. A. Londesborough	
M. Rodgers (Harwood)	943	(Swanland)	1058
B. T. Mackness (Dagenham)	876	J. H. Rosling (Bakewell)	547
W. H. Smyth (Hartlepool)	861	A. F. Roberts	
S. Budd (Worthing)	848	(Kidderminster)	465
L. Gibson		P. L. Shakespeare	
(Barrow-in-Furness)	828	(Foulness)	378

Minimum score for an entry 500 for Phone, 200 for CW. Listings in accordance with HPX Rules and only include recent claims. A "Nil" return is permissible to hold a place.

has already done the obvious and checked his wiring and layout, so one is left either with the operator or the aerial in use. It must be said in all fairness that there could well be an aerial length that just won't perk on one band or another. Ideally in such a situation, you can put a transmitter on it, a reflectometer in the lead to the rig, plus a tuned RF field-strength meter for luck; then you can keep a note of each of the settings. In this case, one can probably attack the problem best by using a GDO as the signal source, coupled into the "receiver" terminals of the ATU, and a field strength meter tuned to the proper band. The first check is to see that the F/S meter is tuned to the same frequency of the GDO by bringing it near enough to the GDO coil to get a deflection (and while you're about it, check that the GDO signal is in the band, somewhere near the middle). Now plug a length of coax into the receiver socket of the ATU, put a one-turn link on it, and couple the link to the GDO; connect aerial and earth to their proper terminals. Next systematically go through the combinations of setting until you begin to see a reading on the F/S meter (and probably a dip in the GDO to a greater or lesser extent). Make a note of the settings which give the best results at mid-band also at the band-edges, always checking the GDO with the receiver to see that it doesn't "pull" too far. Repeat for each band. If you aren't sure, try for the centre of one band, and then check with a receiver. It must not be forgotten that, for instance, the pi-network is essentially a *low-pass* filter, and so in some cases the ATU may seem a bit "flat" on the LF side of the peak, making it not so easy to tune—which doesn't detract from its usefulness! J.C. must admit that even though he has the settings all written on the cover of his log, his normal tune-up procedure is always to offer the ATU to the transmitter RF, and only then to start listening in earnest. Just a last work on Grayham's letter—"Listening on

two-metres is the best incentive to pass the Morse test!"

Our next "newcomer" is ex-G3BVW, QRT since 1948, retired to *Okehampton* after 37 years in the Royal Air Force; *C. P. Townley* started as an "untrained Wireless Operator" and ended his time as Flight Lieutenant in the Electrical Engineering Branch. So—he knows a bit about the technical stuff and knows his Morse, we guess! As he has been out of action since 1948, the first move was to drag out the old faithful AR88, and tune around the CW and SSB bands to see what it was all about; lots and lots of CW Russians were found, SSB /M stations of almost unbelievable signal strength, and a range of commercial gear that he finds quite astounding, the more so when he thinks back to his old B2 transmitter and CR-100 receiver. Pat is now wondering what to do about a new, first-class, receiver and we would strongly suggest that rather than obtain a general-coverage receiver, he goes for something amateur-bands-only, keeping the AR88 for the general-purpose type of listening—if only because a good AR88D is as good as most modern receivers if it is in good nick and properly driven. A classic design in fact, as can be noted by the very few articles offered on the modification of them.

A. Cuthbert (Jarrow) has a long letter full of questions (and interest too!). He has an Inoue receiver, and seems to be having a little trouble in sorting out some snags with it; and we suspect from the way he words his letter that the problem is the old one of how to obtain best results in worst conditions! On the big signals, one can drive most modern receivers almost like a BC set on the medium wave; however, the "noise floor" of the receiver is very largely determined by the even bigger ones which are outside the passband but near enough to ride through to the first mixer and big enough when they get there to upset its operating conditions. This having been achieved, every signal hitting that mixer will be mixed with every other one, and the result as far as the IF strip is concerned will be just plain noise: in other words, we have lifted the noise floor to an artificially high level. The practical answer is to cut the AGC if it is on, wind on the audio gain to somewhere very near, or at, maximum and control the receiver gain by way of the RF/IF gain control, always keeping the latter at its lowest level. In the past year or two, we have been saying this mainly in terms of the LF Bands, but as the sunspots increase, so will the megawatt broadcasters be flooding upwards in frequency, so bringing the problem right on to our doorstep even on the 14, 21, 28 MHz bands. The other main question is that old one of indoor aerials. Yes, they all tend to be very much affected by metal frameworks in buildings, and indeed most people regard a metal-frame building as just about impossible.

Now to *D. L. Mallet (Maidenhead)*, who has an FRG-7, used with a home-brew 14 MHz beam and a long-wire for the other bands; he also has a two-metre converter. Interest of late has grown in the idea of having a look at 80 and 160 metres, and hence in aerials for the band, and earthing systems. Taking the latter first—as much wire as you can bury, with the choice tending towards lots of short ones rather than one or two long ones. While you're at it, you can bond any wire fences to the earth system, and anything metal in sight! However, it should be noted that every soldered joint outside is subject to the possibility of *electrolytic corrosion*, and

should be well coated with some protective such as *Bostik* or *RTV* silicone rubber to prevent this; when it occurs, it manifests itself as an increased noise level in the receiver long before you have mechanical failure. As for the bit up in the air, one is usually stuck with a Marconi-type, which in effect means an overgrown mobile whip, as high as may be, and loaded at around the centre to get it on frequency.

For *B. Hughes (Worcester)* the last few weeks have been a pleasure, with his favourite 21 MHz band really doing its stuff—all *W* call areas, and just about all continents with the exception of Africa—but that omission was handsomely rectified on Ten, where they were prominent. On 14 MHz Bernard now has a score of 325, of which some 310 are confirmed—not a bad state at all!

"Curses on postage-stamp gardens!" says *Dave Hill*, of *Crawley*, having had to "chat up" some four neighbours in order to get a 132-foot wire out, which he couples through at ATU. During the CQ WW Contest, Dave heard various odd prefixes, and he notes how the Russians are using the *4J* prefixes for contest entries. It's a good scheme for a contest station to have a "different" call; and while the Americans can fairly easily do this by a trip into the Caribbean or up to FP8, the Russian contest groups haven't anywhere quite so easily accessible, so they opt for a change of prefix plus a shift into one of the less populated parts of their enormous country.

M. Shaw (Huddersfield) wonders why he isn't shown in the November HPX Ladder—but he is, at 419 in the 1977 Table, his score for the November entry to take him to 508 not having surfaced at this end. So this time we are accepting his 508 for the moment, plus another 48, less a deletion of the YU3/X (not a different series, just an ordinary YU3) and his EB9, which we reckon is a mis-copying of something or other (and not a contest call) to give him a nice round total of 555.

The Rest

This is where we acknowledge letters which have not been singled out for mention in the piece, or scores sent in without comment—which is not to say that we haven't read them all with interest: we have—as always. So, thanks to *J. H. Rosling, Bakewell; L. Stockwell, Grays; B. Shepherd, Staines; M. J. Quintin, Wotton-u-Edge; D. Taylor, Harborne; H. A. Londesborough, Swanland; R. Elwyn Thomas, Corwen; M. Shaw, Huddersfield; M. Law, Chesterfield; N. A. Phelps, Devizes; M. Roberts, Harwood; I. Mackay, Dingwall.*

Finale

It will be near to January by the time you come to read this, so your letters for the March "SWL" piece should, if you are still on the 1977 ladder, contain your closing score up to December 31, 1977. Then if you haven't made it into the All-Time, put that score to one side and make a start for 1978; and if you concentrate on the search for new ones you can enter your 1978 list, while piling up the Prefixes for an All-Time entry as soon as you have the 500 up. But of course we can't accept an entry in both 1978 and the All-Time, unless maybe you are putting an ATPW CW list in—which we would like to see happen. The deadline for next time will be—don't laugh—Friday, January 13. The address of course, as ever, "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

IN view of the increasing amount of interference to our signals by man-made noise, it will be of interest to readers to note that new legislation covering RF Interference (RFI) will become law by the end of May 1978. The relevant directive is contained in the Official Journal of the European Communities, Vol. 9, No. L336 (76/889/EEC) dated December 4, 1976. Article 1 states that the law will apply to "household appliances, portable tools and similar equipment" while Annexe 1.1 also adds "office equipment." The relevant BS-800 is understood to be updated, and at this moment your scribe is awaiting the arrival of a copy. We also note that a directive covering industrial, scientific and medical equipment is being considered. Limits are given for conducted interference between 150 kHz and 30 MHz, and also for radiated interference in the range 30-300 MHz. This being so, it is strongly recommended that readers get a look at BS-800 in its revised form and wave it around the local radio, TV, and 'white-goods' dealers, also making quite sure your own neighbours know about it and buy only goods that comply. It might also be added that, if only because he stands to gain so much from it, the licensed amateur would be well advised to look at his own rig with a view to cutting down unwanted radiations, whether it be commercial or homebrew.

The Bands

Like the weather—wintry. On the other hand, the sunspot count is most definitely up, so things are better than they were this time last year, at least on the HF bands.

Let's make a start with *Top Band*; and of course what better way than by going through W1BB's *Bulletin*?

"First-Timers" this year should note that the first ten minutes of every DX-er's hour are reserved for the chaps who have not yet "made it" over the Atlantic, in either direction. Europeans 1825-1830 kHz,

W's 1800 to 1807 kHz. So—try a call, and then listen on the other side. Slipping sideways to W1WY in this context, Frank's "Contest Calendar" this month asks the writer to request all G's playing in the Transatlantics or, more particularly in the CQWW Top Band affair, to *indicate the frequency on which they are listening*—nothing so annoying as hearing good DX and not knowing where the chap is listening! Yes, we know, "old hat" to the regulars but in every year there are some more newcomers. To come back to W1BB, we notice that this year the KH6 chaps have 1800-1810 kHz in addition to their lump at the other end of the band. Those who have been on Top Band a while will recall W1TX, Roy, who joined the ranks of Silent Keys on July 11. Three weeks before his death from cancer, Roy went up his tree, cleared away some of the branches, and returned to take photographs of his tree aerial—a vertical, using radials at the bottom, and the loading-coil wound on the tree-trunk as a former; with luck we should be able to run the picture and the schematic drawing next time out.

It is of interest, noting W1BB's *Bulletin*, to read that it is reckoned K1PBW, Ernie, who has given so many G's their first contact, is at this moment probably the possessor of greater DX capability than any other station, taking into account his two phased verticals with many radials, his quiet location, miles away from the man-made noise, and having six Beverage aerials for reception. WA1RFM/VP9 and W4EV/VP9 live within 300 feet of each other, so they have organised themselves a common aerial; a vertical complete with an adequacy of radials, plus coaxial cables to each shack, and suitable relay change-over arrangements, so that either can use the beast while the other is otherwise occupied. A fine idea indeed!

It seems G8PG must have touched a spot with his piece on trees as aerials (*October issue*);

we have already mentioned the W1TX effort, and now we have a letter from G3BRL (Chesham), who found the article "rang a bell" and began searching. Eventually he traced the memory down to "The Radio Experimenter's Handbook" published in 1922 by the Wireless Press, where P. R. Coursey—a name so familiar to anyone who has studied the history of our pursuit—writes up some notes on a US Army Signal Corps series of experiments along the same lines as those we mentioned in G8PG's article. And, surprise, surprise!—two pages earlier that same book discusses the germ of the GM3RFR Broomstick antenna (*November issue*)!

"CDXN" deadlines for the next three months—

February issue—January 5th

March issue—February 2nd

April issue—March 2nd

Please be sure to note these dates!

G2HKU (Sheppey) seems to have been a bit more active than usual on Top Band, despite his other commitments; SSB yielded the regular sked contacts with PA0PN while CW accounted for OH1VP, DJ2RE, GM4GK, OL9CGL, YU2HDE, OK1BGW/P, OH2KA, OK1DDL, DJ6TK, 4U1ITU, GM3PFQ, GW3KOR, OK2BUV and OL8CGI. G4FUP (Horsham) had the domestic receiver die on him, so he was forced to use the Panda Cub plus TCS-12 receiver on the LF Bands; Top Band gave (during one of the contests some fifty stations in five hours) the calls so raised of DJ3ZX, F6CNI, E12BB, G13IVJ, and GM3OXX/A.

A report comes in from Colin Squires, G3XCS, who reports that he is handling the QSL's for his old pal Ian Forse, G4DHA, who is Radio Officer on MV *Tugela*, plying between South Africa and the Seychelles and QRV all bands 160 to 10, and signing ZS5IB/MM. That sounds like "possibilities" in the 160 context.

G8JHK has now successfully turned himself into G4FUU (Addington). For Top Band, the aerial has some eighty feet wrapped around in the loft, plus forty feet outside; the latter being rolled up and hidden away by day, and joined to the garden shack after dark. It has been quite reasonable on Eighty but a couple of days on Top Band resulted in contacts with G3XTZ, G4FGQ, G3TQD/A, G3YMC, GM3WTA, OK1DDS, DK5PD, DK4FM, OK5TLG, DL0JS, CW from a K.W. Vespa Mark 1 and received on a Yaesu FR-50B. Mole reckons that there must be hope even for people like him who live at the bottom of a valley; and old 'KFE agrees, in fact the best Top Band sites are almost always places where the ground is damp and the water-table high.

Eighty

G3KPO now has an eyrie perched high—300 feet—above Shanklin Bay in the Isle of Wight, and from there he has worked ON4TB who was using one watt for a 589 report; Douglas, however still has his 100 watts on the HF Bands, although he has QRP on VHF.

G4FUP says it was quite good until some idiot in the government put all the DX an hour earlier! However, the first Transatlantic contacts were made, to VE3AKG, N2DU, VE1DS, K8LX and W3SQ all on fifty watts of CW.

G2HKU seems to have been exhausted by his exertions on Top Band, because he just had enough energy left to dust off the top of the QRP machine and then fire it up for a CW QSO with SM7MS.

GI4FUM operated /A during JOTA, for the Ardnalvalley Venture Scouts and with some considerable degree of success overall; on Eighty we note SK7CL/MM, PA6RSN, PAOVST/J, HB9BAJ, OK1ONA, N2NT, K3UA and K2EL, all SSB.

Eighty isn't easy from the Shetlands, opines GM3RFR from his hideaway up at Baltasound, especially with QRP; nonetheless he is within sight of his target of 100 countries confirmed with five watts of SSB, there now being some 84 in the log of which 49 have QSL-ed. During the current period the band wasn't used much, and so Sam only worked G, GM and LA.

Our next reporter is G2NJ (Peterborough) who seems to be much more active now, using his HW-8 and sticking pretty closely to the noon period, when he worked GM3XNE who was under the double handicap of 500 milliwatts input to an aerial blown down by the gales(!), G2CP, GW5TW who, G2NJ says, is an expert at rigging-up QRP gear from the junk-box, G3URU who now has an improved aerial system, G3IVF, G3BWX and G4FJF, of whom the latter was the most powerful with five watts input. A QRO station noted was F6DJK, who spent a Sunday afternoon picking off the QRP stations one by one, and giving them much appreciated reports. Prize of the month, one supposes, must go to G2CAS though, out /P again with 100 feet of wire strung out between two trees by the river at Ilkley.

Eighty has picked up after a bad start, says G4DMN, who used his SSB to tangle with CT3AB, EA6BW, FP8DX, JX9WT, HR3JJR, IT9PWV, JA6BSM, J3AG, K5MS, K8UR, LG5LG, MIC, OB40 (an OA in disguise), OH0JN, OHONA, OY2A, PY2ELZ, PY2WAM, PY7BXC/0 (Fernado do Noronha) SJ9WL, UF6HE, VE2AUF, VP2VAT, W4EV/VP9, VP2MRJ, W7KW, WOMJ, OE6DK/YK, ZL4AP, ZL4OY, ZL4AV, ZL4QL/A (Campbell Is.), SM4EIG /4U, SH3KG, 8RIAG, 9HICE and 9Y4NP.

G3CED (Broadstairs) complains that his rig remains unused owing to business QRM—work was ever the curse of the drinking classes!—but he forwarded on the log from G4EVO who appears to have made a recovery from the state in which he was in last month in quite spectacular fashion, and, at 76, he is back happily punching the old key, fighting the QRM, and going after the DX with five watts to a Joystick. One gets the feeling that G4EVO only looks at Eighty these days as a substitute for the better DX to be found on the other bands—and if the log says what it seems to, he has tried all bands from 1.8 right the way through to 21 MHz with some fair amount of gusto. Thus, on 3.5 MHz it was very largely a matter of G's and Europeans, and a bare handcount at that.

Another one not to have worked-

over the seam that is Eighty is G4GIE (Gt. Moulton), but in John's case it is the very simple fact of working most of the time away from home during the week and finding many domestic chores to be done at the weekend.

Forty

7 MHz saw G4FUD getting over to the States on another band, W2QKN being the lucky chap; otherwise the only real activity was knocking off a goodly string during the OK DX Test.

It was SSB all the way for G2HKU, who talked to HP1XYA, and LU501, just to keep his hand in. Ted makes an interesting observation that in ZL the Poltava Thing seems to be a bit different from our home version—the gas-engine pounds away around 14270 kHz, at which it is several S-points higher than around the 14100-14150 area. Odd!

Up there in Unst, GM3RFR used his Broomstick aerial to some effect on Forty, and came up with G, GM, LA, SM, OH, DL, UA and UA9 with five watts of SSB.

Having flogged his heart out on Eighty and the HF bands, G4DMN (Wirral) had only a small amount of time or enthusiasm for 7 MHz, so that SSB with HP1XYA and VK5BC were the total contribution.

For G4GIE there wasn't a lot of interest in the band, but he did spend an hour there on one day, so that three DL types and an F6 were recorded for posterity.

Contests, Awards and Things

Don't forget our CCA Award starts on January 1, 1978; those counties *need* to be collected, if Top Band is to still be available to us in the years to come. On the matter of the "verifications," SWL Hill felt this to be a retrograde step, as he feels that few amateurs will wish to QSL SWL reports on this band. Of course they will—provided only that the SWL report is good enough to warrant a QSL, which means that having found his man, the SWL must stay with him and note those things of use to the recipient.

The DL AGCW Summer QRP Contest results are with us, from which we note that G3DNF was

TOP BAND/TEN METRES COUNTY/COUNTRY LADDER

November 1, 1976 to October 31, 1977

Call	TOP BAND					TEN METRES				
	AM	CW	SSB	Countries	Total	AM	CW	SSB	Countries	Total
GM3YOR	—	160	—	14	174	—	2	—	20	22
G4FJU	30	68	68	13	179	—	—	—	—	—
G4AEJ	50	30	12	6	98	—	—	—	—	—

Scoring is on the following basis: one point per county worked on SSB, two per county on CW, three per county worked on AM: two points for county AM/SSB QSO's, each end to score two points in the appropriate column for the mode used. No other cross-mode working permissible. Countries score one point each regardless of mode.

fifth, GM3OXX twelfth (but top scorer on 14 MHz), G3UYM 16th, and G3NEO 22nd (but top scorer on Top Band). The contest attracted the highest-ever number of entrants, with the best geographical distribution around the world to make it all the more interesting. For 1978 the Rules are unchanged, the winter one being slated for January 21-22, and the summer one July 15/16.

We seem to have contrived to miss the ARRL 160m. dates; but January 27-29 are not to be overlooked, this being the weekend for the CQ WW 160 Test, with Rules as last year.

However that one goes, we must now for a moment turn back to the 1977 Bermuda Contest, to note and congratulate G4CNY for being the winning G; VE3KZ was the winner of the VE section, the top W man was K2UR, and VP9IG the Bermudan winner.

Returning to the future and the French DX Contest (which is another to overlap the CQ WW 160) we notice that in the F Contest Rules, their entrants may use CW only and that on a spot frequency of 1825 kHz, so you can keep an ear on that spot during the Top Band contest. If you are in the Top Band affair, the two digits the F's will be sending after their call will indicate the department, of which there are some 95 "home" ones plus the overseas ones and French Territories.

Looking forward a little, we come to the BARTG Spring RTTY contest, from 0200z March 25 to 0200 March 27; this gives the Faithful a chance to drop a line to Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex with an SAE—a big one!—for a copy of the detailed Rules.

Ten Metres

First in the lists here is SWL Wittaker, brother of G3IGW and organiser of those ten-metre activity periods which did so much to keep Ten occupied during the sun's low. Looking at the October/November period, we find that the first DX signal to be heard was UI8FFF, around 0600. 0700 saw VK signals both in October and November, though oddly enough 0800 showed none; but UI8, UL7, UG6, VU2DK and OHOAC were all logged. By 0900 the VK's were back, joined by a UF6 in October and KH6IAA in November. 1000 saw SU, an OE signing /YK in October (while December adds AP2P and D4CBS). The going was then fast and furious until 1700, when we see 9G1JX, 8P6FV, CX4FG, 9Y4NP and HK3AXT in October but nothing of interest in November, while the next couple of hours was North/South contacts in October but nothing in November. It sums up as: all continents heard in October and November, and some 114 countries in 1977 using just the end-fed bit of wire.

G2ADZ (Chessington) monitored down at the CW end and found that during November Ten settled to a fairly consistent pattern, opening around 0900 and closing again around 1500 and, since Bill has dealt firmly with his gremlin he can work them again: W1-5, VE1CD, ZS6ME, UA9's, UJ8JCQ, UM8NNN, UL7AAQ, 4L6M, HC2SL, ZSIW, ZE1CB, VK's, EL2ET, VU2LO, C5AT, and varied Gotaways. Bill wants to know how to QSL C5AT, and it looks as though the correct route is to send them to OH2BFJ.

Only at week-ends has G3NOF (Yeovil) been able to have a turn round the band; in general he found EU in the mornings, with the

Americas after noon till closing time around 1600. Don made SSB

The shorter days meant that, like G3NOF, D4DMN was not able to try things during the week, but the week-ends offered A2CZV, K5DUT, K5OVC, OD5AQ, VK5NIT, VP8PC, VP8PM and 5B4EI.

GM3RFR managed Europeans plus ZS6 and PY, from his spot up in Shetland—and of course those of us down South should always remember the difference in the time of sunrise and sunset, which are a handicap, quite apart from the QRP SSB.

During JOTA, GI4FUM managed to find ZS6BNO on the first day, plus DL and YU; and from the home QTH there were contacts with WD5EEI, W5DU, W4QQN, KP4EFP, ZS1KZ, YU3TPM, I30BO and HB9BEI.

21 MHz

There has been over the past few months quite a flight from Twenty, some to Ten but most to Fifteen; and of course activity begets activity, making the band sound even livelier.

GI4FUM found short-skip on the first day of JOTA, G3AYO/A, G3SAD/A, G5YC, G6HH and GW4CSY/A; on the second day there were DJ6VM, OK3CFS, OZ2NYB/A, ZC4AJ, UA6LAX and IK5HTM. When the short-skip allowed GI4FUM/A picked out WIGG, W2AG, W3IJ, K4MSU, W5IO, WD9AXF, YB0ACP (apparently off the back of the beam), K2BSA (The Boy Scouts of America Hq. station in Nashville, Tennessee), H18JAF, 9Y4NP, VP2MJD, VE1MMM, VE3DFH, VO2WL, ZS1's ZS3BOY, Z54KSA, 9J2WR, and C5AAB. From home HR3JR, N8RA, HC1RE, ZF1SW, VP2M, VP2VDH, 9H4L, 9J31WR and KZ5AS—all on SSB.

GM3RFR has a phased vertical two-element array on this band, the feedpoint being some eight feet above ground, plus a $10\frac{1}{2}$ -wavelength vee-beam: so, disregarding the Europeans, there were VE1-4, W1-4, VP2M, YV, LU, ZP, EA8, 4Z4, JY, TR8, UA9.

Although it's not been quite as good as it was during the autumnal peak, it has still offered openings in the afternoons to the American West Coast. Thus G4DMN, who mentions contacts with HR3JJR, KG6JHW, PY8BXC/O, TJ1BB, VK5NIT (the N stands for Novice, incidentally), VK6HK and 4S7TE.

The band opens about 0830 with long-path JA and VK, turning round to the short path at about 0930 until noon. The Americans start about 1130 and continue till the band closes just after dark; VU's were noted among the later VK's, and a few Africans were noted in the mornings. Contacts were made to J3AH, JA1FRE, JA4MCS, K5EJC, N6VF, UK0AAB, VK2NAQ, VK2NHS, VK3NAC, VK3NBJ, VK3NCF, W0OEV (Colorado), W0OUX (N. Dakota), WA2UNO/MM, W5MLT and 4X4JU.

Now on to G4EVO, who seems to have had quite a time on the HF bands; it is amusing to note how the contesters nowadays never give any report other than 599—the last page of the log has no other report, and the last two QSO's were on 21 MHz with W1RM and K4RV.

G4GIE had a good run for his money on Twenty, but seems to have missed out on the 21 MHz DX, his QRP having only keyed with UA3EZ, LZ2KIM and UW1YY.

Ex-G2XC (Horndean) is the 21 MHz specialist, with a couple of W8JK beams up in the loft to enable him to really hear the stuff. The morning sessions don't seem to have been very rewarding or relaxing, and there have been very definite signs of the slide into winter conditions. Loggings include CM2RX, FK8CC, HK0BKX, TJ1BB, TK7GAS, who turned out to be an FG celebrating something-or-other, VP1AJ, 4S7TE, 5R8AL, 8Q7AD, plus the usual crop of JA, VK, ZL, VS6, YB and such, not to mention some of the novice VK's.

G2DHV (Sidcup) comes next, with CW contacts to W/VE/VO,

A9XCE, VK3RJ, HI8WR, A4XHI, ZS, ZE, 9HI, ZL3IS, PY, KP4, and JR6JMX/MM in Arab waters. And, finally, just one contact mentioned by G4EAN (Nottingham), with N9WW.

Another QRP-er in the lists this time is G2CP up Scarborough way, who runs a valve transmitter—an elderly box containing wide-band couplers and an 807 PA, which was originally run at 350 volts 30 milliamps, for about ten watts. It has now had its power supply volts reduced to 300 by removal of the reservoir capacitor; with no load at all, the absolute minimum dip is at 9 mA., which is then "drawn" up to 11 or 12 mA. to give an input of 3.3 or 3.6 watts—four watts is given over the air for ease of sending. All this fed through an ATU into a 66-footer running E-W with tuned feeders. On the receive side there is an ex-USN National HRO—the first we have heard mention of in this piece for a long time. The total result is that on 21 MHz, G2CP has swapped reports with JE1HJJ, JH3VSK, 4X4NSA and W0DP (Nebraska) not to mention lots of lesser mortals.

Twenty

We may as well stay with G2CP at this point, to note that Henry used the same rig as already described on 14 MHz, where VE7UBC and W6UA demonstrated the worth of the little rig.

G3RCA (Wigan) seems to have been a mite out of luck; the month before last he was QRT for aerial repairs, and this time a week was lost due to a damaged balun up in the eye of the beam, which has duly been mended. For the rest of the time, Tom found it "long-path season," with quite a few knocked off thus. CW found mornings ZL1YL / Kermadec, KG6SW, JT1KAA, VK9NI (Norfolk Is.) to go with breakfast, followed by HL9KL, P29CC, TT8HV, for morning coffee. At Lunch-time there was CE0ZE, while afternoons saw QSO's with FB8WE, 3D6AC, EA9FK, VS5XU, J28AP, XE1AK, YB1ADL, LI2B/YI (this one is our old friend from the "Kon-Tiki" and "Ra" off on his travels again), FR7BI, FB8ZL, VU2BEJ, and J28BA. Turning to the "after work" period we see HH5HR,

PJ9CG, VP8PL, VP2MRJ, C5AT, HH2MC, PY7BXC/O on Fernando do Noronha, 7P8BE and TR8LE.

G2HKU stuck with his daily skeds, on Twenty SSB, with ZL1VN and ZL2SE, adding this month PZ5AA to his collection.

Next we go over to "Doctor FUM" in Belfast; Dave notes QSO's with OHOJN, TF3RF/AM, VP9DZ, FM0FC, FM7WY, HH2MC, HI8MOG, FP8DX, ZB2BL, FC9UC, YV5ENI, VE3HYU/SU, HV3SJ, and a great big question-mark signing "U2USP."

QRP SSB on this band gave GM3RFR contacts with VP9, W, VE, UF6, KV4, UA9, 9G1 and lots of Europeans.

With all the interest being transferred upwards, G4DMN didn't stop long around 14 MHz; but long enough, that is, to raise JT1KAA, KG6JAR, KG6JIA, KL7HCC, FR7BM, VP2MRJ, VP2MUU, VO2WL and MID.

G3NOF reckons to see a start at around 0830, with VK/ZL/JA, W's from noon onwards with the W7/VE7's about 1600/1700, and closure just after dark. SSB QSO's were made with JH2XTX, K7AA, KA6RR, VE7MT, VK2BAT, VP2MRJ, WB7TKB/SU, ZL3AV, ZL3BX, ZL4AP and ZL4BX.

At G4EVO, the Pestilence from Poltava was aided and abetted by severe local electrical noise on occasions, so although 14 MHz was given an extensive going-over, it was pretty well always the Europeans and rubber-stamp natters.

G4GIE bewails the fact that he doesn't work a new one every time he switches his HW-8 on—but he still found a brace of new ones in GM and Lithuania. On 14 MHz, with a Joystick 13 feet a.g.l. the contacts were pretty well all to the Eastwards, OK's, SP's, UB5, UP2, F6 and such, a couple of notable ones being SP8BAB and OK2SAI both of whom had QRP rigs.

Finale

That's it for another month. Please let us have all the *late updates* as it has not shown a change of late. The dates to note are in the "box" as usual. So until we meet again—Adios. The address is, as ever, CDXN, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

TOWARDS TOMMOROW'S BEACON

A MICROPROCESSOR
APPLICATION

PAUL M. JESSOP, G8KGV

READERS of the many popular electronics magazines cannot have failed to have noticed the interest aroused recently by the microprocessor and its applications in everyday life. A complete description of the technical features of a microprocessor is neither possible nor appropriate here but, in essence, it is a digital integrated circuit which by reference to pre-encoded instructions can perform logical and arithmetic functions and, in addition, communicate with the outside world.

The uses of these devices are many and varied and they are now creeping into every home in many disguises; these include washing machines, television games and even sewing machines. The microprocessor is now also finding applications in the "shack" and these are limited only by the imagination of the user and can make operating much more enjoyable by relieving the operator of some of the more mundane tasks. This article deals with one application which would benefit all of amateur radio community; namely the "Microprocessor Controlled Beacon."

Firstly, it should be stated that the idea of a microprocessor performing control functions of a beacon is not really revolutionary: the new *Oscars* carry an on-board processor to control the telemetry, codestore etc. Beacons at present serve several functions; since they are active 24 hours per day, they act as a useful signal for aligning receivers, as a calibration point and serve as a guide to propagation conditions. However, they simply radiate a carrier with the callsign in FSK every n seconds. This has now become a waste of resources and it is not now difficult to enable the beacon to carry useful information as well as providing a signal source.

General Principles

The overall design, together with the present design for comparison is shown in Fig. 1. Clearly, the only difference between the two is that the electronic keyer has been replaced by a microprocessor system—that is the microprocessor itself, memory and input/output interfaces. This latter could quite conceivably have a lower component count than the keyer. The nature of the input ports are determined by the application of the beacon; of this more later.

Weather

Of particular interest to the VHF/UHF orientated amateur are the prevailing weather conditions. These can be measured without great difficulty in electrical terms and can be converted into digital signals acceptable by the microprocessor's input ports. The system could then, for instance, measure the barometric pressure and transmit this for the benefit of those amateurs interested in working DX on the VHF/UHF bands. Also of use would be temperature and humidity, which can both be measured without too much difficulty.

Output Format

In its simplest form, the output would consist of Morse, modulating the carrier as at present, with the data being presented in plain language as far as possible, but because of the restriction on the time available the format would have to be fairly compact. Since the object of the beacon is to be of maximum possible use to the greatest number of people, and since extra facilities can be added at practically the cost of the memory used to contain the required programme (*i.e.* very little), the beacon could send the data in RTTY (Murray Code); and also perhaps in the recently permitted ASCII (American Standard Code for Information Interchange—an 8-bit code without the shift characters of Murray). There is no reason why the output format should not be exactly the same as on Morse, the appropriate carriage control characters being inserted at the end of each line. Thus a typical print-out might be:

```
GB3MPU GB3MPU GB3MPU
GB3MPU ON 144.95
QTH WROTHAM
QRA ZZ11A
NGR TQ111111
TEMP 17C
BARO 1030 MB
HUMIDITY 32 PER CENT
DE GB3MPU GB3MPU GB3MPU.
```

If this line of thought is continued, there is no reason why other, more exotic modes of transmission should not be sent, SSTV for instance. The format of the picture and the generation of synchronous pulses would present no problem to the microprocessor, especially if the picture sent were restricted to the callsign of the beacon. If the number of stations equipped to receive it justified its inclusion, facsimile could similarly be sent. Since these facilities would inevitably be used less than those of CW and RTTY, transmission would best be restricted to a fairly infrequent basis, perhaps every 30 minutes. This service would enable amateurs to align equipment without the use of test-tapes and the attendant problems of speed variations etc.

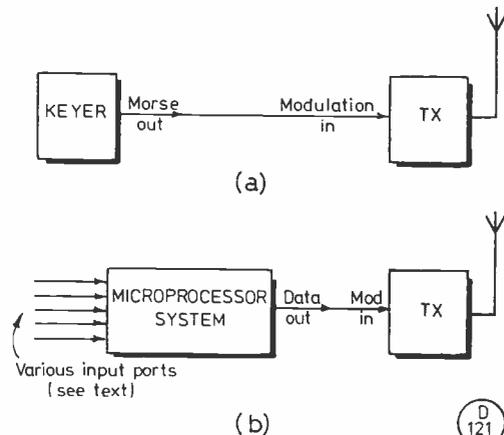


Fig. 1. (a) The present system used in beacons. (b) The "Microprocessor Controlled Beacon" as envisaged by G8KGV.

One of the beauties of the microprocessor is its flexibility. If it is desired to alter the function of the beacon to accommodate a new mode, it is necessary only to alter the programme since this will be stored in a UV-PROM—that is a memory which can be programmed by the user, keeps its memory when power is removed and can be cleared by exposing it to ultra-violet light: this presents no problems.

News

One of the features of the *Oscar* satellites is the "code-store." This enables a command station to programme a message into the satellite's memory and it will then transmit this until it is replaced by a new message; it is not difficult to reproduce this facility for the earth-based beacon. A telephone line is suitably interfaced to the microprocessor, and down this line

the text of the message is sent and re-transmitted at intervals by the beacon. This facility has its most obvious application in warning of "lifts" in propagation conditions and auroral activity etc. However it could also be used for RAEN callouts and appeals for blood donors after an emergency. In this way the beacons would benefit not only the amateur population but also the community.

Conclusions

The only difficulties likely to obstruct any of the ideas presented here will not be technical, but legal in origin. However, some years ago, repeaters would have been unthinkable and there seems no reason to suppose that beacons of the type described above will not eventually be licensed and play an important part in tomorrow's amateur radio activities.

THE 1977 "MAGAZINE" CLUB CONTEST

THIRTY-SECOND ANNUAL EVENT

By "Club Secretary"

MCC again: this time your scribe is not just an invigilator and making horse laughs, but doing the sorting and donkey-work. Thus the thirty-second MCC report may look a bit different from those of previous years; don't shoot the pianist, he's doing his best!

Now, it will be recalled that we ran MCC late last year, and as a result of the protests we moved it back to November; but still the number of entries dropped, as anyone who had been monitoring the band over the last years could have expected. Rather odd, then, that the winners *Guernsey* in fact managed a higher score than last year's top-dog; and what's more they created what must be the record DX for any MCC when they hooked 3B8DT! The rig was a Trio TS-820, driving a folded dipole at eighty feet and running *E-W*, so that it was laying down (and receiving!) a fat signal all over the U.K. They say it was their first effort at a CW-only contest; and as for the QRM, how about a loud firework display going on just a few yards away—one can just imagine the tense looks outside every now and again to see whether the aerial was still in its accustomed place!

That conditions were a little odd was noted by many clubs; and one or two signals disappeared abruptly, due to power-cuts presumably. Second-place was the privilege of GM4AAF, *Kingsway Technical College, Dundee*, again with a half-wave dipole—this time in inverted-vee form with the middle up at 150 feet and driven by a Yaesu FT-101E. The FT101E was also in use at *Glenrothes*, along with a galaxy of operating talent to drive their dipole which was at sixty feet. Both second and third stations made a bigger multiplier score than the winners, it is interesting to note.

The gear changes again when we come to the fourth station in the list, G14ABZ *Lisnasharragh High School*, with the Drake combination of T4X-C and R4-C looking into an inverted-vee with its middle up at 65 feet. For

the rest it was almost entirely transceivers, some of them used in conjunction with transverters to get them on to the band; one particularly neat idea was used by the Cheltenham association—just two days old as a club in its own right!—in that the receive part of their transverter had a Q-Multiplier built in to sharpen things up a bit. The power supplies, the transverter and all the gubbins are fitted in the Heath loudspeaker-cabinet to match all the rest of the station; as the photograph shows, a nicely-built and contrived machine but what a pity they were only able to get in 1½ hours of operating on the Saturday due to visitors, and none on Sunday. A couple of stations used the traditional gear, with *Clifton* using a 6AG7 PA valve and CR-100, *Yeovil* an AT5 and Yaesu FR-50B. One station with an FT-401 went as far as to keep a power meter in the line all the time, and certify it as never going "over the top," while another station with an FT-401 took the alternative path of using it into an outboard PA stage.

The standard of the logs was very high indeed, with the exception of just one—and he was most apologetic and said if we disqualified him please use it as a check log. Needless to say, we accepted this entry! One minor *contre-temps* occurred when we noted the first page of one station's log was missing—it followed up a day or

POS'N	CLUB	CALLSIGN	SCORE
1	Guernsey	GU3HFN	19747
2	Kingsway Tech. Coll., Dundee	GM4AAF	18000
3	Glenrothes	GM4FSF	16750
4	Lisnasharragh High School	G14ABZ	15004
5	White Rose	G3XEP	13462
6	IRTS Region 1 "B"	E12BB	11739
7	Plymouth	G3PRC	11362
8	Maidstone YMCA	G3TRF	11264
9	Sutton & Cheam "A"	G2DMR	11232
10	Torbay	G4EDG	11074
11	Edware	G3ASR/A	10305
12	North Staffs.	G4BEM/A	9366
13	Sutton & Cheam "B"	G4CWH	9240
14	Surrey	G3SRC	9000
15	South Manchester	G3FVA	8120
16	Acton, Brentford & Chiswick	G3IUU	5535
17	STC, Paignton	G3WMK	4455
18	Greater Peterborough	G4BBA	4320
19	Addiscombe	G4ALE	4185
20	Pembroke	GW2OP	4170
21	Clifton	G3GHN/A	3780
22	Cheltenham (Association)	G5BK	1008
23	Yeovil	G3CMH/A	686

so later and worried the office no end. This being said, all of them were good, and some quite outstanding in their presentation.

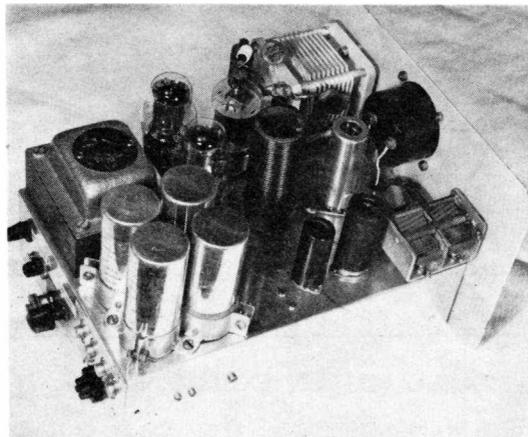
Although some groups were of the opinion that the Saturday conditions were poorer than the Sunday, the logs show differently in looking at the overall picture. Perhaps also on the Sunday there was some deterioration in the Westerly direction, as the Leprechauns at E14LRC swapped reports a couple of S-points down *both* ways with Plymouth on the Sunday as compared with the Saturday.

Signals generally were of pretty good quality, with very few drifters or key-clicks to annoy, despite the likelihood that at least some stations almost certainly were operating under reduced mains-voltage conditions. While, as we have indicated, the numbers of logs were down, it would seem quite likely that some clubs went to 144 MHz (one was heard there after the contest, who was a "regular" in previous years) and of course for the tough guys who really know the contesting game 7 MHz had its attractions—but almost everyone said will we please run it again next year. Let us answer that one right now and say "of course we will, have no fear."

Beefs: for all practical purposes, none. One group did moan about non-club stations not stopping to give their locations, and singled-out G3BMY in particular; but frankly we can't believe Tom Cashmore as unlikely to "know the form" as far as Top Band or MCC are concerned.

Log Comments

Some of the humour was deliberate, some of it accidental—for instance: "Overall sore, 19747" (Guernsey) . . . "Band was very poor on the Saturday night" (Dundee Kingsway Technical College) . . . "Contest rules seemed biased against the G's" (Kirkcaldy) . . . "An enjoyable contest though the QSO rate at times was low; our first attempt at the 160 metre contest" (Lisnasharragh High School) . . . "The 3B8 was a great surprise—it remains to be seen whether he is genuine or not. He gave name as Joe and QSL to DL1IZ" (White Rose) . . . "Maybe Guy Fawkes has blown up MCC 1977!" (IRTS Region One "B") . . . "First night fairly flat and with heavy QRN; second night excellent" (Plymouth) . . . "Things just didn't go the way we planned." (Maidstone Y) . . . "Please keep one contest on Top Band, and over two legs" (Sutton & Cheam A) . . . "Nearly couldn't enter because of damage to antenna coils. Remedied by sawing out the bent piece of tubing and piecing it out, only to find the whole issue resonant on about 2 MHz; added a ten-turn loading-coil about an hour before starters to bring it to 1835 kHz. Phew!" (Torbay) . . . "Several periods of rain static on Saturday, up to S9 + 25dB." (Edgware) . . . "Plenty of Fun and beer!" (North Staffs) . . . "We lost our aerial in the wind between 2000 and 2100 on Saturday—wondered why the band was so flat!" (Surrey) . . . "We thought our first T9c report was C for Club—then someone thought they make it plain it meant C for Chirp!" (*Ed. note:* Creditably, they went QRT for 30 minutes to sort it out.) (South Manchester) . . . "Conditions were very peculiar at times; however, enjoyed by all those taking part." (Acton, Brentford & Chiswick) . . . "I think GM4AAF had trouble with his receiver at times; he gave us RST



The home-built Top Band transverter made by Edgar Janes, G2FWA, and used as part of the gear operated by the Cheltenham Amateur Radio Association during MCC.

529!" (STC Paignton).

Summary

Quite a few stations were worried about the question of repeating QSO's on the second leg. The intention was quite clear in our minds that one could work a particular station once on each night—but we have to admit that the rules weren't clear and a note has been made to that effect. The question of "standard abbreviations" has been made before and we stick to our opinion that since so many clubs use MCC as a forcing-ground for the bigger contests, we should stick to our existing system and *make* the novices pin their ears back!

There is a widespread feeling that the contest is not fair to the G's—and in fact this comment has been made by one club or another *every* year since your scribe has had anything to do with MCC, no matter how the Rules were "adjusted." In fact, if one considers it all rather carefully, the main method of "adjusting" things for fairness is in essence either the starting time, or the date. The reason is this: the chaps in GM, GI, EI, and so on, haven't got many "locals" in the way of three or six-pointers to work, only the single-point stations and none too many of them, until the band starts to open to elsewhere. Meanwhile the G stations, which are largely grouped together in or near the massive conurbations (horrible word, isn't it!) are harvesting their locals at a massive rate of knots, and at the half-way mark have usually quite a good lead which is whittled away by the DX'y station later on in the evening. Thus, a switch to December is not very desirable as it gives too much of the edge to the DX, and a look at the 1978 contest calendar shows the first two weekends of November as already pre-empted by the RSGB 7 MHz and 1.8 MHz respectively. It would seem a bit much to have another Top Band shindig just a week after the RSGB one, and the last week of November would bias things too much, we feel, in favour of the GM's. So, provisionally for the moment, we are setting MCC to the *last weekend in October*, which should be enough to "bias the PA" against the DX just a little more. That gives us then October 28-29, 1978 for the next MCC. *See you there!*



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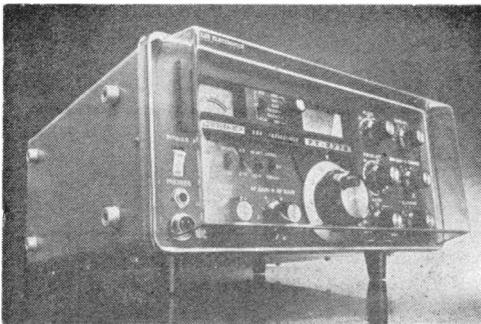
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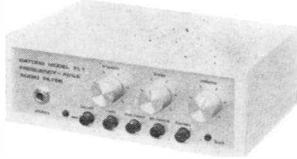
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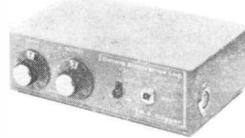
Our new active receiving antenna model AD170 was featured in detail in December's advertisement. A comprehensive data sheet is now available free on request. Another new data sheet describes our mains power unit Models MPU and MPU/I.

FREQUENCY-AGILE AUDIO FILTER MODEL FLI



A versatile bandpass or band-reject filter with fully variable bandwidth and centre frequency plus unique search/lock/track capability for automatic removal of heterodyne whistles. Improves reception of CW, RTTY, and SSB. Connects between receiver and loudspeaker.

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Processes speech as a SSB signal at 60 kHz to increase its ratio of average to peak levels without adding harmonic distortion. Improves talk power of SSB, FM, and AM transmitters without increasing the peak transmitted power. Connects between microphone and transmitter. (See articles by Dr. D. A. Tong, *Wireless World*, Feb. 1975, 79-82 and Oct. 1976, 77-81).

UP-CONVERTER MODEL UC/1



Adds full receiving coverage from 90 kHz to 30 MHz to existing receivers or transceivers tuning 28-29 MHz or 144-145 MHz. The full range is covered in thirty 1 MHz wide synthesiser controlled segments. Also works as a two-metre converter. Connects between receiver and antenna.

NEW PRODUCTS!

MODEL AD170 A compact active receiving antenna covering 100 kHz to 70 MHz without tuning or matching units. Price £29.50 (£33.19 inc VAT)

MODELS MPU and MPU/I Mains power units for FLI, UC/1 or AD170. MPU has integral 13A mains plug, MPU/I has 18" mains lead. Price £5.50 (£6.19 inc VAT)

MODEL AD170+MPU or MPU/I Package price £33.00 (£37.13 inc. VAT)

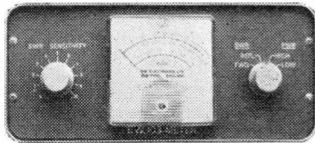
The descriptions above are brief. Please send for free copies of our data sheets and read the full story.

UC/1 £105.00; FL-I £53.00; RFC/M £21.50; RFC £40.00 (with either Jap. 4-pin or stereo jack input connectors).

All plus VAT at 12½%, prices include delivery within UK. A range of accessory leads is also available, full price list on request.

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Optimum Performance with KW

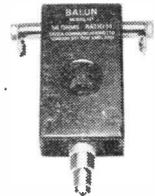


line feeding an Aerial System or Dummy Load (1) Standing Wave Ratio. (2) RF Power with two ranges 0-100 & 0-1000W when used with a 50 ohm Dummy Load.

Decca KW-103 Combined Swr/RF Power Meter is an instrument for measuring a 50 ohm coaxial

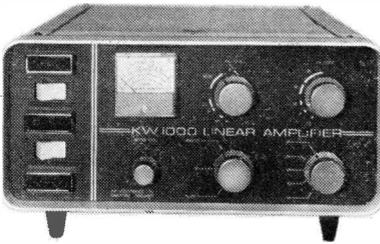


Decca-KW Dummy Load is air convection cooled and has been designed as a purely resistive 50 ohm load up to 30 MHz. Power capability up to 1000 watts.

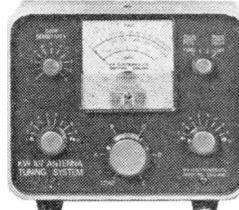


Decca-KW Balun Mk. II. The Decca-KW Balun is broadband—3 to 30 MHz, rated up to 2kW e.p.p. 1:1 Ratio 50 ohms "unbalanced" feed to "balanced" output. Waterproof moulded case. Suitable for dipole and Beam aerials.

Note: The well-known KW LOW PASS FILTER passing 3-30 MHz is available from stock.

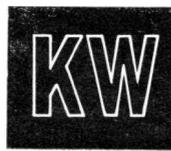


Decca-KW 1000 Linear Amplifier for SSB and CW 10-80 metres, 1200 watts p.e.p. input SSB, can be "driven" by most 100 watt Transceivers and Transmitters. Employs a pair of T160L Tubes in grounded grid. Pi-section input and output circuits. Built-in 2-4kV P.S.U.



Decca-KW Antenna Tuning System including E-Z match, SWR/RF Power meter, Dummy Load, Antenna switch. High power version KW 109 is available.

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Supply voltage is 13.6 nominal (12-15v.), 5mA on receive, up to 6 amps on transmit.

Size: 6" x 2" front panel, 4½" deep. Sockets are SO239.

Price £53.00 + VAT = £59.62.

Also available without the receive pre-amplifier at £44.00 + VAT = £49.50. **BOTH IN STOCK.**

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Top Band (Marine Band) to 20 metre converter. If you miss being able to listen on 160 metres this provides the answer. 1.8 MHz-2.3 MHz in 14-14.5 MHz out. Price £18.00 + VAT = £20.25. **IN STOCK.**

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Sentinel D. G. Mosfet converters. These provide a performance that cannot be beaten. N.F. 2dB, Gain 30dB. Supply 12v. (9-15) 15mA. Size is 2½" x 1½" x 3½". IFs: 28-30 MHz, 4-6 MHz, 2-4 MHz. These are also in stock for Marine Band to 28-30 MHz and Satellite Band to 20-22 MHz. 4 metres to 28-23.7 MHz. Price: £18.00 + VAT = £20.25. **IN STOCK.**

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Containing a mains power unit and RF gain control. Specification as above. Size: 5" x 2" front panel by 5" deep. Price: £22.00 + VAT = £24.75. **IN STOCK.**

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Performance as above converters. Complete unit with box, connectors, etc. Price: £13.00 + VAT = £14.62. We will get them going if you have trouble for £2.50, so you can't go wrong. **IN STOCK.**

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NEW! We now supply these converters switched to cover 432-434 and 434-436 MHz. Add £7.87 (includes VAT) to the price of either the SEM70 or the Sentinel 70. The most economical method of listening on 70cms. is our 70cm. to 2 metre FET converter. N.F. 3dB. Gain 30dB. Price: £18.00 + VAT = £20.25. Size: 2½" x 1½" x 3½". **IN STOCK.**

SENTINEL 70

70cms. to 28-30 MHz, N.F. 3dB., gain 30dB. Size 2½" x 1½" x 4". Price: £20.00 + VAT = £22.50. **IN STOCK.**

PRE-AMPLIFIERS

We have now sold thousands of these pre-amplifiers and many who have a V.H.F. unit come back for an H.F. unit or vice versa. Many of you report to us on the improvement in performance obtained and we have had no reports of anyone not finding an increase in sensitivity, I think that we can safely say that they are the most cost effective units you can buy.

THE SENTINEL AUTOMATIC 2 METRE PRE-AMPLIFIER NEW! Switching circuit provides: greater sensitivity—faster switching—compatible with all modes including SSB.

Contains an RF operated relay for connecting straight into your transceiving aerial co-ax. Performance: 1dB N.F., 18dB gain from selected FETS. Supply 12v. nominal. Price: £14.00 + VAT = £15.75 with Belling Lee sockets. For SL239 sockets add £1.50 + VAT = £1.69. **IN STOCK.**

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THE PA3

Size only about 1 cubic inch to fit inside your transceiver. N.F. 2dB gain 18dB. Price: £5.57 + VAT = £6.27. **IN STOCK.**

H.F. PRE-AMPLIFIERS

Many people are using these devices as an ACTIVE AERIAL. In our workshop for example, an AVO meter, with its normal test leads, used as an aerial into the H.F. pre-amp gives similar reception to a full size outside resonant dipole, without the Sentinel pre-amp, of course. The receiver used was an FR101.

SENTINEL H.F. PRE-AMPLIFIER. These are wideband pre-amplifiers from 1-40 MHz N.F. 1 dB, gain 15 dB. Size: 2½" x 1½" x 3". Price: £7.00 + VAT = £7.87. **IN STOCK.**

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A compact and attractive A.T.U. 80-10 metres tested at 1kV into 50 ohms. Slow motion calibrated dials. Size only 8½" x 4" x 7½". SO239 and screw terminals for co-ax fed or wire aeriels. Balanced or unbalanced. Price: £32.00 + VAT = £36.00.

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- * Transmit converter 200MW drive for 200W input.
- * Spurious output—80dB!

* Size only 9" x 4½" front panel, 4" deep.
Price only £100 + VAT = £112.50. **IN STOCK.**

Complete to plug into Yaesu equipment.
Complete power supply for Europa £45.00 + VAT = £50.62. **IN STOCK.**

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You've read our ads with their recent testimonials and user histories—so this month we thought we'd remind readers of the selling points of the

JOYSTICK VFA (World Patents)

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- ★ Tunes 0.5-30 MHz, no gaps.
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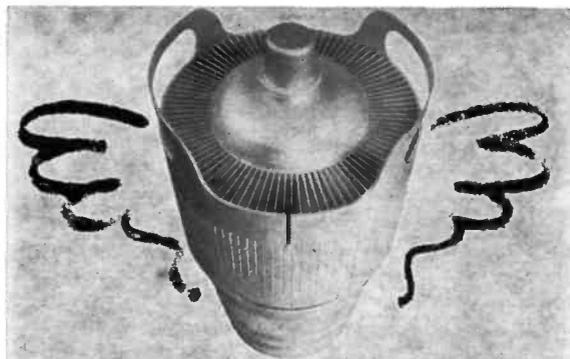
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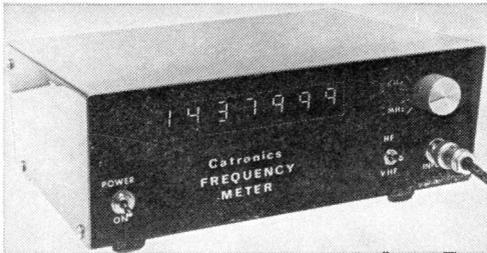
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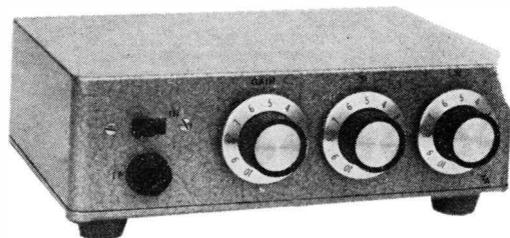
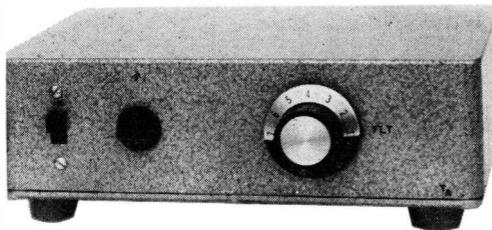
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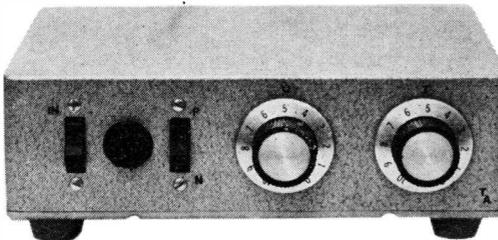


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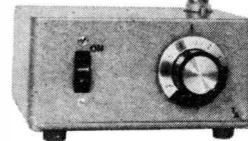


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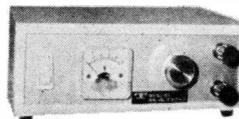
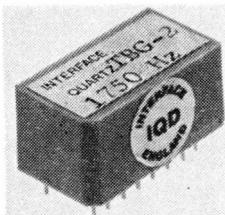
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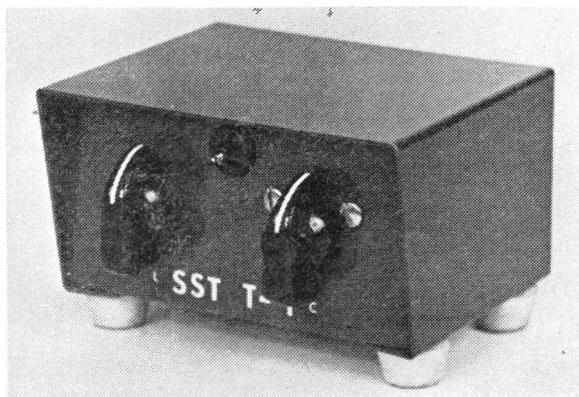
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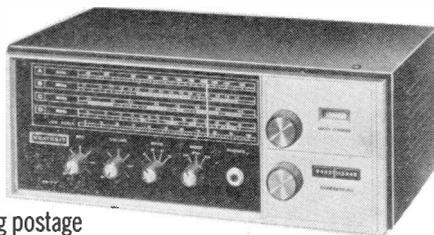
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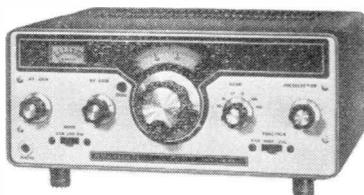
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144-030 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144-4/433-2 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144-480 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144-800 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144-950 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-000/SO ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-200/R8T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-300/S12 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-350/S14 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-400/S16 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-500/S20 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-525/S21 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-550/S22 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-575/S23 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-600/S24 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-650/R2R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-675/R3R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-700/R4R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-725/R5R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-750/R6R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-775/R7R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-800/R8R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145 950/S38 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a

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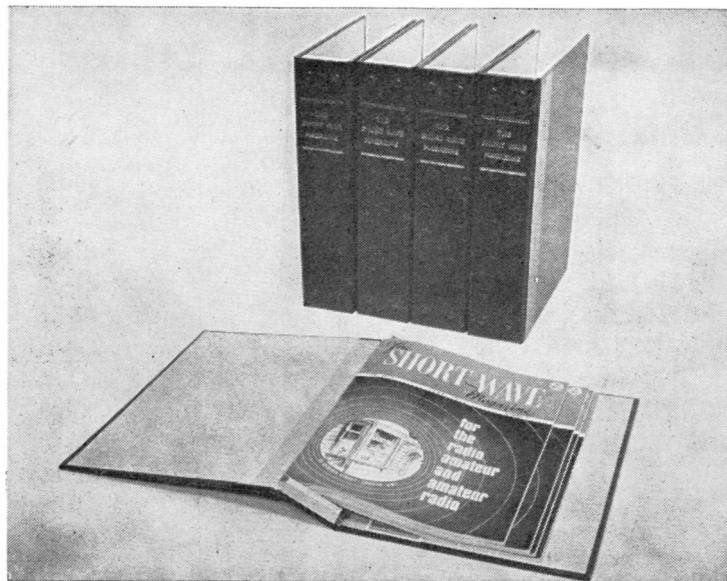
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