radio communication

June 1975

Planning for the future

Conference report—page 464

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radio communication

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LOWE ELECTRONICS

TRIO
TR2200G

SPECIFICATION

TRANSMITTER

Frequency range	144–146MHz
Emission	*F3*
Output power	*1W*
Freq mult	*X12*
Antenna impedance	*50Ω*

RECEIVER

Sensitivity Less than 1μV for 20dB S/N

Intermediate frequencies 10·7MHz and 455kHz

AF output 0·5W

Power source 10·4–15·2Vdc negative earth (8 × UM3 batteries or optional NiCad pack)

Power consumption 450mA TX 55mA RX

Supplied complete with 3 channels, charger for NiCads, external dc lead, carrying case, shoulder strap, microphone, two battery carriers.

This little powerhouse is now the world's fastest selling two metre FM transceiver. Unbeatable at any price, its combination of rugged reliability and high sensitivity give it universal appeal. Now that more and more repeaters are opening, the TR2200G allows the operator to work over long distances with ease—we can often work GB3PI from Matlock using the whip antenna on the TR2200G.

The rig comes complete with carrying case, shoulder strap, microphone, Nicad charger, two battery carriers and fitted with three channels (S20, S22 and R7 normally but alternatives supplied to your choice). Facilities for 12 channels and incorporating Trio's unique tuning fork repeater access tone generator.

If you hanker after mobile working from your car, the VB2200 amplifier is a marvellous addition. This superb amplifier comes complete with a carrying cradle for the TR2200G and boosts the power output from 1W to 10W. The amplifier is automatically switched by a RF VOX system and also supplies regulated D.C. for the TR2200G.

Together, the TR2200G and VB2200 give you portable *and* mobile operation but the real bonus comes when you add together the prices and come out with £109.00 (VAT excl.) This is cheaper than any normal FM transceiver and is the finest value on the market today.

PRICE TR2200G £80 (VAT excl.)

VB2200

2m FM POWER AMPLIFIER

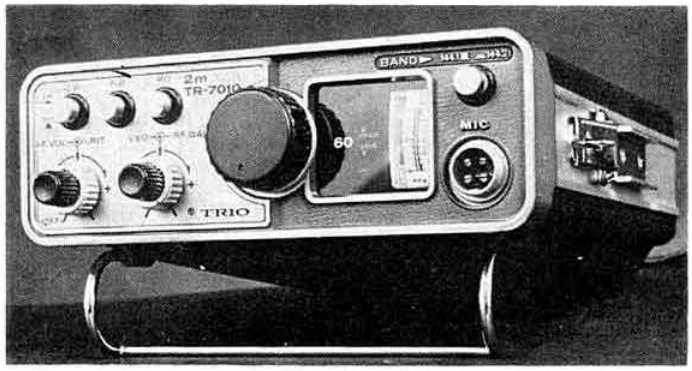
SPECIFICATION

Input Power 1 watt
Output Power 10 watts
Supply 11-16V negative earth
Regulated Output 12V for TR2200G
All automatic RF actuated switching. LED indication of operation.
Fully electronic high swr protection
Carrying bracket supplied for TR2200G.

PRICE VB2200 £29 (VAT excl.)

LOWE ELECTRONICS

TRIO
TR7010



Following the worldwide success of the TS700, Trio have taken the TS700 basic design and packaged it for 2 metre SSB mobile use.

The TR7010 sets new standards in receiver sensitivity and low spurious emission on transmit. Operating CW and SSB from 144·1-144·3MHz, the TR7010 covers all CW, SSB and beacon activity. 40 5kHz channels plus VXO and RIT provide continuous coverage. 8 extra channels can be used, without retuning, in the range 144-145MHz by fitting auxiliary crystals.

Single conversion using an IF of 10·7MHz with a superb crystal filter provides outstanding selectivity. Wide range amplified AGC and newly developed FET devices in RF amplifier and mixer stages allow maximum sensitivity to be used with freedom from overload due to adjacent signals.

Single conversion transmitter with new fully balanced mixer system generates a beautifully clean signal with crisp audio quality.

The first lucky owners are on two metres right now. Listen to the signal and make up your own mind. Why not send for full details of the all new TR7010 right now.

Price £165 (VAT excl)

TRIO
TR7200G

2m FM Mobile Transceiver TR7200G

★ **Now at a new lower price** ★

22 Switch selected transmitting and receiving frequencies in the 2m FM band between 144MHz and 146MHz, five of which are factory-equipped with TX and RX crystals. Illuminated channel indication.

Extended operating possibilities after addition of optional VFO-30 which allows continuous fine tuning of RX and TX frequencies over the entire 2m FM range. Exceptional large signal responses, high input sensitivity (1μV for 30dBs S + N : N) with virtually no cross-modulation, effective spurious suppression and temperature compensation by use of newly developed semi-conductor devices.

Continuously adjustable Squelch eliminates background noise during reception.

Built-in 1750Hz tone burst generator with pushbutton control to activate relays of 2m FM repeater stations. Switch-selectable transmitter final stage deliveres 1 watt or 10 watts output power with electronic over-load protection, input limiter and illuminated ON-AIR indicator.

Built-in speaker, illuminated S-meter which acts as relative output meter in transmitting mode, connector for external VFO-30 (optional), external speaker and earphones.

Works from 12V DC car battery during mobile or from Stabilized Power Supply PS-5 during fixed station operation.

STANDARD ACCESSORIES: 500 ohms PTT microphone with hanger, special mounting bracket for mobile operation, stand-off feet for fixed station use, power cable, spare fuse, etc.

Channels Fitted

145·50 Simplex	145·15/75 Duplex
145·525 Simplex	145·175/775 Duplex
145·55 Simplex	

PRICE £110 (VAT excl)

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LOWE ELECTRONICS

PRICE LIST, JUNE 1975

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TRIO			
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VFO900 external VFO	110.00	**137.50**	2.20
TS900 CW filter	29.00	**36.25**	20p
TS520 transceiver	290.00	**362.50**	2.20
VFO520 external VFO	55.00	**68.75**	2.20
SP520 optional external speaker	12.00	**15.00**	54p
TS520 CW filter	21.00	**26.25**	20p
TS700 2m all mode transceiver	300.00	**375.00**	2.20
Fixed channel crystals for TS700	2.32	**2.90**	10p
VOX unit for TS700	15.00	**18.75**	54p
TR7200G 2m car transceiver	110.00	**227.50**	2.20
TR2200G hand held 2m transceiver	80.00	**100.00**	2.20
Crystals for TR7200G or TR2200G, each	2.32	**2.90**	10p
Crystals as above per channel	4.20	**5.25**	10p
VFO30G external VFO for TR7200G	55.00	**68.75**	2.20
VB2200 10 watt amplifier for TR2200G	29.00	**36.25**	54p
BP-10 NiCad batterypack for TR2200G	11.00	**11.88**	20p
TR7010 2m SSB transceiver	165.00	**206.25**	2.20
R599S Amateur band receiver	275.00	**343.75**	2.20
T599S Companion transmitter	265.00	**331.25**	2.20
QR666 General coverage receiver	130.00	**162.50**	2.20
QR-6MK 500kHz marker for QR666	8.50	**10.63**	34p
Extra for fitting QR-6MK, if required	1.50	**1.87**	
QR-6FM FM tuner for QR666	21.00	**26.25**	34p
Extra for fitting QR-6FM, if required	5.00	**6.25**	
HC-2 Ham Clock	11.00	**11.88**	46p
MC-10 hand microphone with PTT	6.30	**7.88**	34p
MC-50 table microphone with PTT	18.00	**22.50**	46p
LF-30 low pass filter	9.00	**11.25**	46p
BFP-2 2m band pass filter	8.00	**10.00**	46p
PS-5 regulated 13·5vdc psu/digital clock	43.00	**53.75**	2.20
TV502 2m Transverter	100.00	125.00	2.20
GALAXY			
R1530 General Coverage receiver	750.00	**937.50**	2.20
HALLICRAFTERS			
FPM-300 MkII Transceiver	290.00	**362.50**	2.20
Mobile kit for FPM-300	10.00	**12.50**	46p
Fan kit for FPM-300	20.00	**25.00**	34p
VENUS SLOW SCAN TV			
SS2 slow scan station monitor	230.00	**287.50**	2.20
SS2 slow scan station monitor kit	155.00	**195.00**	2.20
C-1 camera	255.00	**318.75**	2.20

	net price. £	price incl. VAT £	carr. £
NIHON DENGYO			
Liner 2 2m SSB transceiver	145.00	**181.25**	2.20
LA-106 Linear Amplifier	165.00	**206.50**	2.20
FS-1007P 2m FM Scanning Transceiver	220.00	**275.00**	2.20
AMR-104 2m Scanning Monitor Receiver	65.00	**81.25**	62p
Marine Version of AMR-104	86.00	**107.50**	62p
R115E regulated psu for the Liner 2	25.00	**31.25**	2.20

NOTE: FS-1007P transceiver and AMR-104 Monitor Receiver fitted 3 channels.
Marine monitor receiver fitted 8 channels.
Extra crystals available—see under 'CRYSTALS'.

LOWE MONITOR RECEIVER REC R1420C			
Receiver complete, less crystals	19.95	**24.95**	46p
Receiver complete, fitted 1 channel	21.87	**27.34**	46p
Receiver complete, fitted 2 channel	23.37	**29.18**	46p
Receiver complete, fitted 3 channel	24.87	**31.09**	46p
Receiver complete, fitted 4 channel	26.37	**32.96**	46p
Receiver complete, fitted 5 channel	27.87	**34.84**	46p
Receiver complete, fitted 6 channel	29.37	**36.71**	46p
Above receiver modified for the 156MHz Marine Band:			
Receiver complete, less crystals	21.76	**27.20**	46p
Receiver complete, fitted 1 channel	24.26	**30.33**	46p
Receiver complete, fitted 2 channel	26.76	**33.45**	46p
Receiver complete, fitted 3 channel	29.26	**36.56**	46p
Receiver complete, fitted 4 channel	31.76	**39.70**	46p
Receiver complete, fitted 5 channel	34.26	**42.83**	46p
Receiver complete, fitted 6 channel	36.76	**45.95**	46p
Extra crystals for 2m Band	1.85	**2.32**	10p
Extra crystals for 156MHz Band	2.78	**3.50**	10p
MICROWAVE MODULES			
MMC144/28 LO	16.30	**20.38**	10p
MMC70/28	15.20	**19.00**	10p
MMC432/28	18.10	**22.63**	10p
MMC432/144	18.10	**22.63**	10p
MMC1296/28	24.00	**30.00**	10p
MMC1296/144	24.00	**30.00**	10p
MMV432	17.50	**21.88**	10p
MMV1296	25.00	**31.25**	10p
WEIR V.H.F. EQUIPMENT			
Weir 2m Mosfet converter 28MHz I.F.	14.00	**17.50**	10p
CRYSTALS			
We stock all the popular channels for all the equipment we sell as well as many crystals for other F. M. equipments			
Price per single crystal	2.32	**2.90**	10p
Where 2 crystals per channel are required			
Price per channel	4.20	**5.25**	10p

VALVES.

For the very common valves, it pays to shop at one of the large London importers who buy in such enormous quantities that they can sell retail at a lower price than we can buy wholesale. We do, however, maintain stocks of the more unusual valves which are used in the equipment we sell, and which you may find some difficulty in obtaining.

LOWE ELECTRONICS

PRICE LIST, JUNE 1975

	net price. £	price incl. VAT £	carr. £
6AH6 6BZ6, 6CB6A, 6CL6, 6U8A, 6EW6, 7BM8, 12BY7A,	66p	**82p**	10p
6GK6	1.30	**1.62**	10p
6JS6C, 6KD6, Matched pairs	4.20	**5.25**	34p
6146B, S2001 direct replacement, each	3.20	**4.00**	22p
6LQ6, Matched Pairs	5.52	**6.90**	34p
ANTENNAS			
2m 'J' BEAMS 50 ohm impedance only			
5Y/2M 5 element Yagi	4.30	**5.37**	2.20
8Y/2M 8 element Yagi	5.60	**7.00**	2.20
10Y/2M 10 element Yagi	11.00	**13.75**	2.20
PBM14/2M 14 element parabeam	16.90	**21.12**	2.20
5XY/2M element 5 crossed Yagi	8.20	**10.25**	2.20
8XY/2M 8 element crossed Yagi	10.20	**12.75**	2.20
10XY/2M 10 element crossed Yagi	14.10	**17.62**	2.20
D5/2M 5 over 5 slot fed Yagi	7.92	**9.90**	2.20
D8/2M 8 over 8 slot fed Yagi	10.50	**13.12**	2.20
PMH/2C 2 way phasing harness circ. pol.	2.85	**3.56**	37p
SVMK/2M mounting kit	2.20	**2.75**	46p
XD/2M crossed dipoles	5.75	**7.19**	2.20
UGP/2M Unipole and ground plane	4.15	**5.19**	2.20
PMH2/2M 2 way phasing harness	3.95	**4.94**	37p
PMH4/2M 4 way phasing harness	9.15	**11.44**	37p
70cm 'J' BEAMS			
D8/70 8 over 8 slot fed Yagi with 3½" boom	9.00	**11.25**	2.20
MBM46/70 46 element multibeam	12.10	**15.12**	2.20
PBM/70 18 element parabeam	10.90	**13.62**	2.20
2m MOBILE WHIPS			
'J' Beam ¾ vertical swivel mount	6.00	**7.50**	2.20
G-WHIPS			
Tri-bander 20, 15 and 10m	12.30	**15.37**	2.20
Multimobile 20, 15 and 10m	14.30	**17.87**	2.20
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Hy-Gain 18AVT/WB 80, 40, 20, 14 and 10m	56.00	**70.00**	2.20
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CDR AR 22 Light duty for VHF Beams	28.50	**35.63**	2.20
AR 40 Solid State Control Box	30.00	**37.50**	2.20
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CD 44 Improved version of TR 44	60.00	**75.00**	2.20
Ham-2 Improved version of rugged Ham-M	90.00	**112.50**	2.20

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Please note that carriage is by Parcel post.			
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Rotator cable 4 core heavy duty per metre	19p	**20p**	2p
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PL259 plugs each	36p	**45p**	10p
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Reducers to screw into PL259 plugs	12p	**15p**	7p
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S.W.R. meter Hansen SWR3 single meter	7.00	**8.75**	37p
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Hy-Gain Balun BN86	9.50	**11.88**	37p
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FT-401B	80-10	560 watts p.e.p. input
FT-200	80-10	260 watts p.e.p. input
FT-75B	80-10	120 watts p.e.p. input
FP-75B	AC PSU	
DC-75B	DC PSU	

VHF FT-2AUTO	Auto Scanning 2m Transceiver, fitted channels S20, S22, R5, 6, and 7
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SIGMASIZER 200R	200 channel synthesized 2m Transceiver

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YO-100 Monitor scope
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Cable 5-way **18p** metre, 8-way (CD-44 & Ham-2) **26p** metre.

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14AVQ	£36.00
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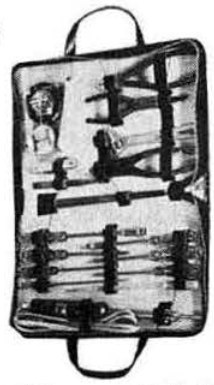

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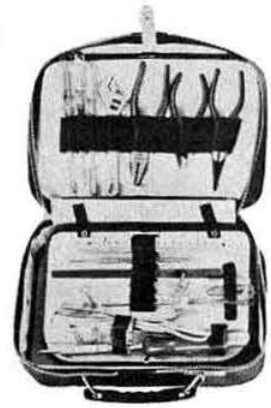

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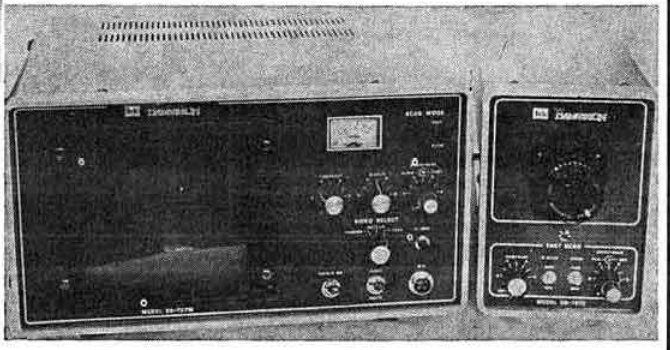
We're so fascinated by this little beauty that we think it makes everything else "obsolete" (or expensive!). The Price? . . . **£125** + VAT. ★ 10 watts(HI), 1 watt (LO) output ★ 12 channels SIMPLEX or REPEATER ★ Single crystal control of REPEATER means you only have to buy one CRYSTAL PER REPEATER ★ Fitted S20, S22, R5, R6, and R7. ★ LED (BUSY) indicates whether you have accessed the repeater or not ★ LED's to indicate EXTERNAL VFO, TRANSMITTER ON, REPEATER OPERATION ★ SPEAKER/MICROPHONE gives PRIVATE LISTENING AND HAS SWITCH TO OVER-RIDE THE CHANNEL SELECTOR ENABLING A CHANGE-OVER TO BE MADE TO AN EXTERNAL VFO. ★ Size only 84mm (W) × 58mm (H) × 235mm (D). ★ TONEBURST IS BUILT-IN.



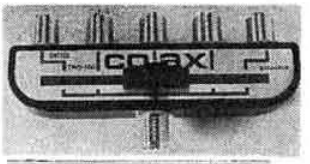
NEW! Here is the latest in SSTV from HAMVISION

This advanced system is packed full of features and beautifully styled. The SS-727M (monitor) and SS-727C (camera lens) is **£485** + VAT.

NEW!

REX DG-100 10-160m DIGITAL TRANSCEIVER £399 + VAT

NEW! CO-AX SWITCH DC-1500MHz, 1kW



This is a superb commercial quality co-axial switch. It is NOT a rotary wafer switch but a gold-plated micro-stripline constant impedance device. Power handling capability—1kW, AM. Connectors—UHF standard (gold flashed), BNC, N, C & F available to order. **£19**

NEW! AC-3 remotely operated antenna switch. No extra cables required.

The AC-3 enables one of 3 antennas to be remotely selected using a single co-axial feeder. No multi-cored cable is required. Handles 500W p.e.p. up to 150MHz. **£35**

Western Electronics (UK) Ltd

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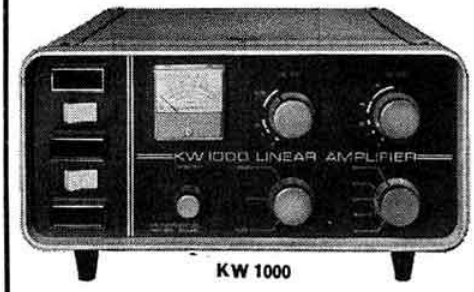
KW 108

KW 108 Monitor Scope Monitor your transmissions 10–160m. two-tone test generator incorporated to ensure optimum linearity for ssb.

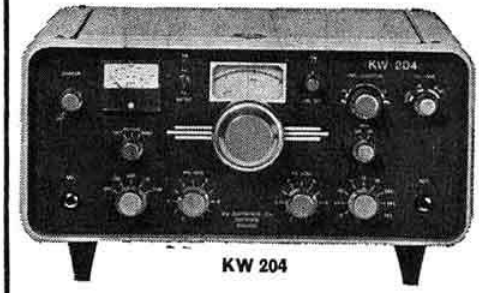


KW 1000

KW 1000 Linear Amplifier 10–80 metres. 1200 watts p.e.p. input max. Designed to be "driven" by KW 2000A/B/E or other Unit of similar power rating. In-built 2·5kV psu. PA tubes pair T160L. Very quiet in operation.

KW 107

KW 107 Antenna Tuning System Incorporates E-Z match, SWR/RF Power meter, dummy load, Antenna switch. A high power version KW 109 is also available.



KW 204

KW 204 Transmitter Well known for really good audio quality (ssb) and a favourite with cw enthusiasts. 10–160 metres. Reliable PA Tubes (2 × 6146).

Stockists for Hy-Gain beams and verticals. CDR rotators, Shure microphones etc.

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Other KW Favourites. KW 1000 Linear Amplifier KW E-Z match ATU; KW 160 ATU; KW 103 SWR/RF Power meter; KW Dummy Load; KW Traps (The original and best); KW Trap Dipoles; KW 109 Supermatch (High Power Version); KW Low pass Filter; KW Balun; KW Antenna Switch.

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Easyterms available over 12, 18 or 24 months

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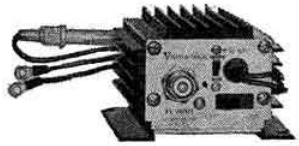


144MHz LINEARS RFL

RF sensing, switchable drop out time SSB, AM, FM, CW, 12VDC. 10W drive. 801 100W, 901 150W. Available late June:

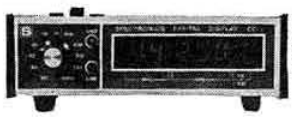
RFA-10-100-HBX (801) .. **£75**
RFA-10-150-HBX (901) .. **£95**

RF SPEECH PROCESSOR KP12

Audio to audio, via 10·7MHz, mains powered, illuminated meter, FT-101, FT2 plugs suitable all phone modes superb on FM.

EX STOCK IN TOTTON.
£44 p & p 40p (+ 8% VAT)

READOUT UNIT FOR FT-101 ETC. DD1 Ex stock in Totton



Digital readout to ± 100Hz for your FT-101 (B), FT-401 (B), etc. 21 IC's 76 diodes provide a most worthwhile accessory.

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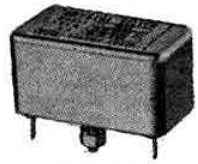

9MHz SSB FILTERS YF90/F/S EX STOCK IN TOTTON.
2·4kHz, 6 pole, each individually supplied with ± 6dB, 25dB, 60dB bandwidths, ripple factor and insertion loss.
Filter only **£11.00**
Filter, USB Crystal, **£12.50**
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FOR SSB ON TWO METRES—BELCOM LINER II low output 240kHz coverage on two 12VDC **£145.00** (+ 25% VAT)

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ONLY £75 FITTED WITH SIX CHANNELS!—SO, S20 AND YOUR CHOICE FROM R21, S22, R5, R6 & R7

KP202, **£75.00** KCP2 base master, **£8.80** NI-Cads (set 10), **£8.50** Stubby Antenna, **£4.25** Case, **£3.75** Burst unit, **£5.50** F to UHF adaptor **95p**

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8% VAT ONLY

FT2FB (14MHz Rx, 18MHz Tx)

144 {·15, ·20R, ·30R, ·36, ·4R, ·50, ·60
145 {·05, ·09R, ·32, ·40, ·44R, ·51R, ·80R, ·84, ·90

All £3.30 pair; £1.80 single

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Duplex 145 {·075/675, ·100/700, ·125/725, ·150/750, ·175/775
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All £3.50 pair; £2.00 single

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144 {·15, ·25, ·36R, ·40R, ·48T, ·60R, ·70R,
145 {·09, ·68R, ·80

All £3.30 pair, £1.80 single crystal

Simplex 145 {·000, ·400, ·425, ·500, ·525, ·550, ·570, ·600, ·65R
Duplex 145 {·075/675, ·100/700, ·125/725, ·150/750, ·175/775
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CRYSTALS TO ORDER 6/8 weeks delivery

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NEW LOW PRICE SWR/POWER METERS (p & p 37p)
Freq. 3·5–144MHz (SWR only to 432) UP to 2kW.

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FL50B, £60.00
FR50B s/s, **£75.00**

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VFO for IC21, **TBA**

Buy it with Access

PLEASE NOTE—THESE PRICES *DO NOT* INCLUDE VAT (25% or 8%)

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Carriage paid, England & Wales

Illustrated right. Tiltover Telescopic post mounted ex-stock. The tilting action allows ease of maintenance and changes of antennas. The relatively low weight eases installation problems. From: **£172.25** (+ 8% VAT)

TELOMASTS
(England & Wales, carriage £1.50) (+ 8% VAT)

Galvanized steel Telescopic 10ft. section with or without rigging.
30ft.—**£15.00** 40ft.—**£20.00** 50ft.—**£25.00**
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Carriage paid, England & Wales

A/Alloy Telescopic 1·5, 2, 3 metre sections, 6-21 metres from **£11.60** for 6m to **£38.00** for 21m. (+ 8% VAT)

HAMTOWERS
(Carriage extra)

Galvanized lattice 10ft. sections 30ft. height with climbing steps on one face. From: **£90.50** (+ 8% VAT)

NEW from U.S.A. **SOMMER GENERATORS**—EX STOCK IN TOTTON (8% VAT) **NEW from SMC**

GA123M5 1000W 230V AC	£135.00	GA303M5 2400W 230V AC	£215.00		
GA203M5 1600W 230V AC	£155.00	GA403M5 3200W 230V AC	£320.00		

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HY TOWER	10–80m Vertical Radiator	£132.00	TH2 Mk III	10–20m. 3 element	£69.00	DB1015A	10–15m. 3 ele		£76.00
18V	10–80m. Loaded Vertical	£18.00	TH3 Jnr.	10–20m. 3 element	£74.00	DB24B	20m 3 ele. 40m. 2 ele.		£142.00
12AVQ	10–20m. Trapped Vertical	£25.50	TH3 Mk III	10–20m. 3 element	£99.90	402BA	40m 2 element		£121.00
14AVQ	10–40m. Trapped Vertical	£36.00	TH6DXX	10–20m. 6 element total	£119.00	204BA	20m 4 element		£96.00
18AVT	10–80m. Trapped Vertical	£52.00	HY QUAD	10–20m. 3 element	£99.00	203BA	20m 3 element		£80.00
BN86	1 : 1 Balun	£9.50	LA1	Lightning arrestor (gas)	£17.50	153BA	15m 3 element		£44.00
5 62	Rotary bearing	£3.50	LA2	Lightning arrestor (spark)	£3.00	103BA	10m 3 element		£35.00

S.M.C. TRAP DIPOLES (Carriage paid) (25% VAT)
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CDE ROTATORS
EX STOCK (IN TOTTON) FOR FAST DELIVERY (8% VAT)

THE NEW CONTROL UNIT FOR THE CD44 AND HAM 2

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ALL ROTATORS SUPPLIED COMPLETE WITH APPROPRIATE CONTROL BOX AND INSTRUCTIONS

AR30 for Stereo and small VHF beams	£25.00
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Con Cable 5 way for AR30/AR40 (8% VAT) at 18p/m	
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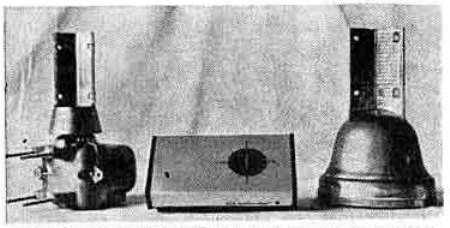

THE NEW SILENT CONTROL UNIT WITH AN AR30 and 40

NEW from CDE **THE AR33** EX STOCK IN TOTTON **Special Offer £35**

Rotor unit mechanically similar to the AR40 but with a deluxe control box. Featuring five push buttons for pre set beam headings (beacons, repeators etc) in addition to full manual control. (Normal price from July **£36.75**). (8% VAT) **NEW from SMC**

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KW103 SWR/PWR meter	£16.00	Dummy Load 75/50 ohm	£12.00	KW160 Topband ATU..	£18.00	KW108 Monitorscope	£85.00
KW107 SUPERMATCH	£63.00	Antenna switch, 3 way	£6.00	KW EZ match 10/80m ATU	£22.00	KW109 QRO ATU	£78.00

MOSLEY TRI BAND (10-15-20m) BEAMS (carriage £1.75) (+ 25% VAT)

TA33 Jnr E 3 ele 200W RMS	£53.00	TA32 Jnr E 2 ele 300W AM	£37.00	Mustang 3 ele 2kW PIP	£70.00	Mustang 2 ele 1kW AM	£56.00

BANTEX FIBREGLASS, STAINLESS STEEL VHF/UHF MOBILE ANTENNAS (Carriage 75p) (+ 25% VAT)

B5 ⅝Wave 144MHz,	£5.00	**B5U** ⅝Wave 432MHz	£5.00	Magnetic Base Mount,	£7.50	Note: deduct 50p from price of
BGA ¼Wave 144MHz	£6.60	**70¼**Wave 70MHz	£6.90	Trunk Lip Mount	£5.10	aerial if standard base not required

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Tribander 10, 15, 20	£13.53	LF40, 80 or 160m	£4.51	Flexiwhip, 10m with base	£10.45	F15, 20, 40, or 160	£4.67
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75 ohm UR57	33p/m	75 ohm Economy ..	10p/m	300 ohm Ribbon	6p/m	50 ohm UR43/UR76 ..	15p/m

COAX PLUGS (p and p extra)
PL259 **42p**; Reducers **12p**; PL259A **54p**; UHF Angle **90p**; S0239 **33p**; VHF back to back **66p**; BNC plugs **42p**; N plugs **82p**

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This month's Heathkit selection. 2 metre FM equipment.

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HEATH Schlumberger

HA-202 2-M FM Amplifier

Delivering 40 watts (nominal) out for just 10 watts in, the HA-202 needs only a 12 VDC supply. So you can easily use it in your car or boat. It features all solid-state design and is a perfect match for the HW-202 Transceiver.

HA-201 2-M Amplifier

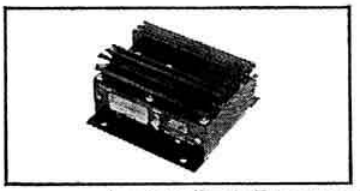
For both mobile and fixed station use from 12 to 16 VDC. The HA-201 operates from 1 to 3 watts FM input in the 144–146 MHz band, giving an 8 watt output for 1 watt input. Supplied in a robust metal case, it features all solid-state design on a single P.C. board.

HW-202 2-M FM Transceiver

With all solid-state design, multi-channel capability, PTT mike and optional tone burst encoder. The HW-202 has 10 watt minimum output and is designed to operate into even an infinite VSWR without failure.

HM-2102 VHF Wattmeter

With a built-in SWR bridge and 50 to 160 MHz range, the HM-2102 is the perfect tune-up tool for 2-M gear, and covers 2-way commercial, aircraft and amateur communications.



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Region 16—East Anglia	E. T. Jacobs, BRS32513, 26 Pondfield Road, Colchester, Essex.
Region 17—Southern	L. N. G. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants.

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Trophies Manager	P. A. Miles, G3KDB, 28 Scotch Orchard, Brownsfield Park Estate, Lichfield, Staffs.
VHF Manager	G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23.

Membership rates: UK—£5.50, VAT included (Unlicensed members under 18 years of age—£2). Overseas—£5 (USA $12). Members are asked to notify changes of address without delay.

CURRENT COMMENT

"Radio Communication" paper

Members will have noted the change from a coated to an uncoated paper on which the May issue was printed, and may wonder at the reasons for it and why this issue is again printed on a coated paper. The simple answer is one of economics.

Up to a year ago it was possible to obtain coated paper of a weight which allowed a 64-page issue to be posted at the under-4oz rate and a 96-page issue at the under-6oz rate. However, as a result of the paper shortage it was no longer obtainable and a slightly heavier paper which tipped the scales over the above limits had to be used instead, which resulted in all subsequent issues carrying a higher postal charge.

In order to cut postage costs, two alternatives (assuming that the printed area per page remained unchanged and that the number of pages was not reduced) were available: (a) trim the journal margins undersize to reduce the weight, or (b) use a lighter paper of a different grade. Having seen the results of (a) on another journal in the field it was decided that (b) was the more acceptable alternative, and consequently the next paper order placed was for uncoated paper which met the weight requirements. This would allow a return to 64 pages under 4oz and 96 pages under 6oz—it should, perhaps, be explained here that the most economical way of printing is in multiples of 16 pages.

The remaining stock of heavier paper was sufficient to print the journal up to and including the June issue, limiting the issues to 80 pages to keep the weight under 6oz. However, it was decided that the special Interference issue should be published in May, and as this needed to be of 96 pages the uncoated paper already in stock was used in order to reduce the postage per copy from 11p to 9½p—a saving of approximately £275 for the whole issue.

This still left, of course, a remaining stock of the heavier paper sufficient for two issues, and it is this paper which was used for the current issue and will be used next month. Thereafter the lighter paper will be used, sufficient stock having been ordered for 12 issues.

The average cost of posting each issue of the journal has risen from £800 in the first half of 1974, to £1,250 from July 1974 to March 1975, and to £1,775 from April 1975. At the latter figure, the present cost of posting an issue of *Radio Communication* has risen to approximately half the cost of printing it, so that a saving of £275 an issue by the use of the new paper will in some measure alleviate the effects of ever-rising postal rates over which we have no control.

A. W. Hutchinson,
Editor

QTC AMATEUR RADIO NEWS

RSGB Trophies Manager

Mr P. A. Miles, G3KDB, whose address is 28 Scotch Orchard, Brownsfield Park Estate, Lichfield, Staffs, has been appointed RSGB Trophies Manager. The Society is grateful to Mr Miles for volunteering his services in this capacity, and members can assist him by returning trophies to him by the first week in November so that he can arrange new engravings in time for their presentation at the AGM in December.

Facts and figures

The Home Office advises that the following numbers of amateur licences were in force at 31 March 1975:

Class A	15,418	Class B/M	1,619
Class B	5,242	Television	286
Class A/M	3,517		

The callsign record received from the Home Office dated 19 April 1975 gives the latest callsigns issued in the G4 and G8 series as G4DXN and G8KEU respectively.

At the end of April 1975 RSGB membership totalled 18,232 made up of 15,337 UK corporate, 1,055 UK associate and 1,840 overseas members.

New call series

The ITU advise that the following callsign series has been allocated provisionally:

C7A-C7Z World Meteorological Organization.

HEADQUARTERS NOTICE

To assist the staff in dealing with members' correspondence efficiently, please address enquiries to the appropriate department, marking the envelope accordingly, ie "The Editor" (all matters concerning the content of *Radio Communication* or other RSGB publications), "Accounts", "Publications sales", "Subscriptions", "Technical".

When more than one matter is being raised, please write each enquiry on a separate sheet. Multi-subject letters are difficult to process and cause delay in reply.

Your co-operation will be appreciated.

"Out of stock" publications

Members' attention is drawn to the fact that the following publications are at present unavailable:

Radio Communication Handbook—out of print;

ARRL Radio Amateur's Handbook (Hardback)—out of stock;

Radio Amateur's Examination Revision Notes—out of print.

Orders already received for these books are not being acknowledged but will be held until stocks are available.

Essex Repeater Group

This group, formed at the beginning of the year, has now submitted its application to the Home Office for a 70cm repeater to be sited at Danbury.

To assist fund-raising, a grand bring-and-buy and junk sale will be held at St John's Hall, Vicarage Road, Chelmsford, on Saturday 28 June from 11am to 6pm.

The group will be arranging talk-in on 433·200MHz S20/S22 and 4m. The trade is invited. For further information contact G3VKQ, G3WCO or G3MVV, QTHR.

Extended coverage of GB2RS

Improved reception of the GB2RS News Bulletin Service in north-west England should now be possible following the recent appointment of two GB2RS newsreaders in that area, these being G3LEQ in Knutsford on 3·6MHz at 1115, and G8BHQ in Stockport on 144·5MHz at 1045.

RSGB Region 12 Amateur Radio Assembly

The following information, additional to that published in the May issue of *Radio Communication*, has been notified by T. C. Wratten, Jnr, GM4CAU, 89 Hilton Road, Aberdeen AB2 2HX, from whom additional details should be obtained and to whom bookings should be sent.

Ladies' programme. Conducted tour of places of interest in Aberdeen, including a stop for refreshments.

Building contest. Exhibition of items entered, with a prize for the best entry.

Talk-in. Listen for GM3BSQ/A on 80m ssb, GM3TDI on 2m fm, and GM4CAN/A on 2m ssb/a.m.

Tickets. These, and bookings for overnight accommodation, will be available until 16 June.

Conference stamp

To mark the recent IARU Region 1 Conference in Warsaw the Polish authorities issued an attractive multicoloured stamp having a value of 1.50 zlotys. The diamond-shaped centre of the stamp depicts a map of Region 1 and carries the IARU badge. A special first day of issue franking was available to conference delegates. The value of the stamp, which converts to about 3p, is that of the cost of the internal letter rate in Poland.

Reward offered

Amateur Radio Shop, 13 Chapel Hill, Huddersfield, tel 0484 20774, will pay a substantial reward for information leading to the recovery of a Liner 2, No 45101494, stolen from their display at the Belle Vue Convention on 27 April 1975.

Aerial circus in the Midlands

Dud Charman, MBE, G6CJ, will present his well-known "aerial circus" at 7.30pm on Tuesday 17 June 1975 at the University of Birmingham. This special meeting has been arranged by Solihull ARS, and visitors will be welcome by prior arrangement with the society secretary, G4AEJ, QTHR, tel 021-783 2024.

Telecommunications research

Telecommunications, a report recently published by the Science Research Council, contains recommendations for a broader inter-disciplinary approach to university telecommunications research. The report contains the findings of a panel under the chairmanship of Professor J. Brown of Imperial College, London, set up to consider the role of the SRC in university research and training in telecommunications.

It is published as a 26-page booklet, copies of which may be obtained free of charge from the Electrical and Systems Engineering Committee Secretariat, Science Research Council, State House, High Holborn, London WC1R 4TA.

Printing

A large range of stationery requirements including QSL cards, rubber stamps, personal labels and notepaper is now available from Western Electronics Press, a division of Western Electronics (UK) Ltd, 1-3 West Park Road, Southampton, SO1 0FX. An sae to this address will bring a leaflet giving full details of the items available.

9M2DQ

During June and July Jimmy Pershouse, 9M2DQ, will be touring in the UK. He would like the opportunity to meet UK operators whom he has contacted on the hf bands. Replies may be sent via G6RC.

SU old-timers sought

Ex-SU1KG, Bob Green, of Alexandria, Egypt, now G3APH and living at 9 Hopgrove Lane North, Malton Road, York, would be very interested to hear from any of the old-timers who were operating in SU-land during the late 'twenties and 'thirties.

Textile net

G3YHC, G4CTU and GW4AES, all connected with the textile industry, have a regular net on 3·795MHz at 9.30am on Saturdays. Any radio amateur employed in the textile or allied industries would be very welcome to call into the net.

Accommodation requested

Gerard Challet, F6BOC, 79290 Argenton–L'-Eglise, France, wishes to stay with the family of a London amateur in the 19-27 age group not far from Heathrow for 8 to 10 days in August. He is an electronics technician, aged 27, who wishes to improve his English and visit amateurs and clubs in the London area.

The GM3OXX portable 3cm transceiver

by G. BURT, GM3OXX*

Introduction

This article describes what is probably the simplest and most economical means of transmitting and receiving signals over considerable distances on the 3cm band (10,000–10,500MHz). As is usual, results depend on the aerial with which the transceiver is used. With a small horn having a gain of 15-20dB, optical distances of 50km or better can be expected, while if a paraboloid of around 30dB gain is used the equipment is capable of distances exceeding 150km, which will earn the user the RSGB Microwave Award.

The transceiver is so small that it can be held in the hand and carried to normally inaccessible mountain tops. For use over short distances hand-held operation is perfectly feasible, but for serious dx a stable support such as a light tripod or mast is recommended. The equipment is powered from a 12V dc battery of 2Ah capacity which provides a minimum of 10 hours' continuous running.

This little transceiver surprised its builder and has delighted the remainder of the GM microwave group. It was a pleasure to see it working, first over modest distances, which gradually increased until finally it earned its owner Microwave Award No 14 for a 2-way contact of 163km when using a 2ft dish aerial.

Basic system

A simple block diagram of the transceiver is shown in Fig 1. An X-band Gunn oscillator functions in the dual role of transmitter and self-oscillating mixer. When in the transmit mode the oscillator is frequency modulated by a 1,000Hz tone for test, alignment and mcw, or by a modulator for speech. Deviation of up to 1MHz is produced. On receive, signals 10·7MHz away from the oscillator frequency are selected by the fixed-tuned high-gain fm i.f. strip and demodulated. After audio amplification the modulation is heard in a small loudspeaker or headphones. The tone oscillator can be used on receive as an aid in reception of mcw and unmodulated signals. A stabilized power supply produces 7·5±1V for the Gunn oscillator alone. The i.f. and af amplifiers are powered by 6V derived from a separate simple voltage stabilizer.

Circuit description and notes

The Gunn oscillator (Fig 2(a)) is to the GM8BKE design described in the May 1974 *Radio Communication*, page 288, with minor improvements. Experiment has shown that the matching screw should be positioned 3λ/8 (7·5mm) in front of the Gunn, and a 6BA screw is now preferred to the 4BA screw originally specified.

While fixed-frequency operation is possible it lacks flexibility unless a tunable i.f. is used. A marked improvement in operating convenience results from making the Gunn oscillator tunable, thus providing the facility of being able to tune the receiver to the frequency of any transmitting station. Accordingly (Fig 2(b)), a small micrometer replaces the 4BA tuning screw. Although this may seem a trifle crude it certainly works and the tuning rate is not unduly rapid. Once netted, small corrections of ±5MHz are made by adjustment of the voltage-setting potentiometer in the stabilizer power supply. The frequency stability has been found to be more than adequate without the need for afc. This is the outstanding feature of the GM8BKE design.

The rf output of the X-band Gunns, currently advertised in *Radio Communication*, (believed to be CXY11 or equivalent) is nominally 10mW. However, spread in production results in devices which will deliver more than twice that; at the same time others will only produce about half. Since most constructors will wish to have a spare Gunn in case of emergency there is a good chance that one of the two will produce at least 10mW. The dc input to the oscillator is

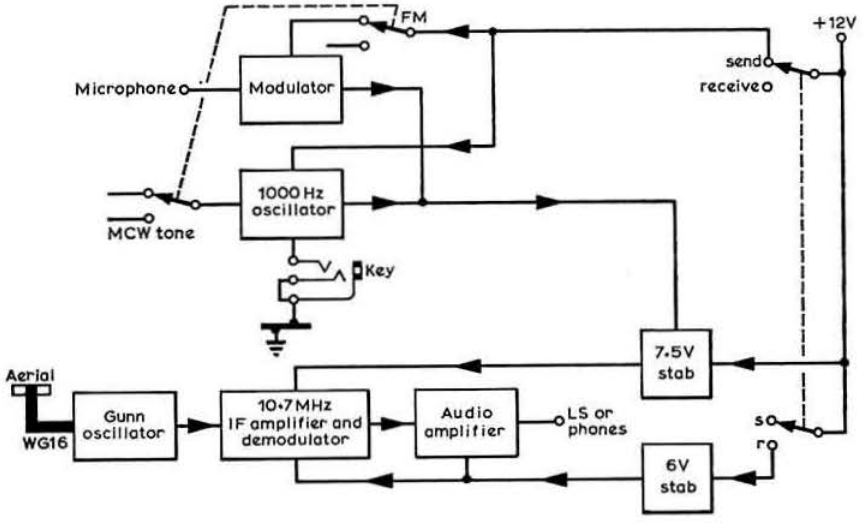


Fig 1. Block diagram of the 3cm transceiver

* 1/5 Essendean Terrace, Clermiston, Edinburgh.

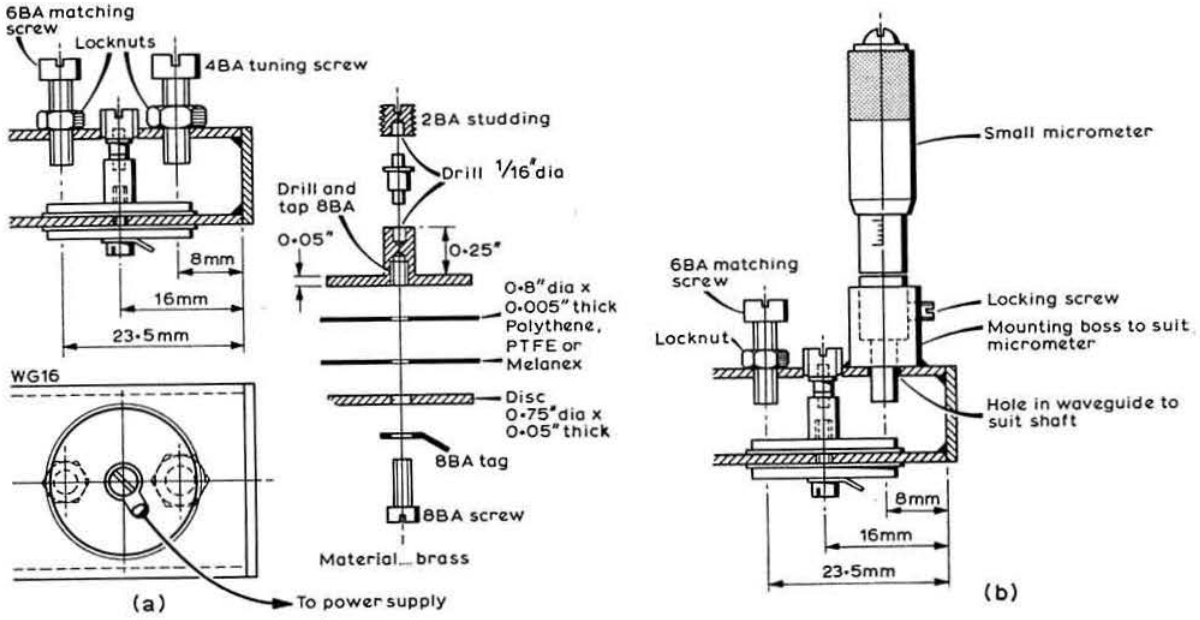


Fig 2. (a) The GM8BKE design for a simple fixed-frequency Gunn oscillator. (b) The GM8BKE design modified for continuous tuning using a small micrometer

approximately 1W (140mA at 7V), giving an efficiency of around one per cent which is comparable with that of a small klystron.

A Gunn device will not survive a reverse supply connection, and it is therefore essential that the constructor should avoid an expensive accident by being able to recognize the polarities of the two stud connections. An enlarged drawing of a Gunn is shown in Fig 3. Correct polarity should also be observed if it is ever found necessary to measure the dc resistance (about 5Ω). Beware particularly of certain multimeters which use internal batteries of up to 22V on ohms ranges.

The modulator, tone oscillator and power supply require little comment, being to the G3ZGO design described in the March 1972 *Microwaves* column: Fig 4(a). An updated version, equally suitable, was described in April 1974: Fig 4(b). The voltage-setting preset potentiometer can be brought out as a manually adjustable control for fine frequency tuning when netting.

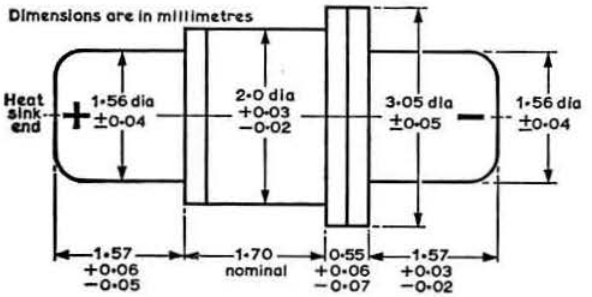


Fig 3. The polarity and outline dimensions of a typical low-power Gunn diode

On receive, the Gunn operates as a self-oscillating mixer. When used as a mixer a Gunn will be noisier than a microwave diode but not by so much as to be of great consequence. Ideally, the device should be selected for optimum performance as a low-noise mixer but the majority of constructors will have little choice in this. Experience shows that Gunns which oscillate normally function satisfactorily as self-oscillating mixers. The untuned primary winding of the first i.f. transformer (Fig 5) is connected in series with the 7·5V supply line to the Gunn oscillator and signals at 10·7MHz are selected by the double-tuned bottom-coupled circuits. Some 20-25dB gain is supplied by the cascode-connected pair of 2N5486, 2N5245, TIS88 or equivalent, whose source current is set to about 5mA by adjusting the 220Ω resistor in the supply line. A second double-tuned transformer is used to couple the amplified signal to the TAA350 limiting i.f. amplifier.

Note that the TAA350 may not now be generally available, having been superseded by the TAA350A. The two are identical except that the connections have been rotated by three on the TAA350A. The amplifier has a matched power gain of typically 80dB and limits at 100μV input. Demodulation is effected by a simple slope detector. Though no snags have been encountered by the author, it should be noted that the TAA350 is a high-gain device and care should be taken to see that no earth-return currents from the output get back to the input, otherwise the device will oscillate. So keep ic leads and decoupling capacitor leads as short as possible. The inductor for the slope detector should comply with the manufacturers' recommendation if top performance is to be achieved.

No volume control was fitted on the box, as it was found that due to the TAA350's input limiting of typically 100μV the recovered audio just drove the final audio amplifier to a

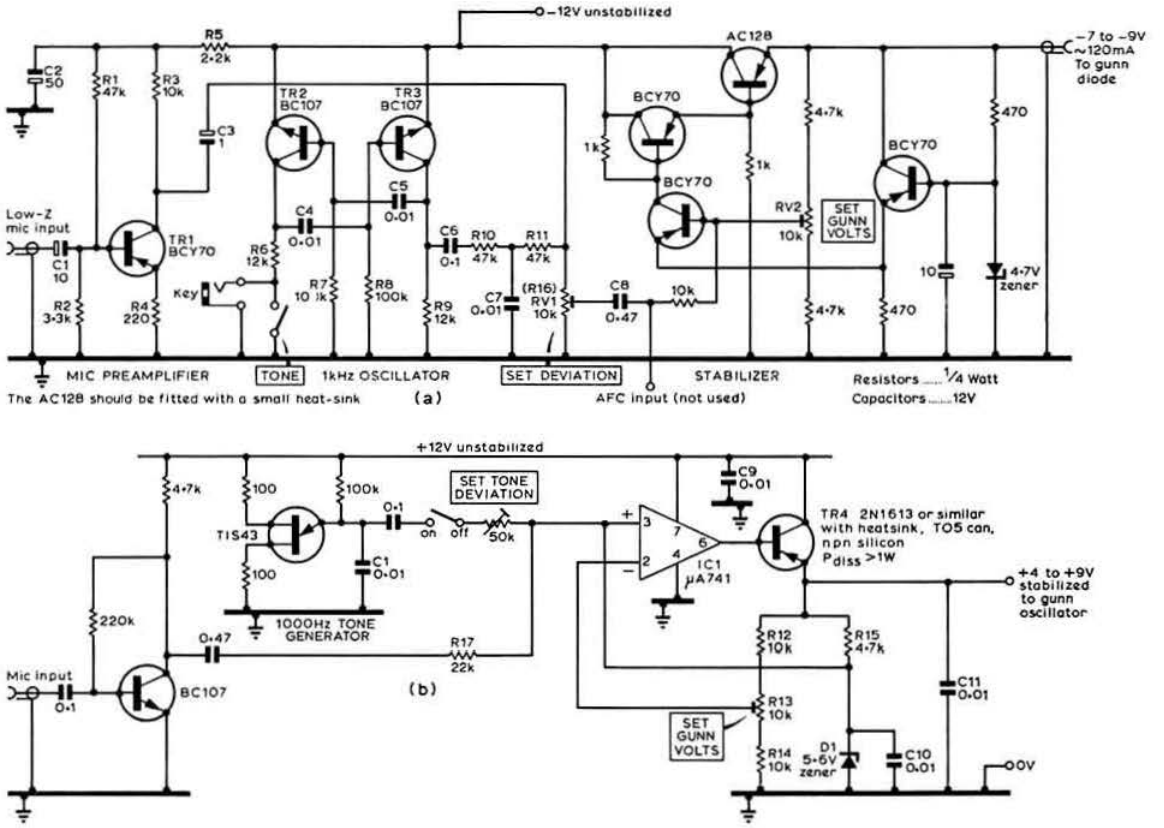


Fig 4. Combined modulator, tone oscillator and psu circuits suitable for use with the 3cm transceiver. For greater safety, precautions should be taken to protect the transceiver from damage due to supply reversal. To protect the Gunn oscillator, connect a zener diode rated at approximately 0·5V above the maximum working voltage across the dc supply line to the oscillator. Component references are keyed to Fig 7 (b).
(a) A positive-earth modulator/psu by G3ZGO. To obtain negative earth reverse the polarities of zener diode, electrolytics, and substitute npn transistors for pnp types and vice versa. A fixed resistor of 10kΩ replaces RV1 in Fig 7.
(b) A negative-earth modulator/psu for a low-power Gunn oscillator after G8CGN. Change C1 to alter tone frequency. Change R17 to vary deviation on speech

comfortable level. However, a volume control can easily be fitted by changing R7(10kΩ) for a 10kΩ potentiometer.

The i.f. and af amplifiers are operated from a stabilized 6V line provided by a simple stabilizer from the 12V supply. Although an MJE520 is quoted, practically any small npn power transistor would do this job, such as a 2N3053. Changeover from receive to transmit is accomplished by means of a miniature toggle switch. The Gunn oscillator runs continuously. The total drain from the 12V supply is approximately 200mA on transmit and 240mA on receive.

Constructional details

Only general guidance can be given because so much depends upon the expertise of the constructor and tools and facilities available to him.

The Gunn oscillator is constructed in brass WG16 to the dimensions quoted in the May 1974 issue of *Radio Communication*. If either oscillator is selected these dimensions can be used with confidence except, as noted earlier, the matching screw is positioned 7·5mm in front of the Gunn and a 6BA screw is preferred.

If a tunable Gunn oscillator is required, the size of the micrometer mounting boss will depend on the size of the micrometer available. In any case the boss outside diameter cannot exceed approximately 12mm. The constructor is advised to have the boss turned down and drilled on a small lathe. Brass rod of ¼in diameter will generally be suitable and if the job cannot be done within the local amateur fraternity most small engineering concerns will oblige for a modest fee. A hole a few thousandths of an inch larger than the micrometer shaft where the tuning screw was originally located must now be drilled.

The micrometer should be inserted in the mounting boss so that the shaft enters the hole and thus locates the boss for soldering. Set and lock the micrometer so that approximately ¼in of the shaft enters the waveguide.

The mounting boss is soldered to the waveguide and solder is built up around the bottom edge to give as strong a

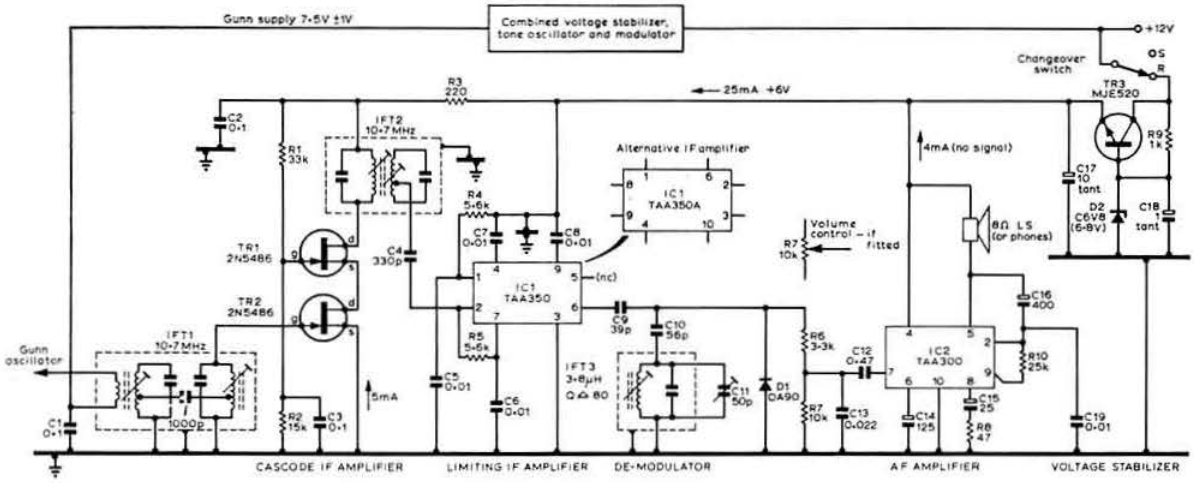


Fig 5. The receiver i.f. and audio circuit diagram. R10 should be selected to give 4-5mA standing current. Note that this circuit has a negative earth. Suitable alternatives for TR1, TR2 and 2N5245 or TIS88

joint as possible. A soldering iron of some 150-200W rating is essential for this job which must be done before the back plate is soldered to the waveguide to seal the cavity. Ensure that the waveguide mounting boss and back plate are shining bright and perfectly clean before soldering, or dry and weak joints will occur.

A further refinement is to terminate the waveguide cavity with a solid, tight-fitting block instead of a soldered brass plate. The block can be slid in or out to set the oscillator frequency and power peak, then fixed by a set screw, solder or adhesive. If this suggestion is adopted the cavity length should be increased to allow for the depth of the block.

With the dimensions quoted, a power peak will be obtained at the bottom of the band, say around 10,050MHz. If it is much lower than this point the back plate can be removed and a few thousandths of an inch taken off the end of the waveguide, using a smoothing file, and the back plate replaced. As this is very much an empirical operation, due care should be taken or the power peak will go too high. In this event it would be better to advertise for QSOs on 10,368MHz rather than on 10,050MHz, or start again and retain the original cavity for later use as a local oscillator in a more sophisticated receiver.

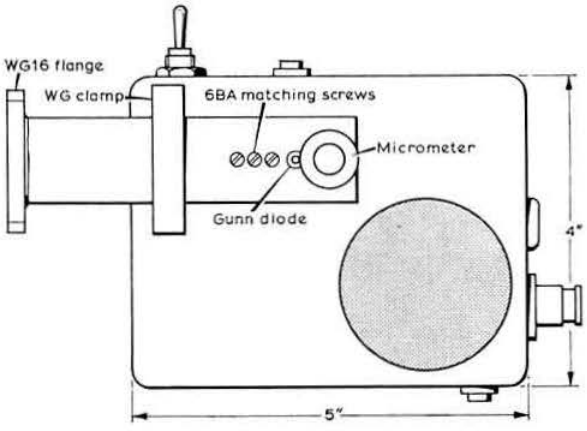


Fig 6. General external view of the 3cm transceiver. Although three matching screws have been allowed for, only the first has been found to be necessary. The Gunn oscillator supply is fed through the box

Although a small horn aerial can be soldered to the output end of the oscillator it is a great convenience to use a flange at this point so that different aerials can be coupled up. Design data for horn aerials was given in the *Microwaves* column, February 1972. The waveguide containing the Gunn oscillator is firmly clamped to the outside of the box (Fig 6).

The constructor has the option of using either a positive or a negative earth system. Although not shown in the circuit, a silicon power diode is connected in series with the power supply line and decoupled to protect the circuits in the event of polarity reversal. The crowbar diode and fuse method may be preferred.

Because the i.f. transformers were salvaged from a defunct fm transistor radio of oriental origin it is not possible to give details. Similar items are available from advertisers; two pairs of single-tuned transformers could be interconnected to do the same job. The overall bandwidth should be 200-250kHz.

The layouts of the printed circuit boards are given in Fig 7. It is not suggested that these component layouts should be followed slavishly by every constructor, but due regard should be paid to the need to avoid rf and af instability by adopting sensible component layouts throughout. The original box housing the complete transceiver measures 5 by 4 by 1½in. Operating controls are mounted round the edge.

Alignment

(a) Check wiring before switching on, set Gunn voltage to 7·5V and, if possible with the use of an oscilloscope, check that there are no parasitic oscillations.

(b) Presence of tone and modulation can be checked by connecting high-resistance headphones across the 7·5V line. Tone and speech will be faint but audible.

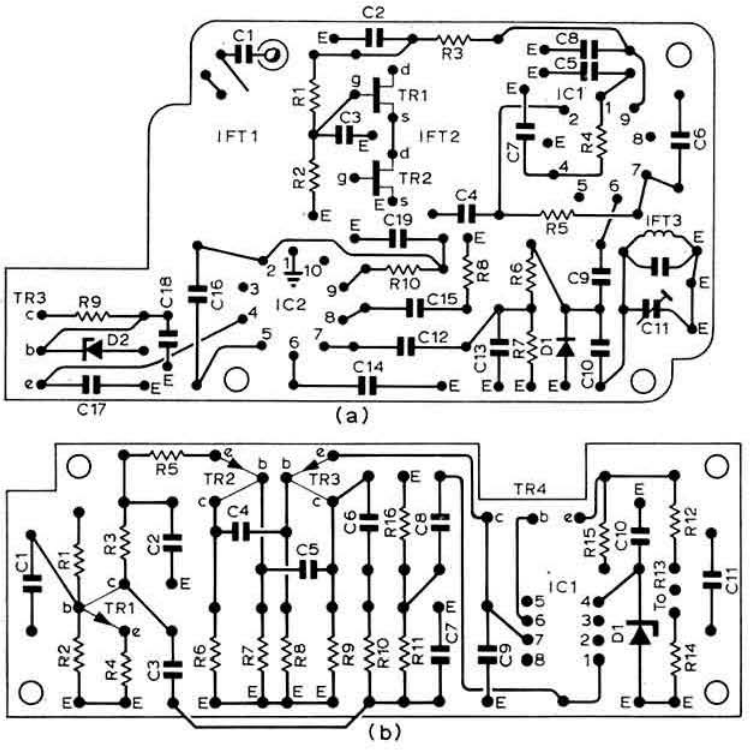


Fig 7. Typical component layouts and wiring: (a) i.f./af board and (b) modulator/psu board which uses a μA741 in the stabilizer section instead of discrete components. Both boards are actual size and are wired for negative earth

(c) Check Gunn is oscillating by measuring the current being drawn by it. Set frequency with the use of a wavemeter; this will depend in which part of the band one's local activity is. For GMs it is 10,050MHz. One point to note about the use of the matching screw is that in some cases it has caused a reduction in the tuning range. If this occurs then the matching screw should be removed and the unmatched power level accepted.

(d) In co-operation with another station, check tone and modulation are working and that deviation is satisfactory.

(e) Peak i.f. transformers for maximum audio output. Adjust slope detector for best audio quality on speech.

Operation

Since transmit and receive frequencies are 10·7MHz apart it is necessary to operate the transceiver in a rather special way.

With the fixed-frequency version the receive frequency must be set up 10·7MHz from the transmit frequency of the station it is desired to contact. This may be done either by means of a short-range contact with aerials at 90° or by using a common wavemeter. On arrival on-site, fine tuning is accomplished by adjustment of the voltage-setting potentiometer.

When using the tunable model there is no need for preliminary netting. The distant station must be invited over the talk link to transmit first with tone on so that a signal can be received and netted. On changing to transmit the distant station will then receive a signal either 10·7MHz above or below his transmit frequency. Tone may now be switched off and a voice QSO commenced.

It has been found useful to transmit tone 5-10s at the beginning of each over to allow the receiving station to adjust if necessary for maximum audio output before the speech transmission commences.

Alternatives

The transceiver should work with all the Gunn oscillators described in the May 1974 issue of *Radio Communication*, although the more elaborate versions have not been tried by the author. The choice of i.f. is wide open and 10·7MHz was selected only because components were available. For example, a 30MHz i.f. strip was described by G3WDG in the July 1972 issue of *Radio Communication*. Another option is to use a domestic transistor fm portable as a tunable i.f. at around 106MHz with a preamplifier of about 30dB gain, but i.f. breakthrough is often a problem due to the unscreened case.

In the tunable version a micrometer is not a pre-requisite. A very satisfactory substitute can be manufactured from ¼in brass rod and a mounting boss, threaded and tapped respectively to 40 turns per inch. The final ¼in of the brass rod can be reduced to ⅛in to reduce the tuning rate.

Since the simple self-oscillator/transmitter has been built, several people have constructed the cavity and have found that a nylon screw fitted into the end block makes a good slow-rate tuning screw.

The basic principle used in the transceiver of the self-oscillating mixer can give much better performance if a better i.f. strip is used. The author is now using an i.f. strip with two rf stages on 28MHz, mixer and crystal oscillator, and two i.f. stages and a CA3089E on 10·7MHz. Results show that the Gunn compares favourably with the conventional microwave mixer, and unless one is going dx hunting 200km plus, the simple Gunn set-up can provide a very good 3cm microwave receiver.

Acknowledgements

The author gratefully acknowledges the help of GM8BKE, GM3DXJ and G3RPE for comments and assistance in the preparation of this article. □

Building blocks for the novice

by SVEN WEBER, G8ACC*

Diodes, diodes and diodes — and some experiments with them (Part 15)

Negative-resistance devices (2)

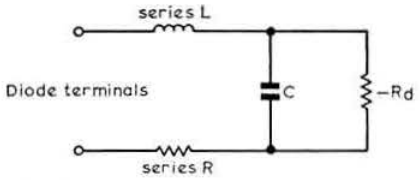


Fig 103. Approximate representation of a tunnel diode to ac

Looking at the tunnel diode more closely, it could be considered as a series resistance, a series inductance and a parallel capacitance to a negative resistance, Fig 103, and it can be proved fairly simply that to get stable amplification $R_{diode} > R_{source} > L/R_{diode} \times C$ (an equality means oscillation) and this applies not only to the diode but to any components attached externally to it. To give some figures, a 1N2940 diode has a capacitance of approximately 5pF, series inductance of 1mμH (with leads cut very short), series resistance 1·5Ω and a minimum value of negative resistance of 150Ω. Putting these values into the L/R_dC expression gives a value of 133. Thus, even ½in leads would have sufficient inductance to make an equality and oscillate (at around 1,000MHz) if there were no external capacitance "non-inductively" (!) connected to the diode. It looks as though these diodes are rather difficult to "tame". Providing, however, that care is taken, they can be very useful and provide gain at a lower noise level than most other systems. A point to make note of here is that the value given to the negative resistance is a minimum, and with change of bias it is normally quite simple to get them out of an oscillating or switching condition.

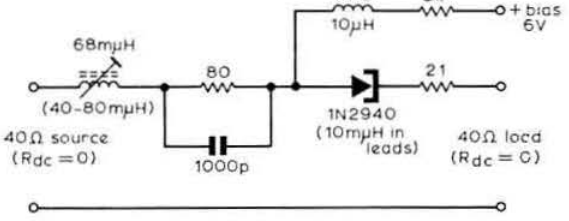


Fig 104. 145MHz series amplifier using 1mA tunnel diode

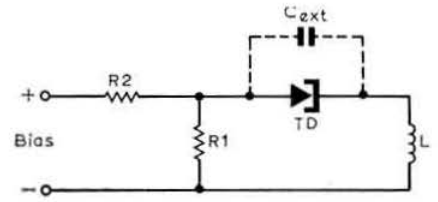


Fig 105. Basic oscillator circuit

Using the following formula

$$f = \frac{\sqrt{(R_d/R_s) - 1}}{2\pi C R_d}$$

(which may again be proved fairly simply), solving for R_s at the frequency of operation and using the inequality $R_s > L/R_dC$, it is possible to design a stable amplifier such as that shown in Fig 104, considering the source and load resistances to be part of R_s. If the inequality given above becomes an equality, so that $R_sR_dC = L$, the diode will oscillate, so a very simple oscillator could be built as in Fig 105. R1 would be in parallel with R2 to form R_s, not forgetting the internal series resistance of the diode and the coil dc resistance. L is both the external and internal inductance. Using the formula

$$f = \frac{1}{2\pi}\sqrt{\frac{1 - (R_s/R_d)}{LC}}$$

and putting L in as 10mμH (total lead length) and arranging the ratio between $R_{s(dc)}$ and R_d to be 1:2, the oscillation frequency comes out at about 500MHz. If the capacitance across the diode were increased, the frequency would obviously drop. The required capacitance across the diode can be calculated for any frequency by combining the inequality with the formula for the oscillation frequency, taking the ratio of R_s and R_d mentioned above and re-arranging, giving $C = 1/(2\pi f R_d)$. So for 1MHz, with $R_d = 150\Omega$, $R_{s(dc)} = 75\Omega$, C is approximately 1,000pF and L is 11·25μH. An oscillator using a 1mA diode with these

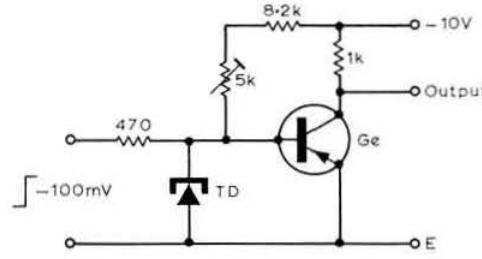


Fig 106. Tunnel diode switch amplified by a germanium transistor

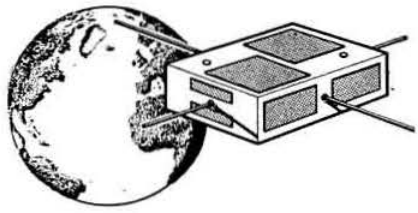
* 132 Murray Road, Rugby, Warwickshire.

constants would give an output of about 35μW sine wave at 1MHz. (The output power is roughly 1/28th of the numerical value of I_{peak}). Frequency stability is dependent upon the negative resistance value (ie, the bias voltage and also the temperature); the higher the frequency the more so. However, oscillators like this and their minute power outputs can be very useful.

If the series resistance is made bigger than R_d, the device will switch very quickly to the corresponding stable state, as was stated above, if a pulse of the right direction comes along. The low power consumption of this switch makes it very attractive. The only trouble is that the maximum voltage is of the order of 350mV, which is not much of a range from the minimum of 55mV, so it has to be amplified. One diode can, however, switch another easily without being amplified, making simple logic circuits quite possible. The disadvantage is that the "fan-out" is very limited. If the voltage is to be amplified, the maximum voltage is too small for a silicon transistor, but a germanium transistor handles it very well, and switching times are quite fast with low input-capacitance transistors (Fig 106). More information about tunnel diodes may be found in the *RSGB Bulletin* of February 1965 and July 1967.

The next article is the last one of the present series and it will deal with points to watch when designing a power supply. □

OSCAR NEWS



Command station

There have been some problems with the Oscar 6 command station and many orbits during the days when the satellite should have been "on" have been unusable. It is hoped that the situation will have been rectified by the time that this is being read.

However, some good contacts have been made through both satellites, and dx stations now active and worked from the UK include FY7AS, KV4AD (29,490kHz), TU2DD (29,480), TU2EF (29,475), ZB2BL (29,485) and 4W1ED (29,480).

Future plans

While both Oscar 6 and Oscar 7 continue to perform splendidly, AMSAT has not been idle; not content with the status quo, it has been formulating plans for the next Oscar. The projected next undertaking, to be known as the AMSAT Phase III project, is being designed to supply a viable alternative to 20m to the majority of the world's radio amateurs. AMSAT Phase III spacecraft are designed for drifting synchronous or high-altitude elliptical orbits. As such, the new planned series of higher-altitude, long-lifetime satellites offers the significant advantage over the previous low-orbiting Oscars of providing improved coverage over longer periods of time and over vastly greater distances.

The AMSAT Phase III spacecraft will be designed by the AMSAT Deutschland group; the actual fabrication of the flight model and integration will be handled by AMSAT-Canada, and WIA Project Australis will design and fabricate the ground telemetry and command equipment.

It will be evident that this is quite an ambitious undertaking in the true spirit of international co-operation. The spacecraft itself will be built for a launch date of mid-1978. It will be much more complex than Oscar 7 and will carry a high-power linear transponder using the 145·9 and 435·1 MHz bands. The command, telemetry and attitude control systems will utilize a common onboard microcomputer. One of two telemetry beacons will utilize a high-speed digital format similar to standard professional spacecraft, the other will employ simpler amateur techniques.

Reference orbits

Date	Equatorial crossing Orbit No	UT	W	Mode
Oscar 6				
7 June	12,084	1624	296	
14 June	12,172	1703	306	
21 June	12,260	1743	316	
Oscar 7				
7 June	2,556	1700	305	B
14 June	2,644	1735	313	A
21 June	2,731	1615	293	B

432MHz equipment

An amplifier and a 28/432 transverter in either kit or built form are offered by ARCOS, Box 546, East Greenbush, NY 12061, USA. This name hides the identity of well-known Oscar user W2GN. The amplifier is based on the established K2RIW design (*QST* April 1972) and is capable of the full legal output on ssb. A power supply and blower are available but in many cases the constructor will have these items. Three IRCs to the above address will bring a descriptive leaflet. □

The RSGB News Bulletin Service

The RSGB News Bulletin, callsign GB2RS, is broadcast every Sunday morning. The bulletin can be received on either vhf or hf, which gives almost complete coverage of the British Isles. It keeps radio amateurs up-to-date about happenings in the world of amateur radio and gives information on coming events, supplementing and bridging the gap between successive issues of *Radio Communication*.

SCHEDULE

Time	Frequency (MHz)	Location and coverage (hf) or beam heading (vhf) of station
0930	3·6	Bromley, Kent (SE England)
1000	3·6	Cheltenham (SW England)
	144·5	Aberdeen (NNW)
	144·5	Croydon, Surrey (NE)
1015	3·6	Belfast (N Ireland)
	144·5	Bangor, Co Down (N)
1030	3·6	Derby (N Midlands)
	144·5	Weston-super-Mare (NW)
	144·5	Aberdeen (SW)
	144·5	Brierley Hill (NW)
1045	144·5	Middlesbrough (NW)
	144·5	Croydon, Surrey (SW)
	144·5	Stockport (NNW)
1100	3·6	Bridlington (NE England)
	144·5	Brierley Hill (SW)
1115	3.6	Knutsford (NW England)
1130	3·6	Motherwell (S Central Scotland)
1200	3·6	Aberdeen (NE Scotland)

MICROWAVES

by DAIN EVANS, G3RPE*

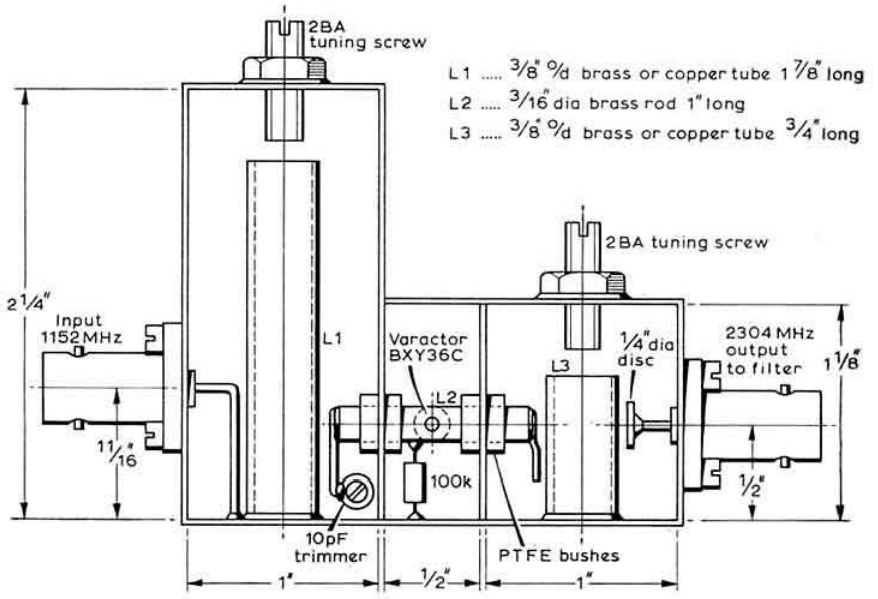


Fig 1. Construction of a 1,152/2,304MHz varactor doubler

10GHz news

G8BDJ is reported to be active from the Brighton area. G4ALN and G8FJG also are now on the band from Romford and eager for contacts. A recent test with G3ZEZ and G3PRQ over a 50km "optical" path from the Isle of Sheppey to Clacton, which should have been successful, failed due to the combination of a very high spring tide on top of which floated a wall of supertankers. That is 10GHz operation!

G8ADP reports that he now works G3WDG regularly over a 10km non-optical path between their homes using crystal-controlled equipment.

In other journals

Rather belatedly, I have come across an excellent magazine called *DUBUS-INFO* which I understand originates from the Berlin Radio Club. GW3ZTH is the local distributor. Besides attracting reports from serious vhf operators all over Europe, the magazine has a fair sprinkling of technical articles. In the microwave area, for example, the October 1974 issue gives the design of a 30-element Yagi for 1,296MHz having a nominal gain of 19dB, and a 1,152/2,304MHz doubler by G3LQR. In the January 1975 issue, DL7QY (its editor) describes a gdo which uses four plug-in rf heads tuned by varicaps to cover 130 to 1,400MHz. DL7HG reports on the use of two CA3049T ICs to form a multiplier which produces 18mW at 580MHz from a drive of 1·6mW at 145MHz.

In the February 1975 issue of *Ham Radio*, the method of construction of a power amplifier for 2,304MHz which involves a minimum of lathe work is given. It uses the ubiquitous 2C39 valve, and an output of 30W and gain up to 13dB is claimed.

A 1,152/2,304MHz varactor doubler

The design given in Fig 1 was based by G3LQR on data given in the Motorola application note AN176. With a drive of 4W he obtains an output of 1-2W. This was ample to work DJ2HF at a distance of 438km to set up the current European record for the band.

The doubler is built in a box of internal depth 1in, fitted with a close-fitting lid. The varactor is mounted between line L2 and the base of the box: one end fits in the hole drilled in L2, and the other in a threaded rod set in a large nut soldered to the bottom of the box. Coupling to the varactor is adjusted by a 10pF trimmer, while that to L3 is by an adjustable tab soldered to the end of L2. The output is taken by a capacitor fabricated on the end of the BNC connector: the spacing should be about 1mm.

Tuning of the input and output lines can be done with 2BA screws as shown, but if screws with a finer thread are available, then they are to be preferred. Great care must be taken with this varactor multiplier, as well as all others, that the output consists only of the correct frequency. □

* 4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

TECHNICAL TOPICS

by PAT HAWKER, G3VA

Several recent topics such as low-cost ssb generation and "alternative" power sources have brought a truly impressive flow of correspondence and we must apologize that some of the very useful comments have to be held over a little while to avoid unbalancing the column and to keep at least some space for fresh subjects. Information, like shaving soap, seldom comes at just the right time in just the right amount —but it is always welcome!

Shoulder-mounted vhf loop aerial

The low-weight "personal" vhf/uhf transceiver is capable of providing a valuable and convenient communications facility—as witness its use by the police. I well remember the considerable struggle that took place some 10 years ago to convince the authorities that the policeman on the beat could really be provided with workable and reliable equipment that would keep him in touch with the station sergeant (one of the earliest and most fervent advocates was Ian Campbell-Bruce, G5IB). The amateur in many areas now has the further incentive of having repeater systems to extend the range.

Most of the British police adopted uhf rather than vhf; this gave the advantage that signals reflected well into built-up areas and also resulted in very short aerials that could be retracted into the body of the unit. But in many countries police personal radios operate in the range 150 to 170MHz and are thus directly comparable with 144MHz practice. This had led to considerable investigation into compact vhf aerials—and how these can be placed so as to minimize absorption losses of the human body.

In *TT* (September 1968) we referred to a classic paper on this subject by Krupa who recognized the very considerable losses that occur when the aerial is in close proximity to the operator's body. This was confirmed more recently in the UK by R. W. Smith, who showed that when an aerial is close to the body or limbs of an operator up to 90 per cent of the signal may be lost. Dr D. A. Tong, G8ENN, in a full-length article in *Radio Communication* (July 1974) drew attention to the normal-mode helical aerial which allows a 144MHz hand-portable aerial to be reduced in length to about 6in (a technique commonly used by the American police) although he did not go into the question of body losses.

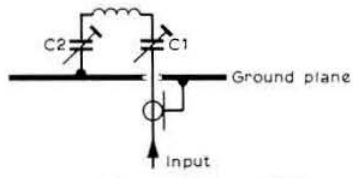


Fig 1. Arrangement of the multi-turn vhf loop aerial. C1 is 0·35 to 3·5pF to establish the correct impedance matching; C2 is 0·8 to 10pF for tuning to resonance. For 150 to 170MHz the loop consists of 3·5 turns of ⅛in wide copper foil wound on a styrofoam form 2·7 by 2·7 by 0·7in high

A novel idea for personal radio aerials is described by H. E. King in *IEEE Transactions on Antennas & Propagation*, March 1975, pp 242-245. This provides a very compact low-profile aerial for shoulder mounting that is only just over half-an-inch high, basically weighs under 3oz. (or a little more when used with a shaped "ground plane" that improves efficiency). The aerial, as described, is tunable over the range 150 to 170MHz with a bandwidth of 1·4MHz for a 3:1 swr; it would thus seem well suited for adaptation to 144MHz operation. The aerial is worn continuously on the shoulder and connected via coaxial cable to the equipment which may be carried in a pocket or waist pouch etc; it is possible to wear a jacket or coat *over* the shoulder aerial with only a little loss of efficiency, or of course the aerial can be worn outside a coat; with a microphone head-set and vox it could provide completely hands-free operation.

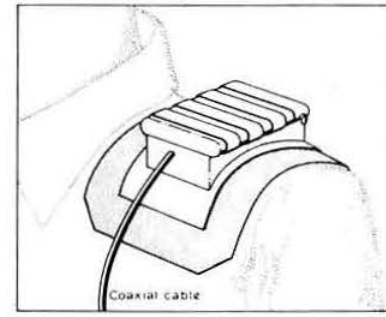


Fig 2. Sketch of shoulder-mounted multi-turn loop with 4·5 by 6·5in metal counterpoise

The aerial consists of a multi-turn loop wound on a styrofoam form 2·7 by 2·7 by 0·7in; the coil itself comprising 3·5 turns of ⅛in-wide copper foil: Fig 1. The coaxial cable and tuning and impedance matching capacitors are assembled on a metallic ground plane which is extended by a 4·5in by 6·5in (minimum) "counterpoise" shaped to fit round the shoulder. Detailed radiation patterns in the *IEEE Trans* paper show that this unit had an average gain of 3·8dB over a shoulder-mounted 6·6in helical-wound whip, which itself is roughly 5dB down on a full-size ¼λ monopole whip. A disadvantage compared with the helical aerial is the restricted bandwith, which calls for fairly careful tuning. This should be done with the aerial in position on the shoulder (requiring an assistant or a contortionist!) though there is little change in tuning adjustment from person to person so it can be tuned safely on someone else. It is also shown that better average results are achieved with the loop axis running fore and aft (Fig 2) rather than directed sideways along the shoulder. It is predominantly vertically polarized.

Altogether this multi-turn loop aerial looks well worth investigating for 144MHz use.

Transistor power amplifier hints

It is some time since we included in *TT* any advice on the design and adjustment of medium-power stages based on rf power transistors although, despite the steady improvement in transistors, it is still necessary to be rather careful if one is to avoid littering the pathway to success with discarded and destroyed devices.

Gene Brizendine, W4ATE, in *CQ* (January 1975) in "Transistor final techniques" brings together quite a lot of useful advice on this subject, and the following notes are based on his article:

Remember that the bipolar transistor is a *current* operated device with low impedances; this implies the use of heavy-gauge conductors and high-value capacitors. A collector tank coil may be carrying both dc and rf currents and needs special attention. If shunt feed is used watch the wire size in the rf choke. The heavy peak currents should also be reflected in the power supply cabling etc.

"Mode jumping" in linear amplifiers is generally due to a tuned tank circuit having a different resonant frequency for a strong drive signal than for a weak one, and this presents problems with the very peaky nature of an ssb drive signal. Precautions include carefully choosing bias values, correct grounding, and using only transistors with low values of parasitic capacitance and inductance (usually met in recent rf power devices but not always in the older types).

Make sure there is sufficient drive; these days, particularly for vhf mobile applications, manufacturers often offer a "family" of devices each capable of providing sufficient drive for the next higher power stage.

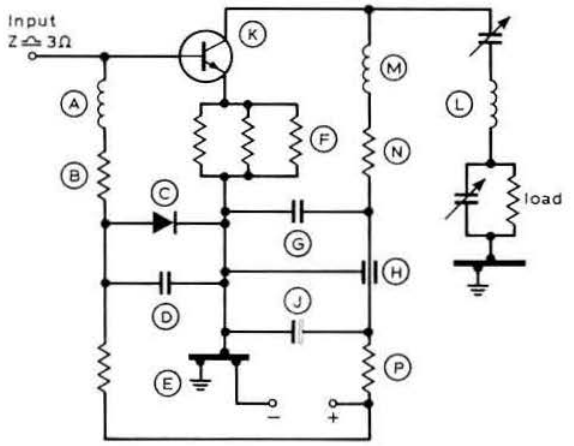


Fig 3. Typical rf power transistor amplifier for medium power illustrating safeguards and suggestions made by W4ATE in *CQ*.

A RFC must be low-Q (high Q causes lf oscillation).
B Resistor lowers Q of rfc (typically 100Ω).
C Bias stabilization diode (see text).
D Diode bypass (0·001μF).
E Group all earth leads near emitter earth connection using short leads.
F Low emitter resistor helps prevent secondary breakdown.
G 0·001μF button vhf type.
H 0·1μF feedthrough capacitor (hf bypass).
J 10μF tantalum af bypass capacitor.
K High-level harmonics are generated due to non-linear characteristics of the transistor plus large dynamic voltage and current swings.
L Network for load matching and reduction of harmonics.
M RFC tunes out reactive component of admittance.
N Low-value resistor lowers Q of the self-resonance of the rfc.
P Decoupling resistor, typically 12Ω.

Use triple bypassing for af, hf and vhf signal components; electrolytic capacitors for af bypassing should preferably be of the heavier tantalum type; hf bypass capacitors can be ceramic feedthrough or (second choice) disc ceramic types; vhf bypass capacitors should be silvered-mica button types with shortest possible leads.

A number of these suggestions are indicated in Fig 3. The biasing circuit uses a stud-type silicon power diode bolted to the same heat sink as the rf power transistor(s) as near as possible to the transistor or between a pair of transistors. Any increased heat then lowers the diode resistance, thus helping to maintain a safe dissipation level in the transistor(s). A temperature-sensitive diode can be selected using an ohmmeter and soldering iron: measure the drop in diode forward resistance after touching the hot iron to the stud for a given number of seconds, selecting the diode with the fastest thermal response.

W4ATE also lists a number of precautions to be taken during initial tune-up of a medium-power transistor power amplifier:

(1) Always carry out initial checks with a low supply voltage and low drive, gradually increasing both together.

(2) It may be advisable to connect temporarily an inexpensive power transistor (eg 2N697) in order to gain the "feel" of tuning-up before inserting the expensive device.

(3) Emitter resistors offer useful protection during preliminary checks. Several 1W resistors in parallel will present lower impedance than ½W types.

(4) Use generous heat sinking. During alignment it is advisable to keep a constant check on the temperature of the power transistor, using a finger, or a thermometer attached to the device with putty.

(5) Never operate a power transistor amplifier without a dummy load or matched aerial.

(6) Monitor collector current continuously; a climbing current is the earliest warning of junction heating. Remember that maximum rf current output does *not* occur exactly at the collector current dip.

A tunable rf indicator is very necessary since, because of the unusual (to the valve man) LC ratios it is easy to tune to an incorrect frequency. The indicator will also help check spurious and harmonic outputs. Use an indicator and not collector dip to tune to maximum rf output.

Harmonic output is reduced by using higher C in tank circuits, tapping coils closer to rf "earth" and careful attention to the bias operating point. But learn to expect and live with higher harmonic content than from valve amplifiers: at the present state of the art a low-pass filter between a transistor power amplifier and the aerial is more or less essential.

G3OTK phasing-type ssb at vlf

TT (March 1975) provided some of the thoughts of Richard J. Harris, G3OTK, on the design of wide-band audio quadrature (90° phase-shift) networks around 741 operational amplifiers. He has now provided further information on how these networks have been used in an ssb generator of unusual but highly ingenious design, taking advantage of the availability of ex-mobile 10·7MHz crystal bandpass filters at very reasonable prices.

His novel approach results in an ssb generator which at

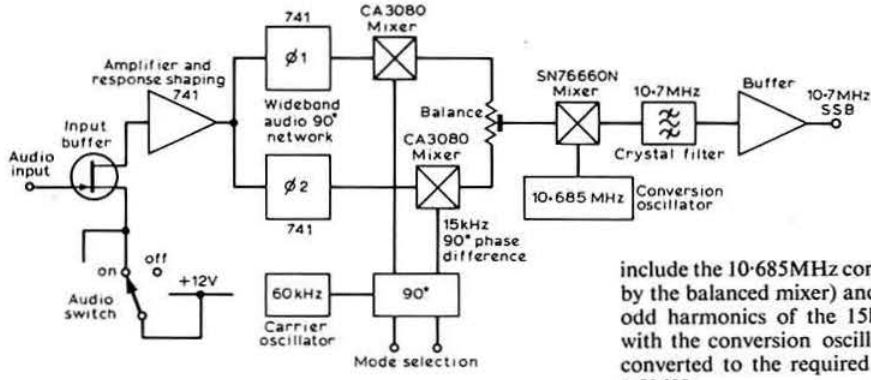


Fig 4. Block outline of G3OTK's inexpensive ssb generator providing output on 10·7MHz but with the digital phasing-type generator on 15kHz

current prices costs less than half the cost of a very popular range of hf ssb crystal filters!

The design approach takes into account the following four factors:

(1) SSB crystal filters, though effective, are very expensive.

(2) Ex-mobile 10·7MHz filters, with bandwidths of ±7·5kHz and stopbands of about ±15kHz at 60dB down, are cheap and readily available but their characteristics make them unsuitable for direct ssb generation.

(3) SSB generation is best done at high frequencies to minimize the number of spurious products.

(4) SSB generation is most easily achieved at low frequencies where components are docile and tend to behave themselves well.

G3OTK therefore generates his ssb by means of the conventional phasing technique at the unusually low frequency of 15kHz (yes, *kilo*hertz) but converts this up into the passband of an ex-mobile 10·7MHz crystal filter which attenuates unwanted mixer products by more than 80dB. Such products include the 10·685MHz conversion oscillator (also attenuated by the balanced mixer) and the other sidebands generated at odd harmonics of the 15kHz carrier oscillator and mixed with the conversion oscillator. Finally the 10·7MHz ssb is converted to the required frequency, which for G3OTK is 1·8MHz.

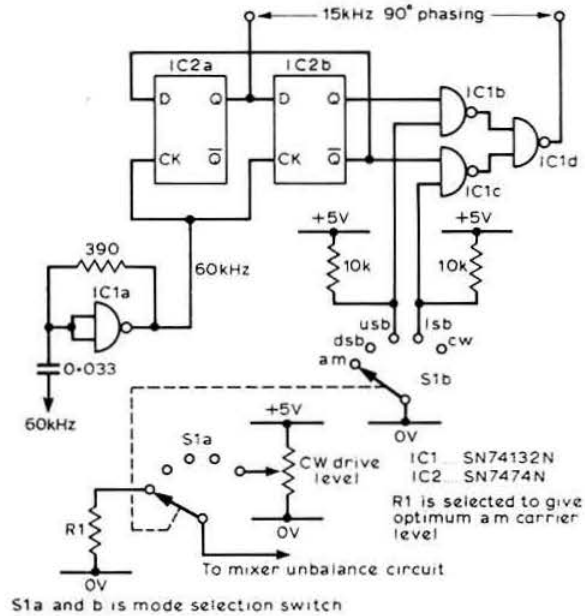


Fig 5. Mode selection in the phasing section of the G3OTK ssb generator

The conventional phasing method, rather than third method or filter method using LC components (feasible at vlf), was used to generate the basic 15kHz ssb on account of the ability to produce a number of modes and to convert later to transceive operation: usb, lsb, cw, a.m. and dsbsc are straightforward; while fm and pm are theoretically possible, the resulting deviation is much too small to be of practical use.

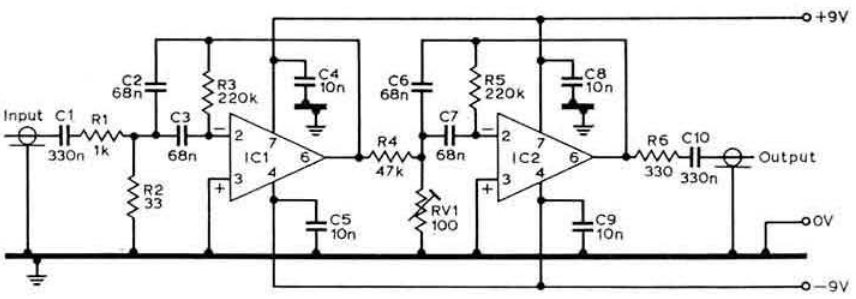
The block diagram is shown in Fig 4. The input amplifier consists of a fet cascaded with a 741 operational amplifier to give the necessary input impedance, gain and frequency response shaping. The audio path can be disabled by taking the fet source to 12V positive. The quadrature network is that given in the March *TT* and uses one per cent silver-mica capacitors and two per cent metal-film resistors. The mixers are based on operational transconductance amplifiers (RCA CA3080) but details of these are likely to be published elsewhere: they are ttl compatible both for carrier drive and mixer unbalance (for a.m. and cw), have stable and well-defined conversion gains, and are driven from a version of the digital 90° network which is also shown in the March *TT*.

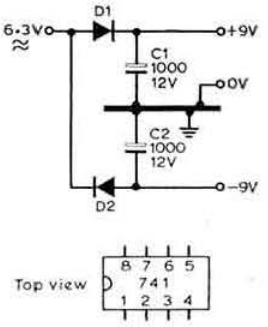
The carrier oscillator is also unusual in that it uses a ttl Schmitt trigger oscillator which can be used in this application because of the very low carrier frequency, and which is attractive because of the ease with which a future irt facility can be added. Sideband selection is made digitally, as are all the mode selections (see Fig 5). The complete exciter thus requires only one preset control set for minimum unwanted sideband level, and in practice almost redundant. The unit occupies a pcb some 6in by 3in.

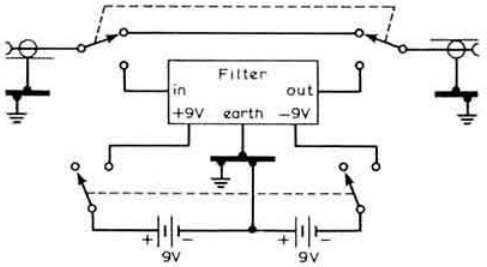
To convert the vlf ssb into the passband of the crystal filter a 10·685MHz oscillator is used, the crystal having been salvaged from a 10·7MHz 50kHz channel-spacing filter. The mixer, and the subsequent mixer to 1·8MHz, both use a Texas Instruments SN76660N which (as indicated by G3YQW last month) is equivalent to the TBA120 featured in a number of recent circuits. Similar ICs are in fact made by several companies.

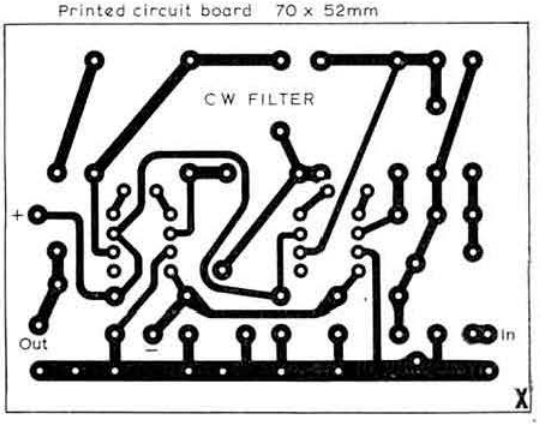
Measurements made by G3OTK using an EA12 receiver and fixed-input attenuators indicate an unwanted sideband suppression between 30 and 40dB over the input range 300 to 3,000Hz, and carrier suppression (which is inherent in the design of the mixers and requires no adjustment) is about 40dB.

While from a cost viewpoint ex-mobile 10·7MHz filters are very attractive for this application, it is possible to use any filter which has a bandwidth substantially flat over about









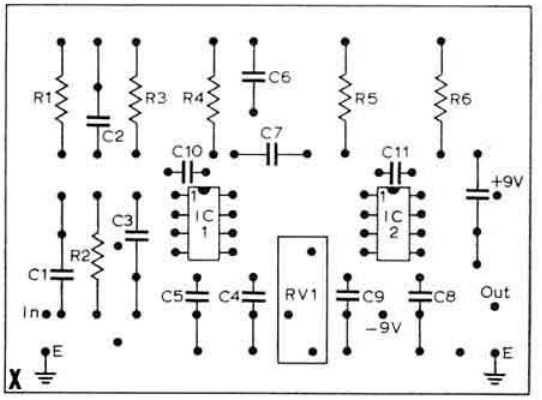


Fig 6. Details of the audio cw filter described in "Amator Radio" by LA2IJ and LA4HK

6kHz (or 3kHz if ease of sideband switching is sacrificed) and an insertion loss of about 60dB at frequencies greater than 15kHz away from centre frequency. Initial experiments were made using a 455kHz ceramic filter (Toko) but this approach was abandoned when a suitable 10·7MHz filter became available. The 15kHz ssb generation frequency seems about right for use with a ±7·5kHz bandwidth filter although higher or lower frequencies could be used.

Active cw filter

Last year (*TT*, April 1974 and *ART5*) circuit details were given of the versatile DJ6HP active audio filter which was along similar lines to one that had provided extremely good performance for Des Shepherd, G3LCS. Indeed, several appreciative comments have been received since then on this filter, which uses four ic operational amplifiers, has tunable frequency and adjustable Q, as well as being capable of being switched to provide a notch facility. This design probably represents about the most effective of all the various active cw filters developed in recent years.

However, good results can also be achieved, if with less versatility, with simplified forms of this general approach. One, using only two ic op-amps, instead of four, has been described by LA2IJ and LA4HK in *Amator Radio* (Nr 11, 1974): Fig 6. Suitable devices include the various 741, 748 or 301A series. The first stage is fixed tuned with a resonance determined (in part) by the value of RS; the equivalent resistor in the second stage is a pre-set type which can be adjusted to exactly the same resonant frequency as the first stage or alternatively slightly off-set to provide a double-humped bandpass characteristic. In the first condition the filter provides a bandwidth of only about 50Hz to −6dB or about 640Hz at −50dB; when off-tuned the effective bandpass can be increased to about 200Hz (1,550Hz at −50dB). With the component values indicated the resonant frequency should be about 880Hz.

There are a couple of points that always need to be stressed when discussing the use of audio filters for cw reception: full protection against strong interfering signals will not be achieved if the filter comes after one or more non-linear stages; some of the advantages will have already been achieved by using the very effective built-in selective filters of the ear; and finally there is the very important requirement that the wanted signal does not drift right out of the passband during "overs" due to drift in the transmitter or the local receiver. A passband of only 50Hz gives the user a new conception of the need for high orders of frequency stability, and at the present time on the hf bands above about 14MHz

an overall bandwidth of 100 to 200Hz is about the limit unless high-stability equipment is being used at both ends. Undoubtedly high stability is the key to extreme QRP and micropower operation with the noise bandwidth of the receiver reduced to the minimum possible for the rate of signalling.

Standard frequencies and micropower QRP

The above notes may suggest to many readers that some extremely interesting micropower results could be achieved by deriving all oscillator frequencies for both transmitter *and* receiver from a highly-precise frequency source, such as Droitwich 200kHz or Rugby MSF 60kHz. With current ic devices such signal sources would be far more practicable than in former times and could be extended to what is possibly the "ultimate" QRP system based on coherent signalling, as proposed by Raymond Petit, W7GHM, in *The Milliwatt* recently (mentioned briefly in "World of Amateur Radio", *Wireless World*, March 1975) as an alternative to the 4MHz high-stability source. In this type of coherent signalling even the electronic keyer is run at a clock rate derived from the station's master source, so that a matched (presumably digital) receiving filter will know in advance precisely when any dits or dahs will begin or end. This allows signal integration over a period in much the same way as the Piccolo teleprinter system, which is capable of printing out good copy from signals well below the noise level. W7GHM claims that "coherent cw" can result in a typically 20dB S/N ratio improvement at moderate signalling rates.

The availability of the 200kHz Droitwich signals could give a considerable boost to high-stability micropower operation in the UK whether or not coherent signalling and matched digital filters are used, as the dramatic effects of reducing receiver noise bandwidth to well below 50Hz are at present seldom exploited in QRP operation. With some increase in complexity the system could, of course, also be applied to vhf operation, and we recall some years ago a paper by Czech television engineers showing how precision-offset frequencies to minimize co-channel interference on television could be based on the use of vlf standard frequency transmissions.

Incidentally, for those who do not receive good strong clean signals from Droitwich on 200kHz there is always the French long-wave station France-Inter on precisely 163·840kHz. Since 163,840Hz is exactly 10×2^{14} it is possible to recover from this station a precise 10Hz by digital dividers.

G3MEO access tone/timer

Fig 7 is not the first tone generator for repeater access to have appeared in *TT*, but its originator, J. E. Cronk, G3MEO, mentions that it is very simple and works well and also has the merit that it is easy to install (it only requires connection to a 12V transmitter power supply) and it can cope well with changes in supply voltage. In fact, G3MEO finds that changing the supply from 6 to 18V causes a frequency change of just a couple of hertz. The transistor is the most temperature-sensitive component, but even this can be made quite hot (holding a soldering iron close to it) before 10Hz variation can be noticed, and the change is in the opposite direction to that caused by heating the other components. The resistor R1 is to provide output isolation and should be as high as possible, but this is usually no problem if the output is required to feed directly into the microphone input circuit.

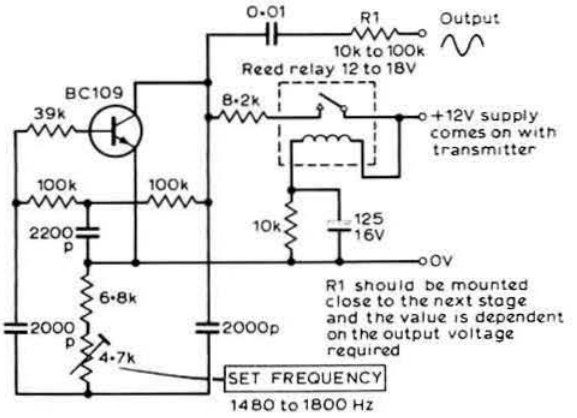


Fig 7. G3MEO's access tone/timer unit for operation through repeaters

The unit can be built on an odd scrap of Veroboard, and either of the supply lines can be grounded. The 4·7kΩ trimmer for frequency setting may be found rather critical and reducing the value to 1kΩ would give better bandspread, although reducing the overall range. The reed relay is an RS Components reed relay type 348–992 1·7kΩ resistance. The length of the tone-burst is set by the value of the electrolytic capacitor (125μF in original) and this form of simple timer has the merit of not consuming any current after the relay has operated.

12 to 24V inverter

In *TT* (May 1974) we included details of a 6V to 12V inverter originally published in *Electronics Australia* for the operation of 12V equipment from the relatively small number of vehicles using 6V electrics. At the time it was mentioned that the arrangement could be used for obtaining a 24V line from a 12V supply but that losses and heat-sinking would then tend to become more critical.

Clive Elliott, G8ADP, has in the past been frustrated in his

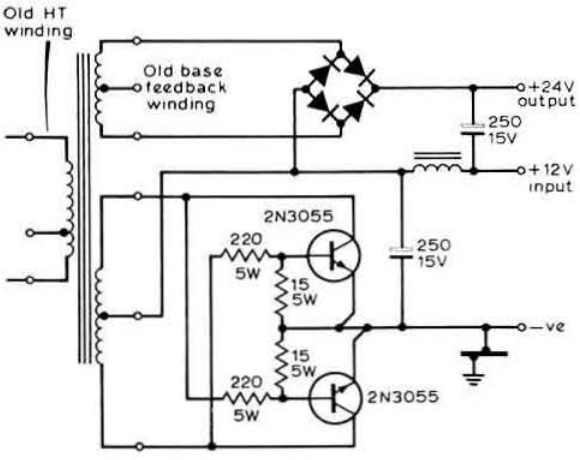


Fig 8. G8ADP's 12 to 24V inverter using ex-mobile inverter transformer

attempts to build a 12 to 24V inverter by the lack of information about transformers that do not involve the problem of finding a suitable ferrite core. But now he comes up with a solution that makes it possible to use almost any of a large selection of 12V inverter transformers from ex-mobile equipment, in his case one from a Pye Cambridge equipment.

His technique is to disregard the ht winding, and to use an oscillator circuit which does not require the use of a base feedback winding. This leaves him free to use the base feedback winding to provide an isolated 12V (at 15W) supply which is then added to the 12V input line to provide an output at 24V: see Fig 8.

Another way of utilizing a spare base feedback winding is to provide an isolated source of 6V ac for portable operation of klystrons, grounded-grid triodes etc, or any application where such an ac source is required. This can be done by omitting the bridge rectifier and using half the feedback winding.

G8ADP also mentions that there are some Pye transformers available with a multiplicity of windings designed to be wired for 6V input, and an additional winding for quick-heat valves. This means there are three spare windings providing 2V each, which when wired in series (making sure they are in correct phase) provide another isolated 6V supply in addition to that obtained from the former feedback winding. This rather useful transformer, he says, is the same size as the Cambridge inverter transformer but can be recognized by the 20 taps to the windings.

Versatile ac amplifier

A useful general-purpose amplifier (Fig 9) that provides a flat 40dB gain over the range 0·1Hz to 200kHz (3dB down at 1MHz) was developed by J. A. Crawford, BRS33141, to meet the requirements of a particular research project at University College, London. It has an excellent square-wave response with rise and fall times of less than 500ns and a droop time greater than 1s. The input resistance is greater than 3·5MΩ and the dynamic output resistance is approximately 10Ω. The amplifier delivers 9V pk-pk into loads greater than 1kΩ. BRS33141 writes:

"The high input impedance is achieved by the use of a monolithic Darlington transistor as an input buffer. The dc level at the output is a function of the current gain of this transistor and should be about half the supply voltage for maximum output capability. Adjustment of this level may be made by varying R1.

"Gain is defined in the second and third stages which form an asymmetric pair (see P. W. Van Der Walt, *Wireless World*, January 1972, letters) and employ a large amount of negative feedback resulting in stable, low-distortion amplification.

"R2 provides both dc and ac feedback. The ac component is effectively decoupled by C1 and Rs and does not become significant unless Rs is made larger (several hundred kilohms). Should this be the case, C2 may be included to decouple R1. To be effective at low frequencies, C2 must be very large and its presence will add an unwanted time constant—with R3—to the dc stabilizing feedback. A particular advantage of this circuit is that for most applications (eg Rs less than 100kΩ) this bulky component is not required."

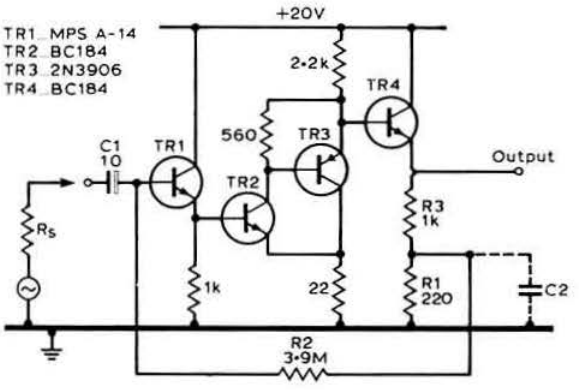


Fig 9. Versatile ac amplifier providing 40dB gain over the range 0·1 to 200kHz with good square-wave response characteristics developed by J. A. Crawford, BRS33141

Cathodeon BP25 filters—more on

In the April *TT* some details of the BP25 10·7MHz ex-mobile crystal filters were given by GW8JOJ and he suggested that the response variations through the passband were of an order that might not be acceptable for some applications. Both Barry Priestley, G3JGO, and Brian Bower, G3COJ, have pointed out that filters of this type only give the correct response between specified source and termination impedances and the details of his measurement set-up show that GW8JOJ was not using the correct values. For the BP25 the correct impedance is 1·2kΩ in parallel with 25pF. Since the capacitance is fairly critical it may be worth installing a trimmer, adjust for optimum response and then substitute a fixed capacitor of the correct value. When correctly terminated the passband ripple of the BP25 should be less than 2dB with a power insertion loss in the passband of less than 4dB. Minimum attenuation outside the passband is 80dB, specified bandwidth for −6dB is not less than 12·5kHz, and for −60dB not greater than 25kHz, so these are high-grade filters. An unfortunate result of providing this information is that the filters are rapidly disappearing from the market—at least at the extremely favourable price they were being offered!

VLF standard frequencies

The recent items about vlf reception and the suggested converter by G3PPT (*TT*, March 1975) has prompted Norman Joly, G3FNJ, to dig out a useful list of standard frequency stations in the vlf/lf bands based on a list published in 1969. Apart from the various Omega navigational transmissions between about 10·20 and 13·60kHz, these include GBR Rugby on 16kHz; NAA Cutler, Maine on 17·80kHz; NLK Jim Creek, Washington on 18·60kHz; WWVL Fort Collins, Colorado and JG2AR Tokyo both on 20·00kHz; NSS Annapolis, Maryland on 21·40kHz; NWC North West Cape, Australia on 22·30kHz; NPM Lualuaiei, Hawaii on 23·40kHz; NBA Balboa, Panama Canal Zone on 24·00kHz; JG2AS Kemigawa, Japan on 40·00kHz; VHP Belconnen, Australia on 44·00kHz; OMA Podebrady, Czechoslovakia on 50·00kHz; WWVB Fort Collins, Colorado and MSF Rugby on 60kHz; HBG Prangins, Switzerland on 75·00kHz; DCF77 Mainflingen, Germany on 77·50kHz; CYZ40 Ottawa, Ontario, Canada on 80·00kHz and FTA91 St Andre-de-Corcy, France on 91·15kHz. Most (but not all) of these are high-power and have typical accuracies of the order of a few parts in 10^{11} (MSF 10 parts). □

IARU Region 1 Conference

by R. F. STEVENS, G2BVN, secretary, Region 1

THE tenth triennial conference of the Region 1 Division of the International Amateur Radio Union was held between 14 and 18 April 1975 in Warsaw, Poland. Previous conferences were held in Paris (1950), Lausanne (1953), Strese (1956), Bad Godesburg (1958), Folkestone (1960), Malmo (1963), Opatija (1966), Brussels (1969) and Scheveningen (1972).

Thirty-five of the 42 member societies of the division were represented by delegates or by proxy. The countries and national societies participating were:

ARA	(Algeria)	PZK	(Poland)
ARI	(Italy)	RAAG	(Greece)
ARM	(Monaco)	RAL	(Lebanon)
BFRA	(Bulgaria)	REF	(France)
CARS	(Cyprus)	RL	(Luxembourg)
CRCC	(Czechoslovakia)	RKDDR	(German DR)
DARC	(FR of Germany)	RSF	(USSR)
EDR	(Denmark)	RSGB	(UK)
FRA	(Faeroes)	RSK	(Kenya)
FRR	(Romania)	RSZ	(Zambia)
IARC	(Israel)	SRAL	(Finland)
IRTS	(Ireland)	SRJ	(Yugoslavia)
LRAA	(Liberia)	SSA	(Sweden)
MARL	(Malta)	UBA	(Belgium)
MRAS	(Hungary)	URE	(Spain)
NARS	(Nigeria)	USKA	(Switzerland)
NRRL	(Norway)	VERON	(Netherlands)
OVSV	(Austria)		

Also present at the conference were the President of the IARU, Mr N. B. Eaton, VE3CJ; the secretary of the Region 3 Association, Mr D. H. Rankin, VK3QV; Mr C. J. Thomas, G3PSM, IARUMS co-ordinator, and Mr A. Taylor, G3DME, chairman of the International Beacon Project.

The conference was held in the Palace of Culture and Science, an imposing building of more than 30 storeys located in the centre of the modern section of Warsaw. The host society was the Polish national organization, Polski Zwiazek Krotkofalowcow.

Opening ceremony

The chairman of the Region 1 executive committee welcomed guests and delegates and introduced the Minister of Telecommunications of the Polish People's Republic, Prof dr Kowalczyk. The Minister extended greetings to the conference participants and stressed the development of the amateur service, which in Poland was achieved with the help of the authorities. The Minister also said, "Thanks to continually expanding forms of activity the IARU plays an important role in co-ordination of actions connected with the amateur radio service and becomes a partner of the professional radio services. The proof of that is the presence today of the Secretary-General of the ITU, M M. Mili".

The chairman then introduced M Mili, who spoke of the benefits of the amateur service and said, "You will therefore readily understand how much I, as Secretary-General of the International Telecommunication Union, appreciate the pleasure and honour of taking part with you today in this opening ceremony of the conference of Region 1 of the IARU which coincides with the celebration of its silver jubilee." M Mili went on to mention the purposes of the amateur service and its valuable contribution to technical training. He noted preparations for the 1979 conference had already commenced and stressed the importance of this event. He stated the impossibility of forecasting the results of such a conference, saying, "But I am convinced that the half-century that has gone by has amply demonstrated the importance of the part played by radio amateurs and that once again you will have the sympathy of the conference on your side." M Mili concluded by paying his respects to the representatives of the Polish government and recalling that two ITU meetings had been held in the same building. He then declared the conference open.

First plenary meeting

SM5ZD reminded delegates of the importance of the conference, one of the primary tasks of which was to prepare the amateur service for the 1979 World Administrative Radio Conference. He stressed that it was not only necessary to carry out a considerable amount of work while at Warsaw, but it was of equal importance to ensure that decisions were acted upon after the close of the conference.

The first meeting concluded with the election of the chairmen for the committees of the conference, these being:
Committee A (administrative and operational), Mr L. v. d. Nadort, PA0LOU;
Committee B (vhf/uhf/shf), Ir C. van Dijk, PA0QC;
Committee C (credentials and finance), Mr J-B. Wolff, LX1JW;
Election Committee, Mr R. J. Hughes, G3GVV. Messrs G. Craiu, YO3RF, and M. Bogosavljev, YU1SJ, were nominated as assistants to G3GVV.

Reception

During the evening of Monday 14 April IARU Headquarters was the host at a reception held in the Hotel Forum. This provided an ideal opportunity for delegates to become acquainted, and for them to meet M Mili; Gen L. Kolatkowski, SP5PZ, President of PZK; and Polish government representatives who were present at the reception.

Committee meetings

Meetings of Committees A and B were held on 14, 15 and 16 April, with meetings of Committee C during the evenings of 14 and 15 April. The final plenary meeting which considered the recommendations of the three committees was held on the final conference day, Friday 18 April. Two working groups were set up from Committee A to consider (a) hf band plans, contests and allied matters, and (b) fox-hunting. G3MXJ acted as convenor of the first-mentioned group. In addition an ad hoc group of rtty operators met to consider the acceptance of standards.

Committee A

This committee, working with the title "Administrative and operational", dealt broadly with all operating matters affecting frequencies below 30MHz and with general administrative questions. With PA0LOU as chairman and G2BVN

IARU REGION 1 MEMBERSHIP

Society	Country	Number of licensed members reported to conference in: 1969	1972	1975	Total licences† @ 1.1.75
ARA	Algeria	26	—	56	—
ARAI	Ivory Coast	25	—	—	—
ARI	Italy	2,500	3,210	4,490	—
ARM	Monaco	19	—	19	23
BFRA	Bulgaria	406	650	—	—
CARS	Cyprus	14	16	31	49
CRCC	Czechoslovakia	1,970	2,060	2,161	3,017
DARC	FR Germany	11,599	13,703	19,220	23,287
EDR	Denmark	2,857	2,405	3,065	5,000
FRA	Faeroe Is	55	—	62	82
FRR	Romania	—	—	1,426	1,600
GARS	Ghana	—	13	12	—
IARC	Israel	—	—	60	—
IRA	Iceland	—	—	48	—
IRTS	Ireland	196	172	—	—
LRAA	Liberia	—	—	36	65
MARL	Malta	16	35	—	—
MARS	Mauritius	44	19	21	—
MRAS	Hungary	—	1,196	1,210	1,430
NARS	Nigeria	12	9	6	6
NRRL	Norway	1,220	1,614	1,888	—
OVSV	Austria	1,174	—	—	—
PZK	Poland	2,141	1,898	5,020	5,752
RAAG	Greece	70	—	160	200
RAL	Lebanon	50	40	75	200
REF	France	2,807	—	4,924	8,500
REP	Portugal	250	398	—	—
RL	Luxembourg	87	—	125	130
RSK	Kenya	37	26	43	58
RKDDR	German DR	—	—	1,758	—
RSF	USSR	5,008	8,250	6,650	—
RSGB	United Kingdom	7,836	9,164	10,245	20,347
RSR	Rhodesia	133	—	137	167
RSZ	Zambia	—	—	69	—
SARL	South Africa	—	1,500	1,350	3,200
SRAL	Finland	2,000	2,232	2,592	2,542
SRJ	Yugoslavia	1,723	1,945	2,081	2,081
SSA	Sweden	2,361	2,557	—	—
UBA	Belgium	800	780	1,018	1,525
URE	Spain	1,068	—	2,256	2,256
USKA	Switzerland	750	911	1,174	1,398
VERON	The Netherlands	1,299	1,678	1,925	3,210

† This includes licences of all categories, eg fixed and mobile.

as secretary, the committee considered more than 20 agenda items supported by more than 40 different papers originated by member societies, almost all of which had been distributed to delegates before the conference. RSGB delegates to this committee were R. J. Hughes, G3GVV, and D. Andrews, G3MXJ, supported on certain items by R. J. Baker, G3USB, and D. Evans, G3OUF.

The future of the amateur service

The most important agenda items were those concerned with the 1979 WARC and the preparations for this event by the representatives of the amateur service. The Executive Committee had prepared a comprehensive paper recommending an outline plan for adoption by all societies subject to particular national considerations. This plan was discussed extensively and examined in the light of the proposals accepted by the recent Region 3 conference in Hong Kong.

It was emphasized repeatedly to delegates that mere acceptance of a plan is not sufficient. It is essential that the suggestions, modified where appropriate, shall be put to national administrations who alone have the votes at the ITU to give effect to the wishes of the amateur service. The IARU

The special callsign GB2IARU was issued to draw attention to the Warsaw conference and to the work of the International Amateur Radio Union. The station was set up at Tonbridge School, Kent, under the supervision of Tim Hughes, G3GVV, who led the RSGB delegation to the conference. He is seen here with Robert Mitchell, G8JZA, at the microphone, and Timothy Trew, G8JXV, writing the QSL cards

attends ITU conferences with special observer status, in the same way as ICAO and IMCO and other international bodies, none of whom have the privilege to vote. The paper recommending the basis for future planning is too long to be reproduced at this time but it is hoped that space may be found in *Radio Communication* for future publication.

As part of the back-up effort for conference preparation the future of the IARU Monitoring Service was considered. This organization originated from the RSGB Intruder Watch and now embraces IW organizers and monitoring stations in all three regions. Further efforts are to be made to obtain the acceptance of the IARUMS as an international monitoring organization reporting directly to the ITU. Colin Thomas, G3PSM, the international co-ordinator, was sincerely thanked for his past efforts which, it is hoped, can be continued for the benefit of the amateur service as a whole.

Other Committee A items

The Region 1 band plan was considered in relation to proposals for contest-free frequency segments and sstv operating frequencies. It was agreed that preferred operating frequencies will be incorporated in the hf band plan. Recommended sstv standards were also agreed.

There was considerable discussion concerning electromagnetic compatibility of electronic entertainment equipment. Papers submitted by the RSGB were endorsed and it was agreed to set up a working group between conferences for which the RSGB will act as convenor. Pressure on manufacturers is considered to be essential and in this connection it was reported that Grundig market an "interference free" television receiver.

It was considered that the International Beacon Project is a valuable way in which radio amateurs can participate in serious scientific work. Further development of the project and publication of the results obtained are essential, and the region offers to give assistance wherever necessary to assist in

IARU REGION 1 HF BAND PLAN

Band		Type of emission
3·5–3·6MHz		cw [2]
3·6MHz	±20kHz	rtty [1]
3·6–3·8MHz		cw and phone [2, 3]
7–7·04MHz		cw
7·04MHz	±5kHz	rtty [1]
7·04–7·1MHz		cw and phone
14–14·1MHz		cw
14·09MHz	±10kHz	rtty [1]
14·1–14·35MHz		cw and phone
21–21·15MHz		cw
21·1MHz	±20kHz	rtty [1]
21·15–21·45MHz		cw and phone
28–28·2MHz		cw
28·1MHz	±50kHz	rtty [1]
28·2–29·7MHz		cw and phone

Notes

[1] For rtty, recommended section of operation shared with cw.
[2] 3,500 to 3,510 and 3,790 to 3,800kHz reserved for inter-continental working.
[3] 3,635 to 3,650kHz is used by USSR stations for inter-continental working.
[4] For sstv, recommended operating frequencies are: 3,735, 7,040, 14,230, 21,340, 28,670 —all ± 5kHz.
[5] For beacons, 28·2–28·250MHz is recommended.
[6] For the downlink of amateur satellites, 29·4–29·550MHz is recommended.

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the work associated with the IBP. The chairman of the IBP, Alan Taylor, G3DME, was thanked by the conference for his work since 1972. Among the numerous items dealt with by Committee A were: Oscar satellites (jointly with Committee B), specifications for amateur transmitters, rtty standards, 27MHz operation, foxhunting, the despatch of QSL cards and representation at *Telecom 75*.

VHF Committee B

This committee dealt with all matters concerning the use of frequencies above 30MHz, and its decisions were subject to ratification by the final plenary meeting. Its members were in most cases the vhf managers of member societies, RSGB VHF Manager Geoff Stone, G3FZL, being its secretary. Another RSGB delegate on this committee was Richard Baker, G3USB, and in addition RSGB sponsored an accredited observer, David Evans, G3OUF, representing the British Amateur Radio Teleprinter Group (BARTG).

The highlights of the activities of Committee B which are of immediate importance to all interested in the vhf/uhf/shf bands included defence of amateur frequency allocations above 30MHz; amateur satellite operation; band plans for 2m, 70cm and 23cm; scientific studies; operating practice; technical standards and other matters.

Credentials and Finance Committee C

The name of this committee describes its purpose and it had a restricted membership of five ordinary members, RSGB being represented by R. J. Baker, G3USB. The finances of the division were reported on by the treasurer, OH5NW, and it was considered that the present rate of contribution must be increased if the division is to be able to accumulate sufficient funds to meet the costs of a long conference in 1979. Accordingly the annual contribution per licensed member was increased to 80 Swiss centimes from the present figure of 60 Sw cts. This will take effect from 1 January 1976. A recommendation from Committee A, accepted by the final plenary meeting, stated that the Executive Committee should have power to increase the annual contribution to a figure between 1.55 and 2.00 Sw Frs in order to finance the employment of a paid general secretary and staff. The implementation of this decision is now left to the Executive Committee. An outline budget for 1976-8 was approved and it was recommended that if possible the funds of the division should be invested to produce a greater rate of interest while retaining the security of the capital. The accounts of the Region 1 Division have for many years been held by a Swiss Bank.

Executive Committee

At the final plenary meeting the following were elected to serve on the Executive Committee: chairman, L. v. d. Nadort, PA0LOU; vice-chairman, W. Nietyksza, SP5FM; secretary, R. F. Stevens, G2BVN; treasurer, K. W. Strom, SM6CPI; members: H. W. Benjamin, EL2BA; Dr J. Rottger, DJ3KR, and J. Znidarsic, YU3AA.

After having retired from the committee in 1972, Per-Anders Kinnman, SM5ZD, returned after the death of the new chairman, W. J. L. Dalmijn, PA0DD, shortly after his election at the last conference. SM5ZD now again retires with the good wishes of all of Region 1 for the tremendous work that he has carried out during the past 25 years.

Next conference

The delegations of Italy, Hungary, Liberia and Monaco offered the services of their societies as the host for the 1978 conference. Following a vote the offer of MRAS, Hungary, was accepted.

Final dinner

This was attended by more than 130 delegates, observers and ladies who heard speeches from SM5ZD, VE3CJ, PA0LOU and General L. Kolatkowski, the President of PZK, who conferred honorary membership of the Polish national society on SM5ZD, VE3CJ, G2BVN, UA3AF and LX1JW. During the 45 years of PZK only 10 persons had previously received honorary membership.

RSGB delegation

This comprised Messrs R. J. Hughes, G3GVV; G. M. C. Stone, G3FZL; D. Andrews, G3MXJ, and R. J. Baker, G3USB. Also present as observers were Dr J. Allaway, G3FKM, and D. A. Evans, G3OUF. Led by G3GVV, the RSGB team carried out their work in a thoroughly competent manner enhancing the high esteem the Society already enjoys in the international field.

Postscript

It should not pass without mention that the UK provided all the conference secretarial staff. Before the event some 45,000 pieces of paper were produced and distributed by Region 1, and during the conference a further 5,000 sheets were prepared for the 100+ delegates. The task is far from ended for it was agreed that in order to have all the material concerning the conference in one document a comprehensive report should be prepared. This will comprise not only the recommendations but also the supporting material, including many items of interest for which space cannot be found in *Radio Communication*. The availability of this report will be noted in the "QTC" feature of the journal.

VHF/UHF/SHF aspects of the Warsaw conference

by G. M. C. STONE, G3FZL

Amateur allocations above 30MHz

Complementary to the activities of Committee A, Committee B spent some time discussing a strategy for the defence of amateur frequency allocations above 30MHz, which will be reviewed at the World Administrative Radio Conference (WARC) to be held in 1979. The basis for this discussion was an RSGB paper which examined our allocations under three distinct headings: 30-1,000MHz (vhf/uhf bands); microwaves (1GHz and up), and space communications.

In the case of vhf/uhf bands it was decided to base our defence on the large number of amateurs who regularly use these frequencies, and each vhf manager is to provide an estimate of numbers for central collation by the end of 1975. It was also agreed to follow a line suggested by IARU Region 3, and endorsed by IARU HQ, to seek a new allocation in the band 220-225MHz to alleviate congestion in the 2m band.

Concerning the lower microwave bands (1-30GHz), it was decided to emphasize the experimental work which is the great attribute of these bands. DARC (Federal Republic of Germany) will especially sponsor the 2·3GHz band, and RSGB the 10GHz band, to encourage even more experimentation and, above all, give emphasis to the publication of both equipment information and achievements of those using these bands. It was also decided to look into the far future and seek new allocations in the band 30-300GHz, to be considered by the WARC for the first time, based upon harmonic relationships to established lower amateur service frequencies, eg 48-49GHz, 24-24·5GHz times two. (Based upon an RSGB proposal originated by Heath Rees, G3HWR, and Dain Evans, G3RPE).

Another very important issue was that of bands for space communication, as above 30MHz only the 144-146MHz and 435-438MHz bands are allocated to the amateur space service at present. It was decided at a joint session with Committee A to aim for all international allocations above 30MHz to be made available for amateur space communications. If not attainable as a blanket release, then consideration will be given band by band, especially 23cm, 12cm and 3cm, all of which are ideally suited for future amateur space developments.

Amateur satellite operation

There has been a considerable demand for both a recognized band plan and a code of operating practice for amateur satellites. Pat Gowen, G3IOR, of AMSAT(UK), submitted two papers, one on each subject, and after discussion it was agreed that IARU Region 1 would adopt the band plans recommended by the sponsor of each satellite system, but would ask each sponsor when drawing up the plans to segregate phone from cw, as a general principle, thus overcoming the main cause of irritation at present. The code of practice as adopted is shown separately. VHF managers will ensure that maximum publicity is given to the code, with the aim of raising operating standards of those using Oscars—that is, to achieve segregation of phone and cw and also to ensure that mixed-mode allocations are properly used (currently the centre of the Oscar 7 band is recommended by AMSAT for mixed-mode operation).

2m band plan

Major changes in the 2m band plan having been successfully introduced following the 1972 Region 1 Conference, with supplementary changes agreed at a meeting of vhf managers in October 1973, it was decided that only some minor amendments and a few additions were required, as shown in the new plan given here.

The most significant changes are to specify the upper limit of ssb as 144·50MHz; to add additional calling frequencies for special modes; and to centre regional beacons (defined as 50W erp or greater) on 144·90MHz rather than 144·150MHz as previously, in line with the views of a number of UK operators, but with a degree of flexibility remaining in that beacons of 50W erp or less are not subject to this constraint. RSGB is the co-ordinator for Region 1 beacon frequency allocation, and all vhf managers are to notify their requirements by 1 August to enable a new plan to be drawn up.

Special mention should be made of the new sstv calling frequency, as 144·500MHz is also used for the RSGB news bulletin service. RSGB agreed that since this occupies the channel only for about two hours per week on a Sunday morning this would be acceptable as an sstv calling frequency, but UK users would be asked to avoid the channel during GB2RS broadcasts.

70cm band plan

Changes to this plan were made, first, to align as far as possible the 432 to 433·5MHz segment with the 2m band plan (this easing the problem of memorizing the plan) and, second, to make provision for a repeater scheme contained within the band 432 to 438MHz (only 70cm allocation available to a number of member societies): see new plan. This also solves the UK problem with regard to the limitations applied to the band 430 to 432MHz (not allowed in South and North Midlands and limited to 10W erp elsewhere). To achieve this a completely new scheme was designed by a sub-committee chaired by Walter Empsten, ON4ZN, which included Richard Baker, G3USB, a member of the group responsible for the GB3PI/GB3PY repeaters.

This scheme defines an input/output separation of 1·6MHz and has a marked similarity with the current 2m scheme. Inputs are in the band 433·0 to 433·225 MHz (RU0 . . . RU9), and outputs 434·60 to 434·825MHz (1·6MHz higher). New simplex channels defined include 433·500 (SU20), 435·55 (SU22), etc—see also Table 1. The success of this scheme assumes co-existence with amateur television using either vestigial sideband techniques or of lesser bandwidth—see also **Technical standards—other.**

23cm band plan

As in the case of 70cm, allocations in the segment 1,296 to 1,298MHz were made to align with the 2m plan. However, a completely new plan was proposed by DARC for the band 1,250 to 1,300MHz, as shown. This was adopted as a provisional plan and provides for amateur tv, amateur tv repeaters, repeaters, wide-band modes, and the existing 1,296 to 1,298MHz band.

Unfortunately France has lost her allocation in the region 1,296 to 1,298MHz due to Government action (a note of warning to all member societies), and instead agreed to use the segment 1,238 to 1,240MHz for narrow-band communication. This facilitates working to those using the 1,296 to 1,298MHz band: 1,268 + 28 = 1,296MHz, 1,268 − 28 = 1,240MHz etc. Notwithstanding this, REF will of course continue to press their national administration for the restoration of 1,296-1,298MHz to the amateur service in France.

Scientific studies

A very important aspect of amateur radio activities, especially in relation to the outside world and national administrations, is the pursuit of scientific investigation into radio wave propagation. The leaders of such activitity in Europe are REF (France—co-ordinator Serge Canivenc, F8SH) and RSGB, the former being responsible for vhf sporadic-E observation co-ordination, and the latter for vhf auroral propagation and all aspects of tropospheric propagation. In connection with sporadic-E, it was agreed that increased emphasis should be given to the investigation of the occurrence of this phenomenon and that additional beacon stations be established in southern and south-western Europe. There will also be an attempt to study possible transatlantic sporadic-E (double-hop), and IARU Region 2 will be encouraged to set up beacon stations, particularly in North America, for the purpose. In the case of auroral propagation, RSGB, as co-ordinator (Charlie Newton, G2FKZ, is the responsible member of the Scientific Studies Committee), tabled a scheme for a European auroral warning network which has just come into operation, the aim being to alert the maximum number of observers when any auroral event occurs. The warning network starts in nothern Sweden, extends down into Germany and across into the UK. The public automatic telephone system is used and a complete warning cycle can be accomplished in less than 30min.

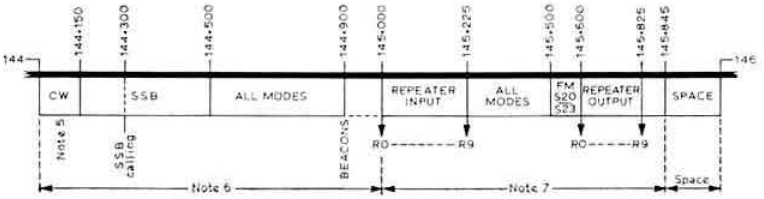
RSGB also presented to the committee the work of Ron Ham, BRS15744, and explained the use made of his solar radiotelescope as part of the warning network. Listening stations can be encouraged to participate in this way, emphasizing that both transmitting and non-licensed amateurs have an equal part to play in scientific observation. The proposed RSGB auroral reporting form was adopted for general use—please contact G2FKZ for further information.

For the greatest benefit to the scientific world, results of observations must be published. The most important channel for this is

VHF BAND PLANS

2m Band Plan

MHz	Allocation
144·000–144·010	E-M-E
144·050	CW calling
144·100	CW random ms
144·150	Upper limit cw exclusive
144·200	SSB random ms
144·300	SSB calling
144·500	SSTV calling
144·600	RTTY calling
144·700	FAX calling
144·900	Regional beacons centre
145·000–145·225	Repeater input—R0 to R9
145·300	RTTY (local)
145·500	Mobile calling
145·500 (S20), 145·525 (S21)	FM simplex
145·550 (S22), 145·575 (S23)	FM simplex
145·600–145·825	Repeater output

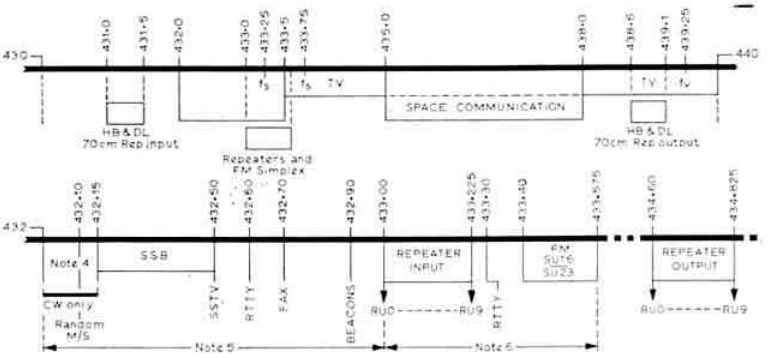


Notes

1. Established simplex frequencies on repeater output channels may be retained.
2. The segment 145·250–145·500MHz may be allocated, if desired, to fm channels.
3. No regional planning for beacons of erp less than 50W.
4. Regional planning for beacons of erp more than 50W.
5. CW permitted over whole band. CW exclusive 144·0–144·150MHz.
6. Channelized nets should not operate in this portion at any time.
7. Local traffic should operate above 145MHz during contests and band openings.

70cm Band Plan

MHz	Allocation
432·000–432·010	E-M-E
432·050	CW calling
432·100	CW random ms
432·200	SSB random ms
432·300	SSB calling
432·500	SSTV calling
432·600	RTTY calling
432·700	FAX calling
432·900	Regional beacons centre
433·000–433·225	Repeater input—RU0 to RU9 (25kHz)
433·25	TV sound (6MHz system)
433·300	RTTY
433·400–433·575	Simplex channels—SU16 to SU23 (25kHz)
433·75	TV sound (5·5MHz system)
434·60–434.825	Repeater output
439·25	TV vision (Vestigial sideband system)

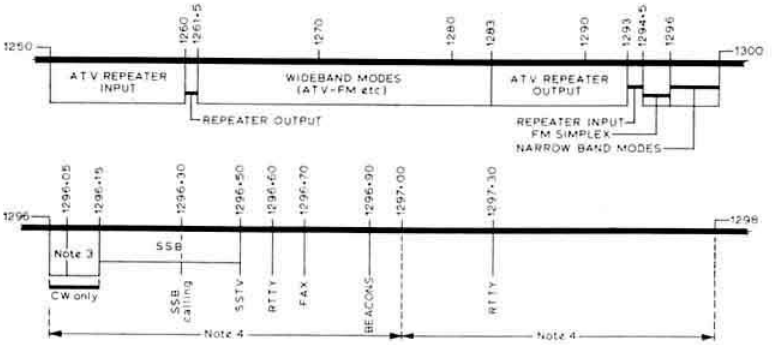


Notes

1. HB and DL repeater system: inputs 431·0/431·15, outputs 438·6/439·1
2. No regional planning for beacons—erp of less than 50W.
3. Regional planning for beacons—erp of more than 50W.
4. CW permitted over whole band. CW exclusive 432·0–432·150MHz.
5. Channelized nets should not operate in this portion at any time.
6. Local traffic should operate above 433MHz during contests and band openings.

23cm Band Plan

MHz	Allocation
1,296·000–1,296·010	E-M-E
1,296·050	CW calling
1,296·300	SSB calling
1,296·500	SSTV calling
1,296·600	RTTY calling
1,296·700	FAX calling
1,296·900	Regional beacons centre
1,297·300	RTTY



Notes

1. No regional planning for beacons—erp of less than 50W.
2. Regional planning for beacons—erp of more than 50W.
3. CW permitted over whole band. CW exclusive 1,296·0–1,296·150MHz.
4. Local traffic should operate above 1,297MHz during contests and band openings.
5. France has no allocation 1,296–1,298MHz. Consequently the band 1,238–1,240MHz is used partitioned as above.

Revised 70cm simplex/repeater channels

Simplex—8 channels

SU16	433·400MHz	SU20	433·500MHz (International mobile calling)
SU17	433·425MHz	SU21	433·525MHz
SU18	433·450MHz	SU22	433·550MHz (International mobile working)
SU19	433·475MHz	SU23	433·575MHz

Repeaters—10 channels

No	Input MHz	Output MHz	No	Input MHz	Output MHz
RU0	433·000	434·600	RU5	433·125	434·725
RU1	433·025	434·625	RU6	433·150	434·750
RU2	433·050	434·650	RU7	433·175	434·775
RU3	433·075	434·675	RU8	433·200	434·800
RU4	433·100	434·700	RU9	433·225	434·825

through the CCIR Study Groups of which SG5 specializes in tropospheric and SG6 in ionospheric propagation. Member societies are encouraged to follow the example of DARC and RSGB and establish very close liaison with their national CCIR representatives. In our case, Ray Flavell, G3LTP, represents RSGB on both the UK CCIR SG5 and SG6, and already several RSGB contributions have been accepted. The amateur radio scientific observation programme is thereby adjusted to the needs of the CCIR, and the value of each contribution can be judged by interest aroused in the study groups.

Operating practice

Two aspects of operating practice were discussed. First, amateur satellite operation mentioned above, and, second, a completely-revised meteor scatter (ms) operating practice.

Technical standards—rtty

Several technical standards papers were discussed. A compromise agreement was reached for new rtty standards, the principal conference participants being DARC and RSGB. David Evans, G3OUF, working in sub-committee, adapted a proposal originated by GARTG, and a new common standard applies to both hf and vhf. Of special interest to vhf operators is that, to achieve economy of bandwidth for audio frequency shift keying, fm transmitters are strongly encouraged to employ standard afsk tones of 1,275Hz space and 1,445Hz mark (170Hz shift) or 2,125Hz (850Hz shift). Full details of the revised rtty standards will be published separately.

Technical standards—other

Several other new standards were adopted. One was a specification for vhf/uhf repeaters, proposed by the RSGB, based very much on the standards already set for UK repeaters. Channel standards were adopted for 70cm simplex/repeaters as shown in the table.

Amateur television was discussed and it was agreed that, again in the interests of bandwidth conservation and the need to fit in new services, the use of vestigial sideband operation for atv in the 70cm band should be strongly encouraged with a vision frequency of 439·25MHz. Future developments in atv are expected to occur, and provision was made for wideband transmission in the 1,250 to 1,300MHz band and for something completely new—atv repeaters—which could well facilitate the development of atv in a band where it is difficult to generate high power.

Also of considerable interest was a proposal from DARC for a medium bandwidth tv system which occupies 1MHz maximum, known as satv (Schmalband—atv). The technical parameters of the system, originated by DC6MR, are picture and line frequency as for CCIR-B, maximum video bandwidth 500kHz to 1MHz, and no sound carrier, the vision carrier being fm modulated with a maximum deviation of ±5kHz. This system permits better dx working because of the improved s/n ratio, and is particularly appropriate to the 70cm band in which high-definition dsb vision transmission is not practicable with the present frequency allocations in most European countries.

Recommendations for amateur satellite operating practice

1. IARU Region 1 member societies publicize the accepted recommended instructions and recommendations made by AMSAT, as regards the times, powers employed, and means of operating through the Oscar satellites.

2. All possible publicity should be given to both the schedule and power limitations, coupled with advice on the necessities of receiver improvement, by preamplifiers and low-angle aerials, to enable operators to monitor their own and other downlinks satisfactorily, thus ensuring that:

(*a*) they do not transmit upon a frequency already in use,

(*b*) they avoid interference due to frequency shift following doppler change,

(*c*) they can identify any blocking caused by their own transmissions and thus reduce power,

(*d*) they are capable of identifying the presence of other stations calling them.

3. Encouragement should be given to prevent Oscar users from:

(*a*) transmitting unless they can monitor their transmissions,

(*b*) to keep their form of emission to that section of the band similarly used,

(*c*) to avoid long calls and slow operation.

4. National societies will supervise the implementation of these recommendations and take action as considered appropriate with persistent offenders.

Another new problem area, especially at microwave frequencies, was that of rf field radiation hazards, and an RSGB paper was presented drawing attention to the need for operators to be made aware of the potential danger of even comparatively low-power microwave equipment. National safety standards (10mW/cm^2 is the UK standard) vary somewhat throughout Europe, and it was agreed that, having ascertained their own country's regulations, member societies should publicize this important subject which is significant for all operations above 100MHz.

Other matters

To condense several days' earnest discussion into a few pages is impossible, hence some issues are not reported here. However, several other items are of special interest. For example, there was an exchange of experience with linear translators which are currently in operation in Austria, Czechoslovakia, Federal Republic of Germany, and Holland.

Typical of these is DB0VU which has an input on 432·600MHz, an output on 145·400MHz and a bandwidth of ±16kHz (QTH locator DL69). Very successful operation was reported both of this and other linear repeaters, it being found that the predominant mode of transmission through the repeater was ssb. To date the RSGB has not developed any specific proposals for linear repeaters but our current thinking favours the use of the 70cm and microwave bands for developments in this area. However, at the present time it is not possible to standardize, and any possible proposal will be given full consideration.

This conference was notable in that Committee B devoted very little of its time to contest operation. Existing agreements remain unchanged but it was agreed that each member society should notify the IARU Region 1 secretary of its national vhf contest calendar well in advance (say, annually) so that some degree of standardization can be achieved by those planning contests.

Conclusion

In all, this was perhaps the most fruitful Region 1 conference yet held. Firm foundations were set for the defence of amateur frequency allocations at the World Administrative Radio Conference to be held in 1979; considerable progress was made in refining existing vhf/uhf/shf band plans, adopting new standards for rtty, Oscar, atv etc; and, above all, the free exchange of ideas between the greatest number of vhf managers ever gathered together will be of inestimable value in promoting the future of all activities above 30MHz.

FOUR-TWO-SEVENTY

by MARTIN DANN, G3NHE*

County boundaries

On the vexed problem of how Scotland is to be divided up for awards purposes, G3NAS, writing as one who has embarked upon expeditions to the north himself, would be unhappy to see the large regions adopted. He thinks it a pity that the old counties could not have been retained for radio purposes, not only in Scotland, but also in England and Wales. Keith feels that there will be no point in an expedition station operating from, say, the old county of Caithness when the region including that area extends to the southern part of what was Inverness.

Perhaps one of the obstacles to the continued use of the old counties is that maps showing them will eventually become impossible to obtain, and it will become increasingly difficult for a station to know what county he is in for radio purposes, particularly where it varies from the actual county. A similar point is made by G3UBX, who finds a surprising number of operators in England and Wales apparently unaware of their new county status. In view of this, he is not confident that the adoption of the second tier authorities, or districts, would be too successful, although Peter Burden makes it clear that he has a great deal of sympathy for the views expressed by GM4CXP in March's *Your Opinion*. The situation is further complicated by the fact that many of the Scottish districts which retain the old county names do not have the same boundaries as the original county.

In the event of districts being chosen as the division for award purposes, Peter wonders whether a case might not be made out for applying the same principle to England and Wales, giving some 400 areas (all 33 London boroughs counting separately). G3UBX also feels that the availability of maps which clearly show whatever boundaries are chosen must be taken into consideration.

News from Ireland

The location of Des Walsh, EI5CD, in Carrick-on-Suir, Tipperary, does not normally give him much to report in the way of vhf/uhf activity. His "local" BBC fm transmissions emanate from Haverfordwest and, despite the 10kW erp from a good elevation, signals are very variable, which does not bode well for the passage of amateur signals further into GW and G. Undeterred, Des discovered that vhf/uhf reception from the east was much improved at a site some 750ft asl a few miles from his home. He has obtained permission from the Forestry Department to use the site and has been busy bashing holes in the rock to provide anchorage points for a mast. He will be leaving some aerials erected for portable operation, but intends to press for a 2m beacon and possibly a repeater, although at present it looks as though Des will have to finance the scheme out of his own pocket.

EI5CD is presently stuck on 145·0MHz fm simplex running 40–45W output to a 4-el Yagi and would appreciate stations in the south-west of England and Wales listening for him at weekends, around mid-day. Des promises to continue his efforts to make vhf/uhf more popular in EI, although the small amateur population and difficult terrain make his task a difficult one.

Beacon news

A new beacon which should be of interest to the dx-minded UK vhf men has recently been installed in the shack of ZB2BL in Gibraltar. Signing ZB2VHF, the beacon is on 144·145MHz running 15W output of F1 to either an 8-el Yagi or a 4-el quad beamed towards the UK. When moved to its permanent site, some 800ft asl, an amplifier will be added to give 40W output. Reports on reception of the beacon, which was built and donated by the Surrey Hills Contest Group, would be appreciated and should be sent to the beacon-keeper, ZB2BL, PO Box 292, Gibraltar.

Now some bad news from the Rock—the 4m beacon is off the air at the time of writing. The trouble is due to a whiff of third harmonic rf which unfortunately falls on top of a local Spanish tv channel. ZB2BL will be trying coaxial stubs and the like, and as soon as the cure is found the beacon will be put back on the air.

Edmund Ramm, DK3UZ, writes to tell us that 144·14MHz is not likely to be the final frequency of the the DL0PR beacon. When the Hamburg repeater, DB0XH, is moved to its new channel, DL0PR will be retuned to 144·144MHz.

Peter Cutler, G3DAO, newly on 4m cw, reports good reception of GB3SU from his location in Selsey, Sussex, and sends along an interesting tape recording to prove it. Signals well over S9 have been recorded under above-average conditions, and even under poor conditions the beacon is audible with only the occasional dip into the noise.

After a good deal of moving around the band, GB3SX has (at the time of writing) arrived on 70·687MHz, so it looks as though efforts are being made to bring it onto the nominal frequency of 70·685MHz. Considering the lack of aerial gain from the Sussex beacon, it puts a healthy signal into the G3NHE receiver. Only under completely flat conditions is a little patience needed to find it, and even then it can be heard popping up out of the noise from time-to-time.

FM channel

Geoff Watts, G8BCH, secretary of the South Dorset Repeater Group, would be interested to hear from amateurs in his area so that the group can assess support for the proposed GB3SD 70cm repeater. The project is progressing well, permission now having been obtained to use a site in Weymouth. The group hopes to use horizontal polarization for the repeater to encourage fixed-station activity, as well as the use of the device by mobiles, and the output power is expected to be around 5W erp of nbfm. Digital and pll techniques are being used in the control equipment, with a 1,750Hz access tone and an "on time" of 2min.

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Writing in the Central Scotland FM Group's newsletter, GM8FM wishes to set the record straight with regard to the suggested channelization of a.m. He certainly does not advocate the regimentation of a.m. into 25kHz channels, but what he does suggest is a common calling channel, and at least one working channel where a.m./fm cross-mode contacts could take place.

The same newsletter also raises the problem of a.m./fm mobile activity in Scotland on 145·8MHz, which is reserved for the down-channel of a future Raynet repeater. It seems that there is considerable use of this channel and, when the time comes, stations are obviously going to be reluctant to write-off perfectly good crystals for that frequency. The suggestion is made, however, that as channel R9 is vacant in Scotland it could be used for fm simplex by "persuading" these crystals onto 145·825MHz. Moving the other way should be avoided, as 145·775MHz (R7) is to be the down-channel for the Aberdeen repeater.

After some delays and set-backs, the Kent repeater project is moving again, albeit slowly. The aerials have been purchased and checked, the logic circuits and power supply are both working, and a transmitter has been purchased and is undergoing modification for 2m. Coverage tests have had to be postponed due to delays in the extension of the mast on which permission has been given to mount the aerials, but the latest estimate is June.

Expedition news

Chris Henderson, A7460, in company with G8GGP, G8CIU and BRS34902, will be holidaying in the Channel Isles during June and, combining pleasure with pleasure, they will be taking the radio gear along with them. As it is primarily a holiday, no skeds are being arranged but they hope to be active most evenings and during the day on Saturdays and Sundays. The itinerary is; Jersey 17–24 June; Guernsey 24–27 June; Sark 27–28 June, and Alderney on 29 June. Activity will be on 2m ssb and fm, and 70cm ssb. All QSLs will be acknowledged and should be sent via G8GGP or G8CIU.

This should be read just in time to swing the 2m and 70cm beams towards Dyfed in South Wales, where Ray Evans, G(W)4AGE/P, will be operating from near Tenby, 8pm onwards from Monday 2 June to Friday 6 June. Activity will be on ssb, around the calling channels on both bands.

Seventy centimetres

Like it or not, with the possible exception of a few pockets of fm on 433·2MHz, 70cm activity is now almost exclusively on ssb between 432·15 and 432·25MHz, and the dwindling number of a.m./fm stations are increasingly to be found within this segment. A check of recent 70cm contest results will show the difficulty any station not using sideband has in finishing well up the results table. This situation is likely to move even further towards sideband domination with the advent of more commercial ssb transmitting equipment for the band, although if the proposed 70cm repeater projects all come to fruition this will no doubt encourage local fm working. Perhaps encouragement should be given for more new repeaters to be set up on 70cm, not only to promote activity on the band, but also to help spread out what activity there is.

With so much traffic in the 432·15–432·25MHz region of the band, it is a pity that this segment is overlapped by the Oscar 7, mode B, up-link. When propagation is good, this can cause QRM over one small part of an otherwise empty band—not a very logical state of affairs. It also seems a pity that so many Oscar men appear to have no interest in how far their signals are getting direct on 70cm while they are firing at the satellite. This was particularly noticeable during the May 432MHz Open Contest, when quite a few southerners were logged at good signal strengths by stations more than 200km to the north, but none of them were heard on the band between Oscar passes. A case of "each to his own" possibly, but shall the twain never meet?

Nets, controlled or uncontrolled?

A correspondent who has had quite a few years' experience on vhf notes the growth of co-channel nets on the 4-2-70 bands. Unfortunately, he also notes the tendency for these nets to degenerate into an uncontrolled shambles. Apart from an inability to net accurately (for which there is little excuse these days), many operators seem to have little idea about procedure.

Net control stations (*not* "masters of ceremonies") have good antecedents in service procedure, although this can present difficulties where no one station can hear all other stations in the net (and vice versa) without the frantic swinging of beams to all points of the compass. A simpler system, suggested by our correspondent and used successfully for years by one Midlands net, is to arrange everybody in call-book order, eg, G3+2 before G8+2 and G3+3 before G8+3, stations within each group being in alphabetical order. All one needs is a call-book, and every operator knows his place.

From the same old-timer comes the suggestion that the "waffling factor" can be reduced to a minimum by limiting overs to one minute per operator, just like the repeaters. Items for lengthy discussion have no real place in a large net, and they can be made note of and discussed in separate contacts after the net has finished its run.

Dying mode ?

While the remark that a.m. was a dying mode did not produce any great howls of protest, a couple of correspondents were stirred into passing comment. G8GHZ felt compelled to say that in his view a.m. was far from dying. Stephen Purser runs only fm and ssb himself, but on fm finds plenty of a.m. takers. He feels that a.m. stations would get many more contacts if they took the trouble to ensure that they were fully modulated; he hears many unresolvable carriers when he tunes 2m. G8GHZ feels that a.m. is worth retaining as an intermediate mode between fm, for local contacts, and ssb, the primary telephony dx mode.

G8GVA's point is that the new starter, consulting the various handbooks, sees plenty of simple a.m. transmitter circuits, but not much in the way of simple sideband information. Reading that a.m. is a dying mode, he then tends to go out and buy a "black box", and joins the ranks of the plug-in appliance operators.

Awards

Several members have commented in the anomalies which have arisen on the FMD Awards due to the changes in county boundaries. These are the result of trying to ensure that no-one finds the door abruptly shut in their face when only wanting a few more cards to complete a claim. There would undoubtedly have been much more comment had members

been told on 1 January this year that all cards for contacts prior to that date were now valueless for claiming an FMD certificate! However, the VHF Committee currently has the whole situation under review and these problems will be taken into consideration when deciding what changes are necessary.

The following FMD certificates have been issued by G5UM, the vhf awards manager:

144MHz Senior Transmitting: certificate No 74 goes to Richard Crossley, G4CZP of Carnforth, who is full of praise for GM portable stations, but is less than happy with the difficulty experienced in persuading QSL cards out of fixed stations north of the border.

144MHz Standard Transmitting: certificate No 438 to G4CMT; No 439 to G8IMF; No 440 to GW8CWP/P; No 441 to G8IYI; No 442 to GM8EUG/P; No 443 to G8BZN, and No 444 to G3JHM (new QTH).

432MHz Standard Transmitting: G8AYY/P earns certificate No 111 for portable operation from the Midlands.

Notes for members claiming FMD awards

1. All claims should be sent to the vhf awards manager, Jack Hum, G5UM, at the address shown on page 447 of this issue. Please do *not* send claims to either the writer of *Four-Two-Seventy* or to RSGB headquarters, as this only involves them in the additional expense of forwarding the package to the awards manager.
2. Claims must be in respect of one QTH only. Any move means starting all over again, although there is no reason why a station already holding an award should not start collecting for a second certificate should he change his location.
3. The full address of the claimant, including the postal code, should always appear on the claim form; if not, the awards manager has no way of being sure that there has been no change since the publication of the current RSGB *Call Book*.
4. Claims for a fixed station should not include cards for contacts made while /P or /A (or *vice versa*). Certificates may be claimed for each separate category, but each counts quite separately.
5. When a Class B licensee changes to Class A, the station remains the same, and despite the change from G8 plus three to G4 plus three, cannot be claimed twice. It is worthwhile, therefore, when working a new G4, to check whether they held a previous call.
6. Application forms for all FMD Awards can be obtained from the vhf awards manager by sending an sae to him.

Contests

The Central Radio Club of Czechoslovakia invites radio amateurs in this country to participate in their "Polní Den" (Field Day) contest which takes place on the same weekend as the RSGB VHF Open event. The contest is for portable stations only, and takes place between 1600gmt on 5 July and 1600gmt on 6 July. Scoring on all bands is at one point per kilometre, and an exchange of report, serial number and QTH locator is required. The sections are: 145MHz 1W maximum input, battery powered; 145MHz 5W maximum input, any power supply; 145MHz input as licence; 433MHz 5W maximum input, any power supply; 433MHz input as licence; 1,296MHz input as licence, and 2,304MHz input as licence. All the usual modes can be used.

The 2m categories are in one 24h session but 433MHz and above are in two sessions, 1600-0400 and 0400-1600. Stations may be worked once on each band, and once in each session. Separate log sheets should be used for each band, and a summary sheet should include callsign, QTH in contest, QTH locator, categories used, a short description of equipment, score claimed, number of countries worked and best dx, plus the usual signed declaration.

Entries (postmarked no later than 25 July) to Central Radio Club of Czechoslovakia, PO Box 69, 113 27 Praha 1, Czechoslovakia. If anyone wishes to show the flag in Eastern Europe, it looks as though a photostat of the the RSGB entry, plus suitable cover sheet, should suffice. All participants will receive a copy of the results.

No-one seemed to be quite sure what to make of conditions during the 432MHz Open Contest on 4 May. They were variously described as good, poor, patchy, directional, up and down, and so on. From reports on the day it appeared that the weather varied somewhat over the country, from very summery in the north, to cold and windy in the south-east, and this undoubtedly contributed to the variation in conditions according to direction and location. The GW3UCB/P team, operating from their usual site near Wrexham, once again look a safe bet for turning in a leading score—they were passing a serial number in the eighties before the end of the contest—and it was interesting (but frustrating) to hear them working Continentals who were totally inaudible at the writer's location, directly over which the signals were having to pass! However, PA0FWS and ON5FF/P were worked by several participants, and G8AGU/P in Devon was heard in the north occasionally. Activity seemed to be a little down on normal, possibly due to the variable conditions.

Technical tips

How many of us have bought, or built, high-gain uhf beams and been disappointed by the results? One possible reason for this is put forward by G3VVT of Kendal, who has noticed that photographs of vhf/uhf aerial installations often show the mast passing between the elements on the uhf beam. This, suggests Bob, can radically alter the polar diagram of the beam, and he recalls observing a test range demonstration using a group C tv aerial, where placing a metal tube between the elements had a markedly deleterious effect on the forward gain, even when the tube was at right-angles to the plane of polarization. G3VVT also points out that the positioning of the coaxial feed to the aerial can degrade the performance if sufficient care is not taken.

These effects obviously increase with frequency, as the diameter of the mast becomes a significant proportion of the wavelength, so it is likely that little is lost by clamping 2m and 4m beams directly on to the mast. If, however, ultimate performance is required from the 70cm beam, it may well be worth while mounting it in such a way that the mast does not actually pass between the elements, such as the very top of the mast or on a stub mast.

Finally, the dead-line for the July issue is immediate, and please send all items for the August issue to G3NHE by 2 July. □

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

YOUR scribe recently attended the IARU Region 1 Conference in Warsaw and was thereby privileged to see just how much amateur radio is able to do to increase friendship and understanding between nationals of all countries. The Polish national radio society—Polski Zwiazek Krotkofalowcow—made every effort to ensure that the delegates' stay in their country was enjoyable, and special amateur station SP0IARU was set up for all visitors to use without any formality whatsoever. It is unlikely that this would be allowed in Britain, and it seems to the writer that relaxations and modifications to the licensing conditions in this country are long overdue.

News from overseas

Alva Excell, VQ9SS/C, reports that he now has an 18AVT/WB vertical which he acquired from WB2POJ/VQ9 who has left Chagos. Clancy, WA6HNQ/VQ9, has no equipment of his own and uses that at the MARS station when it is available. Alva expresses the wish that more amateurs would put out CQ calls on 28MHz as that band often seems to be useful. VS6BL, YB0ABV, JA5EXW, VQ9HCS and VQ9SS/C now hold a net at 1100 on Saturdays and Sundays on 28,550kHz and others are welcome to join in.

Brian Harris, G3XGY, (who was also VS9MB a few years ago) is at present in Singapore with the callsign 9V1SO. He is active on 14 and 21MHz with 14,040, 14,075, 14,175, 14,275, 21,040, 21,075, 21,354 and 21,380kHz being preferred frequencies, with the first mentioned being the most popular. Brian's transmitter is an FT101B and his aerial a ground plane. QSLs should be sent to the address in *QTH Corner* and not direct.

Ian Dredge, G4DIE, left for a 2½-year visit to Saudi Arabia during April. Hopes of acquiring a licence seem remote. Anyone still requiring a QSL for a contact with Brian as VS6AD, VS6AG or G4DIE is asked to be patient as he will only be able to deal with requests during his bi-annual leaves.

Les Anstead, ZF1JA, has left the Cayman Is and is in England for one year. He closed down on 24 November after two years happy operating during which time he made 6,000 contacts in 134 countries. Les offers to deal with requests for QSLs if they are directed via the bureau or to the address in *QTH Corner*.

5N2ESH confirms the formation of the Nigerian Armed Services ARC on 3 February. There are 21 members. Major Williams has pointed out that many African and European countries have for many years organized and enjoyed well-disciplined amateur radio communications, and he therefore would not like Nigeria to be left behind in these matters. A picture of the club's 400W amateur station (donated by Redifon Communications Ltd) appeared in the *Evening Times*. It appears that the only active privately-owned stations are 5N2AAE, 5N2AAJ and 5N2ESH. Bob Osbourne, 5N2AAS, awaits renewal of his licence. Two pirates, 5N2FW and 5N2CST, have been active, and 5N2ESH's call has been pirated on 3·5MHz.

Apologies to 9G1LZ whose QSL address was given in March *MOTA* as an old and obsolete G3LZZ QTH. Andrew prefers cards sent to the address given in *QTH Corner*, and those sent to G3LZZ to go via the bureaux. He also kindly points out that the 9G1GD listed in the same column should read 9G1JD. 9G1LZ is trying to work 100 countries on 28MHz during sunspot minimum year—so far he has 38 and he complains of lack of activity, *not* lack of propagation.

DX news

A new station which has been reported on Chatham Is is ZL3NR/C who has been worked by USA stations on 3·5MHz.

LU1ZA (South Orkney), LU1ZS and LU1ZR (Antarctica), and CE9AA will be active on 3,740kHz from 0300 to 0900 on Fridays, Saturdays and Sundays until July. They will listen for dx callers between 3,775 and 3,820kHz.

There is a possibility that W1AM will be on the air with an XT call from Upper Volta sometime during May and June. TL8AA and TR8WR are new stations in the Central African Republic and Gabon respectively.

9N1MM is said to be back on the air from Nepal, but it seems that the level of activity from SE Asia is rapidly falling. HS4AFD has left Thailand and HS1AKT (who is a German national) is the only non-Thai left on the air. *DX'press* particularly requests those who contact PA0IWH/S2 not to try to QSL direct but to send cards to his home address (see *QTH Corner*).

The number of strange prefixes to be heard on the bands is increasing. Stations in France were allowed to use the TK prefix during May—this was to celebrate the 50th anniversary of REF. In the same way, stations in the French overseas territories used TK7G, TK7M, TK7R and TK7Y respectively (for FG7, FM7, FR7 and FY7). Yugoslavian amateurs may use YZ instead of YU from 9 May until 29 November—this is to mark the 30th anniversary of the formation of the Federal People's Republic. Holders of SJ/SK/SL and SM prefixes may exchange them for 8SJ, 8SK, 8SL or 8SM between 18 April and 30 June. This change indicates the 50th anniversary of the formation of SSA. Liberian stations will be using the 5L prefix for the rest of 1975.

Martii, OH2BH, has now sent out over 100,000 QSLs for his expeditions during the past five years. The latest are being printed by computer.

SV0WKK is on Crete until early 1976, and keeps a schedule with PA0WRR at 0700 on Saturdays on 14,168kHz, and with K6HTM at 1700 on Mondays on 14,210kHz. SV0WAA and SV0WJJ are also located on Crete, but SV0WZ is on Rhodes.

VP8HZ, Tony, is to be found regularly around 14,126kHz at 2030 on Tuesdays, Thursdays and Saturdays. VP8KM and VP8KR are mother and son, and both ask for QSLs via K7RDH. 4K1C is located at Vostok Base, Antarctica, and is

* 10 Knightlow Road, Birmingham B17 8QB.

to be found on 14MHz cw between 0700 and 1000, and also from 1400 to 1700. QSLs from this station carry the commemorative stamp of the 20th USSR Antarctic Expedition.

HH2WF has returned to the USA. PY7YS (also mentioned in "Dxpeditions") says that he is still able to supply QSLs for those who need them for his PY0YS expedition to Trindade Is in December 1974. He also acts as QSL manager for CR8AG and CR8AL.

Dxpeditions

The Amateur Radio Society of Barbados has planned an expedition to Palm Is, off St Vincent in the West Indies, to take place from 20 to 22 June. Six members of the society will take part and the callsign will be VP2SPI. Operation will be from 2000 on 20 June, all bands 1·8 to 28MHz, and both cw and ssb will be used. The island is located 12·8°N 61·4°W. QSLs go to the address in *QTH Corner*.

PY7YS intends to make three expeditions during June and July. He hopes to spend about a week at Fernando de Noronha using the callsign PU0YS, and a few days at Atol das Rocas and at St Peter and Paul Rocks as PR0YS and PS0YS respectively. He will have an FT101B with a 14AVT/WB, and inverted-Vs as aerials. QSLs should be sent to his home address.

HB9TL will be in Corsica as F0CH/FC from 11 to 28 July using all bands. He offers to make schedules and asks for QSLs to be sent to his home address.

K2MH/G5ATJ has started to make plans for a dxpedition encompassing Pacific Ocean islands to celebrate his having held an amateur transmitting licence for 50 years (he was originally 7MH and then W7MH). This will be followed in 1976/77 by a safari through Australia celebrating the 50th anniversary of his first VK contacts. He then hopes to revisit Britain for some operation from GD, GM, etc. Oliver is anxious to correspond with anyone having knowledge of or aspirations towards a trans-Asia or trans-Africa dxpedition, with Australia as a final destination. Difficulties, possibilities, and general ramifications of such an endeavour (preferably by motor-camper) need to be studied, and anyone who is able to help is asked to write to Oliver D. Perkins, Trans-World DX Safari, 1565 S.W. Upper Hall St, Portland, Ore, 97201, USA.

LU2AFH says that a 10-day expedition to the S Sandwich Is will take place in December 1975 or January 1976. There will be about 10 operators and they will travel on the Argentinian ice-breaker *San Martin* (LU5ADU/MM). All bands 3·5 to 28MHz both cw and ssb will be used.

The projected visit to the Kermadec Is by ZL1BKL has been delayed by lack of transport. The best months for the trip are considered to be between December and March. So far Marion has not made arrangements to hire a boat, on account of the expense. It is hoped that the operators will be able to hitch-hike to the island.

Top band news

In a letter to G3FKM, ZL3RB details the results of schedules which he kept with G3OQT during March. The best opening coincided with the full moon on 27 March when reports were exchanged with GD4BEG, G5WP, G3OQT, EI9J and VE7UZ. G3ZYY was worked on the following day. European signals were heard on 2, 4, 6, 8, 9, 15, 16, 18, 19, 20, 21, 23, 26, 27 and 28 March between 0600 and 0700, and besides those already mentioned contacts were made with G6CJ. Others heard included G3OLI, YU2OB, G6BQ and G2JL. Some Ws and a KL7 were also heard. Mick uses a Drake T4X and R4 receiver with multiple-V aerials, 560ft per leg, and a 250ft dipole 60ft above ground and running NE-SW.

Beacons

Alan Taylor, G3DME, reports that DL0AR on 29,000kHz has now closed down, having served its purpose in specific investigations into auroral propagation conducted by the Max Planck Institute. It was a good example of valuable co-operation between amateurs and professionals in scientific studies. Anyone with belated reports should send them to DJ5DT—QSLs are still available.

Amplifying the note in "News from overseas" in April *MOTA* about the use of 28,205kHz by 9G1LZ, G3DME points out that this frequency is much used by him and others interested on 28MHz beacon activities, and as a channel to keep in touch with overseas beacon-keepers when propagation permits. The frequency of 21,205kHz is often used when 28MHz is not open. While obviously there can be no suggestion of a "reserved frequency" the beacon group would appreciate the co-operation of all by allowing the passage of beacon information traffic without interference from breakers who are only looking for dx contacts. Over-the-air reports of beacon matters other than routine observations are always welcome of course.

Shortly after beacon-keeper John Spurling, 3B8DG, returned to the UK, cyclone "Gervaise" blew away the 3B8MS aerial on 6 February. Winds of up to 200mph were experienced. It is believed that the Mauritius ARS has already repaired the damage and that 3B8MS is active again.

Contests

The 16th All Asian DX Contest

1000 21 June to 1600 22 June (phone).
1000 23 August to 1600 24 August (cw).

All bands 1·8 to 28MHz. Single-operator single-band, or multi-band, and multi-operator multi-band categories. Exchanges consist of RS/T followed by age (lady operators send 00). No cross-band or cross-mode contacts allowed. Each contact with an Asian station counts one point, and the QSO points total on each band is multiplied by the total number of Asian prefixes worked on that band and all are added together in order to arrive at the score. Note that JD1 (Minamitori Shima) is not in Asia, and that KA prefixes do not count. Use separate log sheets for each band and indicate date, time, station worked, number sent and received, if multiplier and points. A summary sheet showing how the total score on each band was calculated, and the usual declaration of rule observance should be included. Logs should reach JARL, PO Box 377, Tokyo Central, Japan, by 30 September for the phone and by 30 November for the cw event. Certificates will be awarded according to the participation from each country.

In the 1974 phone contest the UK was represented by G3RCV, G4BUE and GM3PIP. Note that Japanese stations now use the 3,793-3,802kHz section of the 3·5MHz band.

Band reports

The declining sunspot activity has meant that the usual spring burst of Pacific signals on 14MHz in the mornings has been much poorer than in recent years. Very little has

QTH Corner

A9	Bahrain QSL Bureau, PO Box 472, Awali, Bahrain.
W9MR/CE0	via K3RLY, Box 125, Simpsonville, Md, 21150, USA.
FM0BQQ/FG7	via W6HJP, 1765 Ednamary Way, Mountain View, Cal, 94040, USA.
HB0AFI	via HB9AFI, Av de la Piscine 20, CH 1020 Renens,VD, Switzerland.
HB0AZD	via OH2TW, Merimiehenk 10-D-28, SF-00150, Helsinki 15, Finland.
IA5BFY	(see II4FGM).
IA5DJD	(see II4FGM).
II4FGM	wef 1/4/75 via I4BFY, R. Borhy, 133 Via Toscana, 40141-San Ruffillo, Bologna, Italy.
JY8BH	via OH2BH, Hiirakkotie 1-B-37, SF-01200 Hakunila, Finland.
JY8HJ	via DJ3HJ, Freiburgerstr 13, 7814 Breisach, Germany.
JY8ZB	via DJ9ZB, C Kistnerstr 19, 7800 Freiburg Breisgau, Germany.
KM6EA	R. Holman, US Naval Stn, FPO, San Francisco, Cal, 96614, USA.
KV0ISU	via WA0KHF, Cyclone ARC Men's Rsd Assn, Iowa State University, Ames, Ia, 50010, USA.
PA0IWH/S2	W. Bolkensteyn, Paus Leostraat 14, Haarlem, Holland.
SM QSL Bureau	SSA, Oestmarksgatan 43, S-123, 42 Farsta, Sweden.
SV0WAA	via W7PHO, 18549 Normandy Terrace SW, Seattle, Wash, 98166, USA.
SV0WZ	via OE3NH, J Reiterstr 3, 3430 Tulln, Austria.
TL8AA	Emilio Alberici, Via Farnesiana 100, I-29100, Piacenza, Italy.
TR8WR	R. Wegsheider, PO Box 101, Moanda, Gabon.
I0LPY/TZ	Box 34, I-04024 Gaeta, Latina, Italy.
VE8RCS	via WA70BH, Lee Graves, 728 Division, Hardin, Mont, 59034, USA.
VP2SPI	via 8P6 QSL Bureau, PO Box 814 E, Bridgetown, Barbados.
VS5DB	via JA2KLT, 204 Gonaka, Shnozuka, Kozakai, Hoigun, Aichi 441-01, Japan.
ZF1GA	Les Anstead, 80 Allington Rd, Paddock Wood, Tonbridge, Kent.
9G1GD	QSL via W3HQO.
9G1JD	PO Box 3247, Kumasi, Ghana.
9G1LZ	A. M. Pomfret, Crops Research Institute, PO Box 3785, Kumasi, Ghana.
9V1SO	via G3XGY c/o RSGB QSL Bureau.

RSGB QSL Bureau, G2MI, Bromley, Kent, BR2 7NH.

happened on 28MHz (a report on BRS25429's special activity period will appear next month), and 21MHz has been extremely erratic.

The writer is most grateful to the following who submitted logs from which this section was compiled: Gs 2HKU, 4RZ, 5JL, 6GH, 3GVV, 3NKQ and 3UOL. G4DFN, BRSs 17567, 17991, 25429, 35413 and 35608, and As 8317, 8428, 8713 and 8752.

Stations listed in italics were using cw, the others ssb.

3·5MHz. 0000 VU2GDG, ZB2CJ. **0100** VP2DM, 9A1BT. **0200** FG7AN, **0300** HC, KV4, PJ, 9Y4. **0500** *FY0BHI*, HK, VP5B. **0600** *W7JLH*, YN, ZL. **2000** VQ9s BP, D. **2100** OX, UW0LT, 5Z4PI. **2200** FL8FN, HZ1AB (QSL to OD5FH), VQ9P, VS6DO, 9J2WR, 9X5SP. **2300** AP2KS, FM7WE, HZ1KE, ZS5LB.

7MHz. 0000 *CX, HK0BKX, LU, OA, PY, TU, YN, ZP, ZS6MP.* **0300** *FM0BQQ, VP2VL, 3B8DO, 8R1J.* **0500** *VE7BNJ, W7NCO, ZL.* **0600** *TI9FAG, VK, ZL, 5T5ZR.* **0700** VK. **2100** *JA4FCS.* **2200** *VP2VK, 3D6AW.* **2300** VP9GO, *YB0ABV, 9G1LZ, 9X5PT.*

14MHz. 0600 KH6OT. **0700** FO8EG, KB6CU, KH6, *KL7HMO*, KM6EA, KS6FF, KS6SFA. **0800** *JT1KAA, UK1PAB* (N Zemlya, Franz Josef Land), VK4AK/9, 3D2AE. **0900** HL9KT, UA9VH/JT1, KW6HI, VK, VR4DX. **1100** A4XFV, A7XA, JY9MS. **1200** WA6EVX/KG6, VP5GT. **1300** HK0BKX, JA, TA, VS5DB, OE2SCL/YK, ZL1AVS, 9M8VLC. **1400** P29s *BG*, CW, VK6, LU2DZ/4U (Egypt), 5R8YA. **1500** A6XB, 7X5AB, 9N1MM. **1600** P29CW, *SU1MI, TJ1EZ*, VQ9GP, *XW8BP.* **1800** HR6SWA, *OX, VP5, VU, YB*, 9G1FF. **1900** TR8s RS, WR, *VP8NT*, 5H3JR, 5N2AAE, 8Q6AC. **2000** *OE5CA/YK*, ZD7SD. **2100** *CE8AA*, TI9FAG (QSL to HB9AQM), VP1FF, VP2AYL, VP8HZ, *VU2MCX.* **2200** *W9MR/CE0, FY0BE, OA*, ZF1MA. **2300** CP, LU, TG, VP1, VP2, VP9.

21MHz. 0800 *KS6FD, 3D2AJ.* **1000** *ZS.* **1300** JY5UMN, *VE3CUD/SU.* **1400** *5Z4PP* (QSL via W3HNK). **1500** *JY9FOC, VS5MC, YB9ABX*, ZD8, 3D6, 9X5. **1600** *DU*, LU, *VP8NU*, VQ9, *YB7AAU*, ZD8, *ZD9BT, 5T5DY.* **1700** CR6, *FR7ZW*, VP8NK, *VS5PM*, 5Z4, 9J2. **1800** CR7, CX. **1900** *FY0BH.* **2000–2200** LU, PY.

28MHz. 1100–1200 Europeans. **1300** 9J2DT.

Many thanks to all correspondents, and acknowledgements to the authors of the following: **DX'press** (*PA0TO*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6WA*), the **DXers Magazine** (*W4BPD*), **Long Skip** (*Nick Sawchuck*), and **West Coast DX Bulletin** (*WA6AUD*).

Please send all items for **July** issue **to reach G3FKM** no later than **3 June**, and for **August** by **2 July.** □

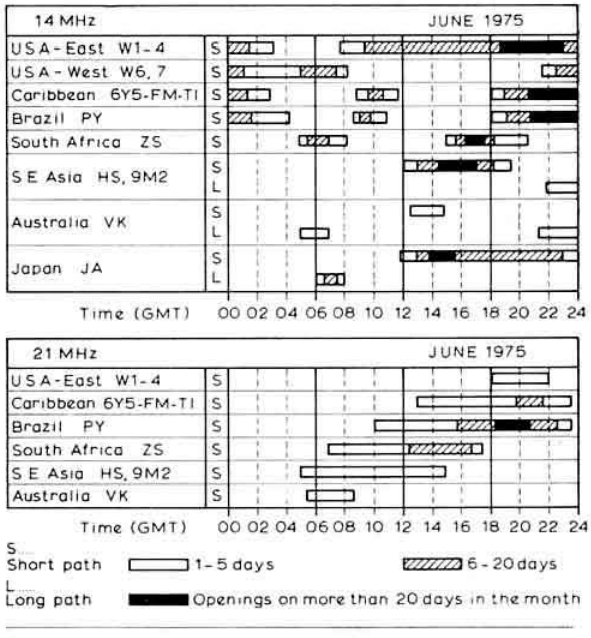
Propagation Predictions

During the present phase of solar activity, summer conditions will be very poor on both 28 and 21MHz. **28MHz** will be of no value at all except for brief chances of traffic with South America from 1830 to 2030gmt and with Central and North Africa from 1600 to 1930gmt. Sporadic short-skip conditions may liven up this band and **21MHz**, and will last into September. South America will be heard with certainty on **21MHz** from about 1600 to 1930gmt, Central and North Africa almost certainly, but traffic with eastern North America as well as Australia and South-East Asia will only be possible under very favourable conditions. No traffic will be possible with western North America and Japan.

On **14MHz** summertime conditions will lead to an improvement of dx possibilities, especially in the early hours of the morning. Traffic with Hawaii and Alaska will be possible on this band from about 0500–0930gmt via the direct path. Short-skip conditions which make contacts possible, may on the other hand lead to considerable QRM in the afternoon and early evening. **14MHz** will seldom be interrupted by the dead zone and traffic between European stations will be better on this band than on **21** or **28MHz.** DX via the indirect path will be possible on **14MHz** with Japan, South America and western North America.

There will be little change in conditions on **7** and **3·5MHz** from those given for last month. Local traffic on 3·5MHz will not be interrupted by the dead zone during the latter half of the night.

The provisional sunspot number from the Swiss Federal Observatory for April was 6·2, the lowest number yet recorded. The entire month was virtually devoid of solar activity. Although the first spots of the new cycle have been reported it is not anticipated that conditions will show any improvement for at least a year. The predicted smoothed sunspot numbers for August, September and October are 9, 8 and 7 respectively.



Amateur radio aids mountain rescue

by D. J. BRADFORD, G3LCK

IN April a party of boys from the Simon Langton Boys Grammar School at Canterbury, with G3LCK in charge and with G8IAM, G8IZJ and G8KCA were working in the Tal-y-Bont region of the Conway Valley. Among their equipment was a Ken Handitalkie and an IC22 mobile rig.

G8IZJ was operating on 2m in QSO with GW8HCZ when two pupils of the Helena Romanes Comprehensive School at Great Dunmow, Essex, arrived with the news that one of their party was suffering from exposure some miles away at about 1,500ft asl. GW8HCZ immediately telephoned the information to the police and mountain rescue organization in Llandudno who responded with a request to keep the 145·00MHz channel open.

Since the location of the casualty was fairly close to a moderate road, the SLBS minibus was despatched with Sub/Lt Fisher, G8KCA, (plus the Ken set) and two fifth formers. Keeping in touch was not easy due to the terrain, but G3GZX called in to say he could copy the GW8KCA/P signal and that he would QSP. At the same time G4DIT was doing a great job keeping 145·00MHz clear. Their co-operation was invaluable.

Police and mountain rescue personnel soon arrived at GW3LCK/A and after the GW8KCA/P-G3GZX-GW3LCK/A circuit reported the casualty as "picked up and returning", an RAF Valley helicopter made a rather spectacular night landing at the main site and took the boy to hospital.

On the following day the Gwynedd Constabulary and the Mountain Rescue Service expressed their appreciation of the assistance rendered and of the overall efficiency of amateur radio as a means of emergency communication. There was a strong feeling that the evidence of their own eyes and ears had considerably enhanced their opinion of amateur radio.

If one is in the right place at the right time with the right equipment, that section of the amateur licence which permits limited third-party traffic can be put to very good use. A view shared by the others involved on this occasion. □

Some of those involved: (l to r) Lawrence Atkinson, G3LCK, G8KCA and David Hughes. (Photo by permission of *Kentish Gazette*)

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr R. J. W. Brocklesby, G3DJX
Reg Brocklesby, "Brock" to his amateur friends, died on 22 April aged 70. Until his retirement he was on Marconi's technical staff and during the late 'twenties was the operator using that firm's testing callsign.

Mr M. D. Calvert, BSc, G3WXS
Michael Calvert died on 17 April, as the result of an accident, at the age of 22. He obtained his licence at the age of 14, and was a leading member of the amateur radio societies of his school and Bangor University College. At the time of his death he held the Somerset Trophy on behalf of the college. His amateur radio interests covered contests, construction, top band dx, 4m and cw operation.

Mr D. N. Corfield, DLC(Hons), FIEE, G5CD
David Corfield died on 16 April, aged 69. He was first licensed in 1926 and in the early days played an active part in the Golders Green and North Middlesex radio clubs.

For over 40 years he was a keen worker on behalf of the RSGB—as a Council member in the 'thirties, and a member of the Technical Committee from its formation in 1935 until forced to retire by ill-health in 1971. He was elected an Honorary Vice-President of the Society in 1951.

He was a keen vhf/uhf experimenter, spending more time developing and making equipment, and contributing articles on it, than operating it. He pioneered the use of fm and uhf transmission, including the first application of Gubam's "G-string" single-wire aerial feeder theory, and played a leading part in proving that amateur tv transmissions would not interfere with aircraft instrumentation.

Mr A. Gandon
Arthur Gandon died on 28 March at the age of 75. He was a keen dx listener and a strong supporter of the Weston-super-Mare Radio Society. Although he had been a Merchant Navy radio officer for over 35 years he never obtained an amateur licence.

Mr S. T. Kavanagh, G8CIY
Syd Kavanagh died on 25 April. He was a member of the Basingstoke ARC, and a founder member of the Southern FM Group. He operated both fixed and mobile on 2m.

We have also been advised of the death of **Paul D. Clarke, G8IVX**, at the age of 16 on 1 May 1975.

Contests calendar

7-8 June	—HF NFD (Rules in February issue)
21-22 June	—Microwave FD (Rules in April issue)
22 June	—DF qualifying—High Wycombe (Rules in June issue)
22 June	—RSGB Region 1 VHF (Rules in June issue)
28-29 June	—Summer 1·8MHz (Rules in June issue)
5-6 July	—RSGB VHF Open and SWL (Jubilee) (Rules in May issue)
12-13 July	—SSB Field Day (Rules in March issue)
13 July	—DF qualifying—Salisbury (Rules in June issue)
27 July	—144MHz QRP (Rules in May issue)
3 August	—DF qualifying—Dartford Heath
10 August	—70MHz Portable (Rules in June issue)
31 August	—DF qualifying—Coventry
6-7 September	—VHF NFD and SWL (Rules in March issue)
6-7 September	—IARU Region 1 VHF (Rules in May issue)
14 September	—80m Field Day
21 September	—DF final—Slade
5-6 October	—RSGB UHF Open and SWL (Rules in May issue)
12 October	—21-28MHz Telephony (Rules in May issue)
18-19 October	—7MHz CW (Rules in June issue)
1-2 November	—144MHz Open
1-2 November	—7MHz Phone (Rules in June issue)
8-9 November	—2nd 1·8MHz
16 November	—432MHz Open
7 December	—144MHz Fixed

48th Annual General Meeting

Minutes of the 48th Annual General Meeting of the Radio Society of Great Britain held at the Royal Society of Arts, John Adam Street, Adelphi, London WC2 on Friday 6 December 1974 commencing at 6.30pm.

Present: *The President*, Mr G. R. Jessop, G6JP, *in the Chair; the Executive Vice-President*, Mr C. H. Parsons, GW8NP; *the Honorary Treasurer*, Mr J. O. Brown, G3DVV; *the Immediate Past-President*, Dr J. A. Saxton; Messrs P. Balestrini, G3BPT; D. Byrne, G3KPO; W. J. Green, G3FBA; L. E. Newnham, G6NZ; W. A. Scarr, G2WS; R. F. Stevens, G2BVN (*members of Council*); W. E. F. Corsham, G2UV; J. Hum, G5UM; J. W. Matthews, G6LL; A. O. Milne, G2MI; P. A. Thorogood, G4KD; A. J. H. Watson (*Vice-Presidents*), D. A. Findlay, G3BZG, *Secretary*, and 97 corporate members of the Society.

The President welcomed the members of the Society to the meeting.

Notice convening the meeting

The President explained that the notice calling the meeting was set out in detail on page (ii) of the Annual Report and Accounts which had been circulated to members. The notice was very long and to save time he proposed that the first part only be read, and that the agenda items be taken as read as they would be dealt with as they arose.

As all were in favour of this procedure the secretary read only part of the notice.

Minutes of the 47th AGM

The minutes had been published in the November issue of *Radio Communication* and Mr W. E. F. Corsham, G2UV, proposed and Mr R. L. Glaisher, G6LX, seconded that the minutes be confirmed.

There were no questions and the proposal was carried unanimously.

Annual Report of Council for the year ended 30 June 1974

Mr W. N. Craig, G6JJ, proposed and Mr T. F. C. Davies, G3YMM, seconded that the Annual Report be adopted.

Mr. A. Holloway, G3VUQ, pointed out that the Report of Council was a very brief document while a much more comprehensive report under the heading "The Year in Review" of some of the Society's activities was also included. He felt that the review should take the place of the Report of Council.

Mr J. Bluff, G3SJE, asked whether the review which accompanied the Annual Report was a legally binding document; Mr J. O. Brown, Honorary Treasurer, explained that the review was not one of the legal documents that were required to accompany the Annual Report and Accounts.

It was pointed out that although members could claim from the Society a refund of any amount of VAT overpaid there had only been so far about 20 claims.

There being no further questions, the proposal was put to the meeting and carried with three members voting against the proposal.

Audited Accounts for the year ended 30 June 1974

The report of the auditors was read to the meeting.

Mr T. F. C. Davies, G3YMM, proposed and Mr W. J. Green, G3FBA, seconded that the audited accounts be adopted.

Mr E. W. Yeomanson, G3IIR, pointed out that at the last AGM it had been agreed that the item "Surplus on rallies" should be shown separately in the accounts this year.

Mr Brown explained that Note 10 on the accounts gave the required information and it was specifically stated in the Balance Sheet that the notes on the accounts formed part of the accounts. It was usual practice to include matters of detail in the form of notes rather than to include the items in the Income and Expenditure Account or Balance Sheet so that these documents did not become too detailed.

Mr Yeomanson persisted that the information had not been given but Mr Brown said that he felt that this was a quibble. He would, however, consider the matter when dealing with the next accounts.

Mr A. C. Morris, G3SWT, said that, as a former honorary treasurer, he was interested in the accounts and wished only to comment generally. He noted that there had been a reduction in the profit on sale of publications and that debtors had increased.

Mr Brown explained that the profit on sale of publications was less because it had been thought prudent to reduce the stock value of certain slow-moving publications. Debtors had increased because there had been a large increase in revenue from advertisements and generally customers were trying to obtain longer credit terms.

It was pointed out that a provision of £1,000 had been made against the possibility of legal costs that might be incurred to protect members who might be involved in actions alleging interference. Mr Corsham said that it might be possible to insure against such legal costs, but Mr Brown said that he thought that such insurance would only be possible if negligence could be proved.

Mr Bluff pointed out that proceedings in the High Court could be exceedingly expensive. Mr J. W. Swinnerton, G2YS, explained that although the Society might be called on to support a member, support would only be forthcoming if it were a matter of interest to the amateur movement as a whole in the UK.

There being no further questions the proposal was put to the meeting and carried unanimously.

Special resolution 1

To amend the Articles of Association so that the following Article be substituted for the present Article:

9. Associates

Candidates to be eligible for election as Associates must be under 18 years of age. Associates shall have no vote. On attaining the age of 18 years an Associate must apply for transfer to Corporate membership. An Associate under the age of 18 years on obtaining the permission of a competent authority to install and operate an amateur radio transmitting station may apply for transfer to Corporate membership.

Mr C. H. Parsons, GW8NP, proposed and Mr D. Byrne, G3KPO, seconded the resolution. Mr Byrne explained that this amendment was only to help those younger members who might obtain a licence before the age of 18. At present they were required to transfer to Corporate status and pay the full subscription. The amendment would make transfer to Corporate status optional before reaching the age of 18.

Mr C. Burkett, G8FTU, asked whether a member who had already transferred to Corporate status while under the age of 18 could transfer back to Associate status until he reaches the age of 18.

The Honorary Treasurer said that he could see no objection to this proposal.

There being no further questions the resolution was put to the meeting and carried unanimously.

Special resolution 2

To amend the Articles of Association so that the following Article be substituted for the present Article:

26. Composition of Council

"No member shall be eligible for election as a Council member other than as President, until he shall have been a Corporate member for a period of not less than three consecutive years immediately prior to the date of his nomination. All Council members except the President and Immediate Past-President shall serve for three consecutive years commencing on January 1 following the Annual General Meeting at which they were elected. A retiring Council member, not excluding the Immediate Past-President, shall be eligible for re-election for a further term of three years provided he complies with this article after which he may not seek re-election until after a minimum period of one year.

Mr C. H. Parsons, GW8NP, proposed and Dr J. A. Saxton seconded the resolution. The President explained that the present Article did not provide any limit to the time that a member (excluding the President and Immediate Past-President) may serve on Council. The amendment provided that a member may only serve on Council for a period of six consecutive years after which there must be a break for a minimum period of one year.

Mrs C. Stone, G3SGN, asked for confirmation that in the Articles of Association, particularly in connection with Council members, any reference to "he" did include "she". Mr Brown confirmed that this was the position and that female Council members would indeed be welcome.

The President explained that for several years there had been a tendency for retiring Council members to stand again for Council and be re-elected, with the result that there was no flow of new blood. It could be said that this amendment to the Articles of Association might deprive the Council of experienced members.

Considerable discussion took place.

Mr Yeomanson pointed out that he had served as a Council member for 17 years and was very much in favour of this amendment. In his experience he had found at times that Council consisted mainly of Past-Presidents, and while this produced much experience it did not provide for the future of the Society.

Mr Corsham said that he was in favour of the resolution.

Mr T. Davies said that he had heard of this proposal previously. He was concerned that it would result in the loss of Council members who had done much hard work for the Society.

Mr Swinnerton supported the earlier remarks by Mr Yeomanson. He had served for nine years as a Council member and because of his conviction that there should be fresh thinking he had deliberately refrained from standing for re-election.

Mr Bluff asked whether the change in nomination procedure had been successful. (Prior to 1971 the Council had power to nominate retiring Council members for re-election). The President said that this particular amendment had not achieved the desired result.

Mr G. Packer, G3UUS, said that the meeting seemed to be more concerned with the details of length of service than with the principle that Council needed a fresh outlook.

There being no further questions the resolution was put to the meeting and passed. There were five members who voted against the resolution and two members abstained.

Council for 1975

The President read a letter dated 3 December 1974 from the scrutineers of the ballot for Council members. He announced that Mr David Pratt, G3KEP, was elected to fill the vacancy for an ordinary member of Council, and Mr D. M. Thomas, GW3RWX, was elected to fill the vacancy arising in Zone E.

The President congratulated the members elected and thanked the unsuccessful candidates for taking part in the election.

The letter from the scrutineers had stated that the votes cast for Mr G. M. C. Stone, G3FZL, had not counted as his nomination was not in order.

The Secretary explained that the nominators of Mr Stone included one person who was not a member of the Society. The nomination was therefore invalid and Mr Stone's name should not have been included in the ballot paper. The Society's solicitors had been consulted and they were of the opinion that Mr Stone's name should not have appeared, but that the rest of the ballot was in order.

The ballot papers had been printed and distributed before the error was discovered. It was a most unfortunate and embarrassing situation but it would be quite wrong to suggest that there could be any alteration to the procedure.

Auditors

It was reported that the auditors, Messrs Edward Moore & Sons, had expressed willingness to continue in office. The Honorary Treasurer proposed that the remuneration of the auditors for 1975 be £450. Mr Davies seconded the proposal which was carried unanimously.

Other business

The President stated that in accordance with Article 14 of the Articles of Association, the names of any Honorary members, Vice-Presidents or Honorary Vice-Presidents elected during the year must be announced at the next AGM.

It was therefore with great pleasure that he was able to announce that Mr W. Browning, G2AOX; Mr Jack Hum, G5UM, and Mr P. A. Thorogood, G4KD, had accepted the Council's invitation to become Vice-Presidents of the Society.

Mr Browning was unfortunately unable to be present at the meeting due to illness but Mr Hum and Mr Thorogood were both present and the President presented them with their Vice-President badges.

There being no further business the President declared the meeting closed.

After the AGM the presentation of trophies to those winners who were present took place.

Informal discussion

An informal discussion took place after the AGM and presentation of trophies. Details were reported in the January issue of *Radio Communication*.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held in Cardiff on 21 February 1975

Present: Mr C. H. Parsons (*President, in the Chair*), Messrs R. J. Baker, P. Balestrini, J. O. Brown, D. Byrne, R. W. Fisher, W. J. Green, L. E. Newnham, J. Petty, D. Pratt, W. A. Scarr, R. F. Stevens, D. M. Thomas, F. C. Ward, (*members of Council*), G. R. Jessop (*general manager*), A. W. Hutchinson (*editor*), H. C. Bostock (*minute secretary*).

Apologies for absence were received from Dr E. J. Allaway, and Mr A. W. Smith. Mr W. F. McGonigle was reported to be in hospital after collapsing at home.

Council meetings 1975

The President requested the opinions of members concerning suitable dates and times for Council meetings for the remainder of 1975, and after discussion the following dates and times were agreed: Tuesday 22 April at 5.30pm, Monday 14 July at 2.30pm, Monday 15 September at 5.30pm and Monday 24 November at 2.30pm.

Financial report 1 July-31 December 1974

The Honorary Treasurer presented the interim accounts, the income and expenditure accounts and the balance sheet as at 31 December 1974. He regretted a deficiency of almost £7,000 for the half year that the accounts showed and said that there were three main reasons for this:

1. Fall off in received subscriptions;
2. Increase in cost of producing *Radio Communication*;
3. Increases in staff salaries.

He emphasized that action must be taken to contain this loss trend; the general manager was already planning action wherever possible on items 1 and 3, and the Honorary Treasurer, the editor and Mr Stevens would consider item 2 in an endeavour to reduce costs during the second half year.

Mr Stevens said that the production cost of *Radio Communication* would continue to increase but pointed out that every effort was being made to keep this as low as possible. Higher rates of advertising would operate from 1 July 1975 and these would help to off-set the effects of the higher costs of printing, paper and postage.

The Honorary Treasurer said that he thought subscriptions would have to be increased, and the amount and timing were fully discussed by the Council.

Mr Scarr reminded Council that it would not be possible to increase subscriptions above £6 until the Articles of Association had been amended at the next AGM.

The Honorary Treasurer stated that he had taken guidance on this point and the proposed amendment to the relevant article would remove the upper limit to avoid frequent change to the article. The Department of Trade and Industry had advised this course.

Membership and representation

It was resolved:

(i) to approve the applications for membership, transfers and re-instatements of 125 members;
(ii) to accept reduced subscriptions from 11 members;
(iii) to waive the subscriptions of three members on the grounds of blindness or other disability;
(iv) to grant life membership to two members;
(v) to grant affiliation to QRZ Club (DL5YQ), c/o W. O.11D Moodie, BFPO 30; Cheshunt and District Radio Club; TACT ARS (G4BPT), c/o Hull College of Technology, and Radio Club Santiago Del Estero.

1973 Presidents' Committee

Mr Brown, secretary of the above committee, tabled the following recommendations from this committee:

(1) That a telecommunications liaison officer should be appointed. This was envisaged as an honorary appointment which would be

made annually. It was felt essential for the Society to have a consistent policy in dealing with the licensing authority.

It was proposed and carried unanimously that Mr Stevens be appointed to this office for 1975.

(2) As soon as is possible, bearing in mind the economic situation, the Society should appoint a managing editor to correlate and expand all the Society's publications activities. This appointment would be on a full-time basis and terms of reference would be drawn up.

Mr Baker questioned what a managing editor could contribute and suggested that the financial aspects of such an appointment should be examined by the Finance & Staff Committee.

Mr Hutchinson asked if it was the intention for the proposed managing editor to be a part of the existing editorial staff. He felt that the appointment of an editorial assistant would enable the assistant editor and himself to take on more book production. He thought the proposal needed more examination.

Mr Brown accepted this, and said that he, Mr Stevens and Mr Hutchinson would discuss this matter.

"Ham Radio Magazine"
An invitation had been received from Skip Tenney for an RSGB representative to attend the Dayton Hamvention. It was resolved that this was not practical for 1975 but it may be worth considering for next year when the new *Radio Communication Handbook* and *VHF Manual* are available.

AMSAT-UK
Council agreed that this group provided a very useful service to a large number of Society members, and approved Finance & Staff Committee recommendation that a donation of £50 be made to AMSAT UK, which would have the status of an RSGB Group.

Committee minutes
Council received the minutes of the following committee meetings: Telecommunications Liaison Committee (21/11/74 and 30/1/75); VHF Contests Committee (29/11/74); Finance & Staff Committee (5/1/75); Interference Committee (17/1/75); Mobile & Exhibition Committee (21/1/75); HF Contests Committee (23/1/75); IARU Working Group (28/1/75); Education Committee (1/2/75); Scientific Studies Committee (3/2/75); VHF Committee (5/2/75).

Following a recommendation of the VHF Committee, Mr Baker proposed, Mr Newnham seconded, and Council agreed that the Fraser Shepherd Award be divided between the Barry Radio Society (GW3PPF, GW4AMU) and the Scottish VHF Group (GM3OXX).

Mr Brown advised Council that at the last meeting of the Headquarters Location Committee it was decided to postpone any further action on the removal of headquarters as it was considered that the circumstances, ie severe staff problems, which originally indicated a move, now no longer existed. The subject would become a regular agenda item of the Finance and Staff Committee and would be reviewed at each meeting.

Representation
The general manager circulated to all members of Council committee standing orders, committee terms of reference, and press releases. He hoped it would be possible in the near future to produce a booklet containing all such information, including the scheme of representation. The booklet would be an outline of the Society's organization for all officers and committee members. It was agreed that such a booklet should be produced.

The general manager tabled a list of nominations for regional representatives and area representatives so far received.

Visits
Council approved a request from Dr Allaway that he attend the Warsaw Convention as an observer. Council also approved visits by Mr Newnham on behalf of the Society to several clubs.

Looking ahead

28 June — RSGB Region 12 Amateur Radio Assembly, Robert Gordon's Institute of Technology, Schoolhill, Aberdeen.
6 July—Third Microwave Round Table, IBA Headquarters, near Winchester.
21 September — Southampton RSGB Group Convention.
30 Oct-1 Nov — Amateur Radio Retailers Association Exhibition, Granby Halls, Leicester.

RAYNET

by S. W. LAW, G3PAZ*

THERE are those who feel that our efforts do not receive due recognition, but let them take heart, for we continue to receive enquiries of our structure and activities from many quarters. The two most recent are from as far apart as the USA and Gibraltar. An American author is compiling a book on the activities of radio amateurs during emergencies and disasters, and no less than three chapters may be set aside for Europe. As to Gibraltar, great interest has been expressed in our work in the UK, and the Raynet Committee will have pleasure in compiling the information requested.

We have many regular reports from some quarters and these are very much appreciated, but it is likely that some groups might be unduly modest at the idea of bothering the committee with what may be regarded as minor activities. This is not the case; all Raynet news from groups large and small is gratefully received and duly noted, so please let us hear from you as often as possible. Even an unsuccessful exercise may provide a most valuable lesson in learning the best methods for overcoming any particular difficulty in communication and may assist others who have similar problems.

As a final "plum" to the above, the material which we hope to supply to the Gibraltar ARS may well form a part of a radio and television programme which we understand is being compiled for presentation over there. Who knows, it might even get on to a UK network? So do your best to oblige our friends, even to the extent of inundating the committee with information, tapes, 8x10 glossy prints, slide transparencies or even movie film.

Kent exercise "Nemesis"
The promised extensive Kent exercise "Nemesis" has been delayed by the extensive debriefing process necessary, but it will be published as soon as possible.

Liaison in camera?
One type of exercise record which is woefully lacking from our archives is cine film of group activity, despite the very generous offer of a committee member to supply photographic film (or plates) to any group intent on making such a record. It has occurred to us that there exist many amateur cine clubs in the country who might welcome the suggestion of making a film of what, to them, might appear a fresh and novel subject quite outside the confines of the usual club film script: film club venues should be available at local libraries or social services centres. A straight documentary style is the best thing for which to aim.

Cornwall consolidate
After a long interval the Cornwall group have come up with a first-class report on progress over the last 16 months. County controller G3XC now has 42 members in five areas under area controllers G8DZE (Falmouth), G2XFL (Truro), G3THT (Newquay), G3XTE (Camborne) and G3YJX (Wadebridge). Frequencies in use are 4m (2), 2m, 10m and 70cm, the two latter hand-held to /P or /M at the incident site. Liaison with the user services is excellent. A great deal of work has been done by the members in exercise and survey of terrain and G3XC would like to express his sincere thanks to all concerned for their unfailing assistance.

Same old trouble?
Some concern has been expressed over the opinions voiced by certain non-Raynet operators when politely requested to clear the channel during a genuine emergency involving the user services. We wonder how they would feel if they were in the position of the unfortunate person in dire need of immediate assistance?

Hon Registrations Secretary; Mrs L. A. Crane, "Greta Woods", Bromley Road, Ardleigh, Colchester, Essex.

* 130 Alexandra Road, Croydon, Surrey CR0 6EW

CONTEST NEWS

April 70MHz Open and Listeners' Contest results

Contrasting with the 1974 event, "Weather-miserable" and "Conditions—worst ever" were typical of the comments made by entrants about this year's major 4m event. Nevertheless a good entry was received and the leading stations were approaching a three-figure QSO total by the end of the contest. The lack of entries from the nether regions was in no small measure due to extensive snow on high sites in the north and west.

Perhaps the most significant change has been the takeover by ssb as the prime operating mode; 80 per cent of entrants used ssb but cw is still necessary for the real dx. There were no complaints of poor signals and, in general, operating techniques were good. However, one or two ssb stations, evidently using transceivers, lost QSOs through not being able to tune over the band.

Most stations voluntarily shut down during the small hours but a statutory period would seem to be more welcome. By popular request this trophy event may be moved to later in the year.

The Golden Valley VHF CG retains the VHF Manager's Trophy with a clear lead. Certificates go to GW4ABR/P, GW3WAS/P, GD2HDZ and G3XDY. A special effort by G3NHE using cw only was rewarded by a creditable third placing.

W.J.M.

FIXED SECTION

Posn	Callsign	Score	QSOs	QRA	Best dx	Km
1	GD2HDZ	321	33	XO68	G4BOX/P	420
2	G3XDY	311	43	ZN50	GD2HDZ	295
3	G3NHE	289	45	ZN54	G3DAO	283
4	G4AIR	283	51	YN60	G4ALE/P	360
5	G3WRA/A	275	45	YM77	—	—
6	G4BWG	266	78	ZL50	G3NKL	—
7	G3ONP	251	47	YM40	G3XCS	286
8	G3NPI	225	65	ZL46	G3WCS	255
9	G2AXI	224	50	ZL55	G4BYP	258
10	G5DF	215	42	ZL45	G3WCS	272
11	G3FIJ	198	36	AL05	GW4AZS/P	292
12	G3RWM	191	37	ZM32	G3XCS	291
13	G3OSS	180	52	ZL40	GD2HDZ	390
14	G3KIN/A	176	67	ZL49	GW3WAS/P	258
15	G3TBK	174	35	ZN77	G3KFN/P	335
16	G3YRB	159	47	ZL50	GW3WAS/P	270
17	G5HD	130	25	ZK02	G3OHH	253
18	G4BYP	119	29	YN46	G4CVI	290
19	G3YQW	89	33	ZL70	GW4ABR/P	272
20	G3HBG	81	25	ZL60	GW3WAS/P	290
21	G4DDC/A	47	17	ZL09	G3XUS/P	155
22	G4ALG	46	23	ZL46	GW4ABR/P	200
23	GM3EOJ	39	5	YR70	GW4ABR/P	532
24	G4DPD	28	22	ZL39	G3XUS/P	67
25	GM4AOR	27	11	YP04	GM3ZBE	160

PORTABLE SECTION

Posn	Callsign	Score	QSOs	QRA	Best dx	Km
1	GW4ABR	642	86	YM77	GM3EOJ	530
2	GW3WAS	541	79	YM14	G3DAH	337
3	G3FEC	492	94	ZL32	GD4BEG	361
4	G3PMH/A	439	95	AM71	GD4BEG	390
5	GW4AZS	427	73	YM25	G3DAH	320
6	G4KF/A	378	88	AL33	GD2HDZ	440
7	G3XUS	368	84	ZK10	G4BZD/P	300
8	G4BOX	362	97	ZL59	GD2HDZ	425
9	G4ALE	320	68	AK11	GW3WAS/P	315
10	G3ZME	311	60	YM36	G4ALE/P	283
11	G4BZD	267	45	ZN44	G3KFN/P	370
12	G3TDM	251	51	ZL32	GD2HDZ	345
13	G3WMR	243	53	YL10	G3XDY	275
14	G3XBY	197	32	ZM36	G3KFN/P	323
15	G3VDF	156	25	YK28	G3FIJ	277
16	G3CDG	145	31	YL10	G3DAH	235
17	G3VPS/M	87	36	ZL80	GW4ABR/P	255
18	G3YGF	66	28	ZL38	G4BZD/P	190
19	G3VHH	49	27	AL21	G3WMR/P	140

Check log: G3MEH

LISTENERS' SECTION

Posn	Callsign	Score	QSOs	QRA	Best dx
1	BRS34348	262	58	AL53b	GD2HDZ
2	BRS26431	223	49	ZM03a	G3KFN/P
3	BRS15822	170	58	ZL40j	GW3WAS/P
4	BRS28198	27	9	AK04h	G3FEC/P

1974 VHF/UHF Listeners' Championship results

Apologies are offered for the delay in tabulating these results due to some of the log sheets not being to hand, although this did not make any difference to the overall results. Attention is drawn to the current Form 427 and log sheets for vhf/uhf contests which can be obtained by sending an sae to G4CUT, QTHR.

The winner of the Hanson Trophy for 1974 is Joe Skidmore, BRS26431, with a large score over the runner-up, David Barber, A8016, who will receive a certificate. There was not a great deal of difference in the equipment on any band used, but Joe is 430ft asl and David is only 30ft asl. It seems to be a question of the better the way and time spent on the task, the better the results.

G4CUT

Posn	BRS/A	70MHz	144MHz	432MHz	1,296MHz	Total
1	BRS26431	—	1 922	6,400	—	8,322
2	A8016	280	944	2,787	—	4,011
3	BRS33823	—	591	3,133	—	3,724
4	BRS15822	160	1,128	590	750	2,628
5	BRS34348	—	1,538	530	—	2,068
6	BRS28005	—	1,203	—	—	1,203
7	BRS31038	—	599	—	—	599
8	A8552	—	351	—	—	351
9	BRS33794	—	294	—	—	294
10	BRS32525	—	259	—	—	259
11	A8060	—	229	—	—	229
12	A8163	—	203	—	—	203
13	A8094	—	190	—	—	190
14	A8324	74	23	50	—	148
15	A8605	—	143	—	—	143
16	A8065/A	—	132	—	—	132
17	A8284	—	120	—	—	120
18	A8163	—	96	—	—	96
19	A8552	—	40	—	—	40

Summer 1·8MHz Contest 1975 rules

1. The general rules for RSGB hf contests, published in the January 1975 issue of *Radio Communication*, will apply.

2. When. 2000gmt Saturday 28 June to 0100 Sunday 29 June, 1975.

3. Eligible entrants. The contest is open to licensed amateurs in all parts of the world. Multi-operator entries will be accepted. There will be two sections:

(*a*) British Isles stations.

(*b*) Overseas stations.

British Isles entrants must be members of the RSGB.

4. Contacts. CW (A1) only in the 1·8-2MHz band. County code letters, as published in the January 1975 issue of *Radio Communication*, must be sent after the RST/serial number group by all British Isles entrants, eg for a contact from Surrey—579001 SRY.

5. Scoring. British Isles section—three points for each contact, with a bonus of five points for the first contact with each county within the British Isles, and with each country outside the British Isles.

Overseas Section— three points for each contact with a bonus of five points for the first contact with each county in the British Isles. Overseas stations may work only British Isles stations for points.

6. Logs. Column (5) of the log must be headed "County Code Letters received". Multi-operator entries should show the callsign of each operator against the contacts for which he is responsible, and the names and callsigns of all the operators should be listed on the cover sheet.

7. Entries must be addressed to The RSGB HF Contests Committee, c/o R. L. Glaisher, G6LX, 279 Addiscombe Road, Croydon CR0 7HY.

8. Awards. Certificates of merit will be awarded to the leading three entrants in each section.

70MHz Portable Contest rules

0900-1700gmt 10 August

All entries and check logs to: G4CUT, 59 Harewood Road, Chelmsford, Essex CM1 3DH. The following general rules, published in January issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7a, 8c, 9a, 10a, 11-22.

Note 8c. Award to highest scorer and runner-up.

March 144MHz Open Contest results

For the past few years the best 2m sites in Britain have been in the Welsh border counties, and by winning this contest the GW3UCB/P team lent weight to that opinion. But the second- and third-placed portable stations, G8BQX/P on the south coast and G3XDY/P in Lincolnshire proved that one need not go to Wales—judging by their considerable lead over the rest of the Welsh(?) portables. The March & D RAS found that a 125ft high aerial on a Fenland site helped them to lead the fixed stations. Runner-up in this section was a welcome entry from ON8IW, who concentrated largely on working G stations. GW3UCB/P will receive the Mitchell-Milling Trophy, and certificates will be awarded to GW3UCB/P, G8BQX/P, G3PMH/A and ON8IW.

Several complaints of poor-quality signals were received: most of them levelled against the complainant's near neighbour and not confirmed by anyone else. In these circumstances it is difficult to be sure that part of the blame does not lie with the complainant's receiver. The operators of one portable station whose spurious signals led to widespread comment had checked the transmitter with a spectrum analyser before leaving home, but on their return they found the complaints were justified.

This illustrates that well-sited stations have a special responsibility to make certain that their signals are always above reproach, whatever the power level. At the same time, complainants should be sure of their receivers, many of which never experience really strong signals from one contest to the next. The adjudicators would prefer the operators of a defective transmitter to withdraw from the contest voluntarily and send in a check log instead—even GW3UCB/P has done so in the past.

Several people have asked for a 2m contest that excludes ssb. The contest calendar is too full for a separate event this year, so, as a trial, entrants who certify that they have not used ssb will be listed separately in the December fixed station event.

It has been necessary to disqualify G4DML for gross errors in the claimed score, which would otherwise have won the fixed station section. The nature of these errors has led to the matter being referred to Council.

Thanks to G3JFO/P, GM8GFF/P and GC2FZC for check logs (no self-disqualifications), and to the stations who were contacted by mail.

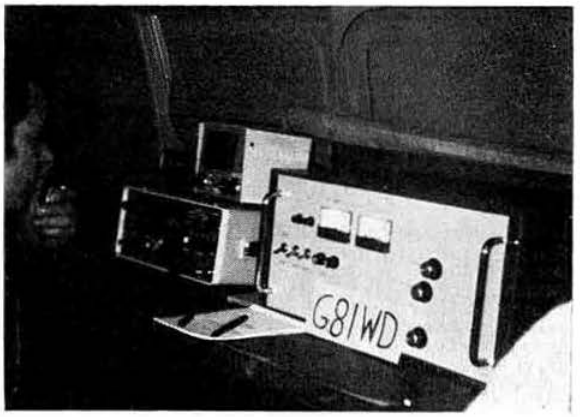
G2HIF, G3SEK

PORTABLE STATIONS

Posn	Callsign (/P)	Points	QSOs	QRA	Best dx	Km
1	GW3UCB	4,072	514	YN75	DC9DZA	683
2	G8BQX	3,761	424	AK03	DJ9MH/P	740
3	G3XDY	3,700	479	ZN49	FIKBF/P	747
4	GW3FEC	2,736	394	YN61	ON8IW	618
5	GW3WRA	2,616	398	YL05	GM4DSZ/A	580
6	F0DA	2,557	255	ZJ21	G8DAZ/P	570
7	GW8BHH	2,293	327	YM44	DC9DQA	670
8	G8IWD	2,153	265	YK28	DC6BBF	720
9	G8FAB	1,933	318	ZL52	GM4DSZ/A	620
10	G3NNG	1,857	364	ZL33	DC5KE/P	568
11	G4CCC	1,532	300	ZL53	F1SP/P	525
12	G4BWG	1,503	374	AL51	GM4DMZ/P	495
13	G4CAR	1,415	277	ZN71	GM4DSZ/A	452
14	G4DDP	1,396	252	AL21	GM4DSZ/A	610
15	G4CLC	1,303	248	ZM37	DC9DZA	500
16	G8ELO/A	1,277	276	ZM64	GM8BOV/P	425
17	G3LCH	1,107	283	ZL59	—	475
18	G4COA	1,033	260	ZM73	G3BW	310
19	G4BEM	1,025	299	ZN71	PA0BWL/A	450
20	G4BRA	969	245	ZL62	ON5GF/P	410
21	G3SAD	925	232	ZL10	F1CTT/P	400
22	G4BSP	912	204	ZN53	PA0CKV	475
23	G3KUE	871	174	YN18	F0DA/P	415
24	G8JAY	861	189	ZL01	PA0BWL/A	450
25	G8GMF	795	163	ZL53	PA0CKV/P	440
26	G3UEU	772	134	YN10	GM8HXQ	510
27	G3KIN	719	224	ZL59	GM4DMZ/P	485
28	G3SFG	716	104	AM34	DK0CO/P	630
29	G3XZW	690	140	YL75	ON6DH/P	530
30	G8CDL	682	156	ZL08	DC9DZA	460
31	G3ZLQ	655	190	ZL26	GM4DMZ/P	415
32	G8ARO	641	167	ZL77	PA0BWL/A	420
33	G4APA	639	143	ZL10	GM4DMZ/P	435
34	G8IZU	632	140	ZM27	PA0BWL/A	375
35	G8JAE	615	147	AM71	GM4DMZ/P	430
36	GW3XJQ/A	612	75	XL26	PI1ARU	625
37	G8HYF	525	90	ZO54	G8BQX/P	400
38	G4DSP	516	108	ZN60	F0DA/P	470
39	GM8BOV	343	62	YP13	G8FAB/P	520
40	G3WDX	335	107	ZL15	F0DA/P	260
41	G4CCQ/A	333	121	AL52	G4CZP	370
42	G8DAZ	326	53	YO20	F0DA/P	560
43	GM3VTB	138	40	XQ80	G3XDY/P	360

FIXED STATIONS

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3PMH/A	2,539	370	AM21	F1ANH/P	665
2	ON8IW	2,030	181	BK40	GW3FEC/P	618
3	G8HCL	1,755	285	ZL58	GM4DSZ/A	647
4	G4CDN	1,750	161	AM18	F1LC/P	677
5	G4CWW	1,454	266	YM40	GM4DSZ/A	503
6	G4CZP	1,180	158	YO77	F0DA/P	480
7	G8GGP	1,012	227	AL52	PA0JOU/P	450
8	GM4DSZ/A	988	80	YR80	G8IWD/P	694
9	GD2HDZ	987	105	XO68	F0DA/P	555
10	G8AWZ	937	118	AM27	DC6BB/P	450
11	G3JQA	782	148	YN45	GM8HXQ/P	480
12	G3KMI	692	126	ZK04	DC9DZA	534
13	G6UW	654	106	AM61	DK3QY	500
14	G3UHF	632	145	YN49	GM4DSZ/A	395
15	G3BPM	629	175	ZL48	GM4DMZ/P	460
16	G3UKC	618	108	AL56	GW3FEC/P	410
17	G8ETB	609	163	ZL37	DC5KE/P	490
18	G8FKI	577	139	AL23	PA0JOU/P	380
19	G8CSA	544	164	AL31	G4CZP	360
20	G3HOX	539	123	YN40	F0DA/P	390
21	GI8EWM	527	63	XO21	G8HCL	510
22	G8HQJ	505	205	ZL79	PI1ARU	—
23	G3XTT	499	111	ZM66	DC9DZA	495
24	G3OUR/A	468	127	ZL14	ON4TX/A	410
25	G8FBF	450	99	AM52	PA0CSL	280
26	G8ERW	448	154	ZL30	F6CTT/P	365
27	G8IYI	2	89	ZN37	PA0CKV/P	415
28	G4BZD	416	87	ZN34	F0DA/P	433
29	G3FIJ	414	72	AL05	F6CTT/P	405
30	GW4DRR	401	66	XN58	GC3YIZ	430
31	G4DRO	385	124	ZL59	PI1ARU	355
32	G8IZN	350	122	AL31	GM4DMZ/P	491
33	G8IKO	348	148	ZL40	GW3FEC/P	300
34	GC3YIZ	343	46	YJ48	G3XDY/P	455
35	G8JAZ	325	120	ZL60	GW3UCB/P	280
36	G4BPO/A	324	59	AM76	DC9DZA	369
37	G3ZMF	305	115	ZL59	ON8IW	293
38	G8ESA/A	280	106	AL41	DC9DZA	440
39	G8BKR	273	57	YL48	G3XDY/P	270
40	G4BYP	271	73	YN46	G4DML	310
41	G8DCA	245	65	ZK10	DC9DZA	432
42	G3SXY	234	55	YL47	ON8IW	468
43	G8IXS	232	72	YM69	G3BW	265
44	G8IKS	230	34	ZO58	G8BQX/P	375
45	GC8JEK	191	28	YJ48	G3XDY/P	460
46	GM8GFF	188	44	YP04	GW8CWP/P	340
47	G8GIO	185	47	ZN68	G8FAB/P	232
48	G5UM	177	33	ZM35	DJ9CZ	503
49	GI8HXY	164	30	XO31	G3PMH/A	425
50	GI3JLA	159	—	—	G3PMH/A	531
51	G3MWZ	150	—	ZN68	—	
52	G3JVJ	139	23	ZM42	GM4DMZ/P	370
53	G8FDL/A	134	57	YN38	G3PMH/A	182
54	G8JXV	121	36	AL62	PA0CKV/P	350
55	G8HUC/A	110	—	ZN18	G8FAB/P	285
56	GM8HFJ	109	33	YP11	G3MOT	461
57	G8AHK	96	55	ZL68	GW3WRA/P	132
58	G8JEG	75	37	AL31	GW3FEC/P	310
59	G8JWM/A	72	28	ZN49	G8FAB/P	270
60	G3RQJ	68	35	AL61	G3NNG/P	122
61	G8JJL/A	39	23	YL38	G3WDX/P	110
62	G4DBW	18	12	AL41	G8GDK/P	75



The West Dorset ARG station G8IWD/P being operated by G8DJW in the March 144MHz contest. *(Photo: G8GHU).*

RSGB 7MHz DX Contests 1975 rules

Licensed amateurs and SWLs throughout the world are invited to take part in these contests for single-operator stations (Note: no multi-operator participation allowed). Log and cover sheets may be obtained from RSGB, 35 Doughty Street, London WC1N 2AE. UK members should enclose a large sae, please.

TRANSMITTING SECTION

1. The general rules for RSGB hf contests, published in the January 1975 issue of *Radio Communication*, will apply.

2. When. CW contest from 1800 18 October to 1800 19 October 1975.
Phone contest from 1800 1 November to 1800 2 November 1975.

3. British Isles entrants must be members of the RSGB.

4. Contacts. CW contest—A1 only, phone contest a.m. and ssb. Reports and serial numbers must be exchanged (the latter to start from 001).

5. Scoring. British Isles stations may not work each other for points. They score five points for contacts with Europe and 50 for those outside Europe. They may also count 20 bonus points for each different country worked (as per the RSGB Countries List). In the case of VE, VK, W/K, ZL and ZS, each call area will count as a country for this purpose.

Overseas stations *in Europe* score five points for each contact with the British Isles, those *outside* Europe 50 points. All may claim a bonus of 20 points for each British Isles numerical prefix worked (ie G2, G3, G4, G5, G6, G8, GC2, GC3, GC4, GC5, GC6, GC8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GM2, GM3, GM4, GM5, GM6, GM8, GW2, GW3, GW4, GW5, GW6 and GW8). Note that contacts with stations using GB prefixes will not count for bonus points.

6. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw section. Certificates will be awarded to other participants and to European entrants outside the British Isles who make at least 50 contacts and to non-European entrants whose logs show a minimum of 10 contacts.

RECEIVING SECTION

Rules (1), (2) and (3) for the transmitting section apply.

British Isles entrants should only log overseas stations in contact with British Isles stations and must record the report and serial number given by the overseas station and the time in gmt. European stations logged count five points, outside Europe, 50. The bonuses mentioned in (5) above also apply to this section. Note that *no more than 20 QSOs* made by any one British Isles station may be logged.

Overseas listeners should log British Isles stations and must record the reports and serial numbers given, and the time. European listeners claim five points per QSO logged, others 50. A bonus of 50 points may be claimed for each British Isles country and numerical prefix logged. GB prefixes do not count, and not more than 20 QSOs made by the same British station may be logged.

Awards. Certificates will be awarded to all European entrants submitting logs containing a minimum of 50 QSOs, and to non-Europeans with at least 10 QSOs.

ENTRIES

Entries must be addressed to: The HF Contests Committee, c/o J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, West Midlands, England, to arrive no later than 15 December for the cw contest and by 29 December for the phone event. British Isles logs must be postmarked no later than 3 November and 17 November respectively.

It is extremely important that entries are sent only to this address—those sent elsewhere may suffer delay or disqualification.

Derby DF Qualifying Round results

Nine teams reported in at the start at the entrance to Darley Park in Derby on 13 April.

Strong signals were received from both stations at the start, but competitors found that the A station was inaudible outside the town. This station was in fact only about 400m from the starting place and was manned by G3SZJ who appeared to be innocently taking pictures, from a public footpath, of horses in a field. The equipment was concealed in his various camera bags and the aerial was about 5ft of wire in the hedge. Several competitors walked right past the cameraman; one asked if he had seen anyone operating nearby, and another kindly moved out of the way of the camera's field of view!

The B station was manned by G3IFA and G3ESB and was located at Carvers Rocks, an old quarry near Ticknall, about 15km south of Derby. To reach the operators the teams had to cross the swamp, with the result that several of the teams returned looking rather the worse for wear.

All teams found the B station and seven found both.

Posn	Name	Club	Time of arrival Station A	Station B
1	E. L. Mollart	Oxford & DARS	1552	1506
2	W. L. Pechey	Chelmsford	1600½	1518
3	B. J. Mahoney	Rugby	1449	1608
	W. J. North	Chiltern	1608	1519
5	T. C. Gage	Oxford	1622	1533
6	D. C. Holland	South Manchester	1624	1519½
7	J. R. Vickers	Stratford-on-Avon	1628	1532
—	J. McBurney	South Manchester	—	1506½
—	D. E. Newman	Rugby and Slade	—	1603

Subject to confirmation, E. L. Mollart and W. J. Pechey qualify for the final.

DF Qualifying Round—Salisbury

Date: 13 June 1975.
Map: OS Sheet 184 (Salisbury and the Plain) 1-50,000 series.
Assembly: 1300bst for start at 1320bst.
Location: NGR 101365 (near AA box)

Intending competitors please notify A. Newman, 74 Victoria Road, Wilton, Nr Salisbury, Wilts, as soon as possible, of the number in their party requiring tea.

DF Qualifying Round—High Wycombe

Date: 22 June 1975.
Map: OS Sheet 165 Aylesbury and Leighton Buzzard 1:50,000 series
Assembly: 1300bst for start at 1320bst.
Location: Cholesbury, near Rising Sun Public House, NGR 936070.

This event is being organized by members of the Chilterns ARS, and competitors requiring tea should notify Mr Colin Vernon, "Durlston", White Pit Lane, Flackwell Heath, Bucks, (tel: Bourne End 21005) as soon as possible.

Microwave Field Day rules—amendment

The general rules which apply to this contest on 21-22 June, published in the April issue, should be amended to read 1, 2, 3, 4b, 5b, 6a, 8b, 9b, 10a, 11-22.

RSGB Region 1 VHF Contest rules

0900–1700gmt 22 June 1975

Bands. 4m, 2m and 70cm; plus 23cm separate trial (Section 4).

Section 1. Multi-operator, fixed or /P. Separate callsigns for each band, simultaneous operation.

Section 2. Single-operator, fixed or /P. On any or all bands. /P entrants may go up to 20 miles outside the region, stating this in QSO.

Section 3. Outside region: operators in other regions may enter. Send in complete log for the period for checking, but score **only** Region 1 contacts for points.

Section 4. 23cm. Any entrants, separate log.

Rules. The following general rules, published in the January 1975 issue of *Radio Communication*, will apply: 2, 3, 5a, 6a, 10a, 11 to 16, 18, 19, 20a, 20b.

Scoring A Sections 1, 2 and 3 as Rules 7a, 9a; section 4 as 7b, 9b.
B Multiply 4m score by 1·5, and 70cm score by 4.
C Add 10 points bonus for each contact with a Region 1 station.
D According to aerial height asl. A, B and C totals may be multiplied as below:
000ft by 2, 100ft by 1·8, 200ft by 1·6, 300ft by 1·4, 400ft by 1·2, 500ft by 1·1, 600ft and over by 1.

Logs. Separate sheets from 001 on each band. Cover to include NGR and aerial height asl.

Awards. The G3SMM shield and the G2CIP Shield; both to be held for a year. Certificates of merit to band leaders in 1 and 2, and to leaders in 3 and 4.

Entries to G2CUZ, 34 Sandbrook Road, Ainsdale, Southport PR8 3JE.

MEMBERS' ADS

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 40p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

The closing date for each issue is the 1st of the preceding month, but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale. Advertisements may be edited or abbreviated as necessary.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

Post to: MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE

FOR SALE

Telford TC7 i.f. af unit 24 to 26MHz, as new, £28. Oscilloscope: waveform monitor by Sperry, £10. 6cm wavemeter, with 3in microammeter, £4. Large 5-0-5 microammeter in metal cabinet, £6. G2WS, QTHR. Tel Weston-super-Mare 27087.

Three-bedroom detached house, Marshfield, Wilts, £14,250. Four miles to M4. 610ft asl, lounge, dining room, cloaks, kitchen, bathroom, garage, gas central heating, gardens, open country at rear. FB QTH all bands, 15 countries worked 2m. G5BM, QTHR. Tel Marshfield 459.

Xtals 38,666·6kHz HC18U, £2.50. 100kHz xtal oscillator modules in sealed can but adjustable, 5V dc supply, £5. Zener diodes, 5·1V, 5·6V, 80p/10. Small mains transformers 12-0-12V at 50mA, 50p. All tested and post paid. P. Smith, 49 Hucknall Avenue, Ashgate, Chesterfield, Derbyshire.

Swan 700CX plus ac psu, mint, £375. Europa with valves, mint, £55. Codar AT5 plus ac psu, £20. Pye base transmitters: F27AM, low band, £12; F27FM, high band, £8. Pye Reporter, 70·26, ac psu, £6. Offers considered. G3VSK, QTHR. Tel Mexborough 2419.

TW Communicator, 2m, not wkg, comp, £25. Sentinel 2m converter 28-30, £10. MM432 converter 28-30, new, £18. *Wanted:* Pye Bantam, Westminster spkr, panel assem, tx/rx boards, u/s set, spares. G4AFY, QTHR. Tel Kidderminster 63358.

KW2000A, ac psu, mic, re-valved, £150. Tel 051-677 8618 or 051-638 3736.

Mosley Mustang, unused and never assembled, stored in loft for past two years, £45 ono. Carriage at cost. G3XUA, QTHR. Tel Hucknall 6585 after 6pm.

PSU, 12V dc, outputs 600V at 100mA plus 250V dc at 240mA, transistorized, diecast box, £10. 4X250B, base and chimney, new, plus 4CX250B, used, £10. G3HRO. Tel 01-460 7660.

Halson telescopic mobile aerial with two loading coils, covers 80 to 10m; also 48in glass fibre rod wound helical copper strip for 20m, all worked VK/ZL mobile, comp mount and instructions, lot, £10. G5FH, QTHR. Tel Highcliffe 0425-2-5974.

HW-30 2m tx/rx modified for fm, 144·8/145·8 xtals, mic, spare pa, modulator valves, socket for external rx, £15 plus postage paid ono. Gordon Yarnold, Springfield Place, Springfield Green, Chelmsford, Essex. Tel Chelmsford 61667 after 5.30pm only.

Pye base station rx in 19in cabinet with handbook and xtal for 145·0MHz. Pye Cambridge a.m./fm six-channel, xtals for R6 145·15/75 offers. Ledex switch and xtal platform for Pye bootmount equipment, £2. G8HRU, QTHR. Tel Chard 2834.

Meters 3in², mainly Sifam 100μA-300μA, 1-200mA, 500V, some centre-zero. UM1 mod transformers and many misc components going cheaply. Prefer buyer inspects and collects. G3JLJ, QTHR. Tel 594902.

KW Z-match with switch, £15. KW103 power, swr unit, £8. KW aerial switch, £2. Aerial noise bridge, £4. G3ZLN, QTHR. Tel 55200.

RTTY set-up: 7B 44 perf, 651 auto tx psu for motor and sig circuit, FSY11 tu and P15, all parts DL6EQ tu, brand-new tools, manuals, RSGB *RTTY Handbook* (brand new), £30 the lot, will not split. Buyer collects. G3UXU, QTHR.

UHF power meter/dummy load, 500W up to 600MHz, £15. Solartron CD711S db scope with handbook (large), £20. Typewriter electronic keyboard with contacts, unused, £10. Ancient 2V marine rx, 10kHz to 15MHz, offers. G3MBN, QTHR. Tel Hawthorn (Wilts) 810621.

FLDX400 tx 80-10m, £140 ono. FRSDX400 rx 160-2m, £150 ono. Europa 2m transverter comp, £70. AM25B 2m tunable rx, £12. 432MHz mosfet converter, £12. Creed 7E with silence cover, £15. G4CTT, "Avondale", Sutton, Norfolk NR12 9RF. Tel Stalham (06928) 240 evenings.

Plessey PF215, ssb, dsb, am, lsb, drive unit and matching PF223A frequency-changer unit, 3·1MHz o/p, £30 the pair. Buyers collect or local delivery at cost. G8AYY, QTHR.

FT401, exc cond, fitted cw filter, comp set, spare valves including 6KD6s, £250. AR22 rotator outfit, comp, £15. Bauer 88RS cine camera, Schneider Variogon zoom 6-1, with filters and case, exc cond, £60. GM3CFS, QTHR. Tel Dunbeath (Caithness) 319.

Trio 2200, unmodified, exc cond, xtals include S20, S22 and LO, £70. Set Ever-Ready ni-cad batteries to fit Trio 2200, £10. Xtals for tx/rx to bring Hudson onto 144·48, £2.50 pair. G8ENZ, QTHR. Tel Egham 5737.

RA1, perfect cond, £25 ono. Late G3ZAQ. 98 Kingscourt Lane, Stroud, Glos. Tel Stroud 2189.

Quantity vintage radio gear circa 1926, including three bright emitter set (vulcanite front panel), 6 Edison valve holders, movable coil holder, plug-in coils, variable condensers with dials, psu, etc. Exchange for comp vhf rtty station. G8IPY, QTHR. Tel 01-977 1982.

HW17A, 2m a.m. tx/rx, wkg, fm disc and aerial c/o relay fitted, mods, manual, £50 ono. The Little House, Braywick Road, Maidenhead, Berks. Tel Maidenhead (0628) 22031 evenings.

4m tx, 6-40A final, screen mod and mic, xtals for 70·26/·365/·4, psu reqd, £15 ono. LM13 frequency meter inc psu and ×4 amp to give 8MHz vfo o/p (no charts), suitable for 2m, £15 ono. G3ZRM, QTHR. Tel 0252 26108.

Hudson FM120 50W tx, needs 6-40A, can demonstrate, £30 ono. TC7, faulty, mains psu, £35 ono. G8FWJ. Tel 01-253 0329.

Detached three-bedroom QTH, gas central heating, wall insulation, brick shack, £13,500 ono. G3OWQ, QTHR. Tel Bedford 56676.

Pye Vanguard a.m. tx on 2m, with xtal, control box and cables, £25. Homebrew mains psu for above, £5. Sentinel X 2m converter, 2-4MHz i.f., as new, £18. FL-30HA absorption wavemeter 1-300MHz, £2. GM8HFK, QTHR. Tel Uddingston 815877.

G3TDZ 2m rx, all components, not finished, £8. 12V motor, very powerful, 75p. 40 various *PW* magazines 1971-1974, £5. 10 *Ham Radio* magazines 1970-1972, £1. Gen cov rx Veritone DX Mates, £15. David Thorpe, 161 Tomswood Hill, Hainault, Ilford, Essex. Tel 01-500 8240.

X-band thermistor mounts with thermistors. Philips motor-driven t/r switch, mint cond. Creed No 92 5-hole tape reader, vgc. EK-9X keyer. Offers. *Wanted: Ham Radio* pre-1973. Any issues or bound volumes. Why. Shepheard, Bryn Tawel, Belmont Road, Bangor, LL57 2EZ.

Liner 2 with PA3, keyed carrier cw facility, £110. Pye AM10B, modified dash mount, 70MHz a.m./cw, xtals for 70·26 included, £20. 4MHz xtals 70·080, 70·184, 70·200, 70·240, 70·464, £1.50 each. G3USE, QTHR. Tel Luton 20312.

Manual copies TS497B/URR, TS375A, URM25D, SP600JX, £2.25 each. CT381 sweep generator 10kHz to 33MHz, brand new with circuit and data, £20. Buyer must collect. BAY96, £2.50 each. CXY11, £1 each. *Wanted:* RA17 cabinet and knobs. G3RNV, QTHR.

Racal xtal ssb filters, BA22287 1·4MHz usb and BA22786 lsb, £9 each, brand new. RA17 vfo unit, good cond with film scale but incomplete, £25 ono. *Wanted:* Buy or borrow any gen on CT212 sig gen. G3RNV, QTHR.

Westminster a.m. tx parts pa, modulator, £12. Vanguard AM25B, manual, 2m tx xtal, £11. Microwave Modules converter, 2-4 MHz i.f., £10. Codar CR45 regen rx, with phones, suit beginner, £5. Hamgear PM2 preselector, £4. G8JAH. Tel Rushden (Northants) 4797 after 6pm.

Liner 2, £115. Burgess Elto 90A arc welder, £25. 47·8083MHz xtal (Hy-Q) for 432MHz transverter when used with Liner 2 at high end, £2.66. G4BWW, QTHR. Tel Southport (0704) 40584 daytime.

Solid State Modules SM70 converter, brand-new, unused, £10 inc postage. G8EPQ, QTHR. Tel King's Lynn 61554.

Home wanted for retired but healthy B40 rx and its faithful companion Heathkit DX60 tx, £15 each ono. Would exchange for lf bands QRP rig, HW7, Tentec, homebrew, why? Must be small size. G3ZDR, QTHR. Tel Gravesend 63284.

Heathkit HW17A 2m tx/rx, fm discrim fitted, recently professionally aligned, brand-new cond with handbook, £50. Also 2m a.m. homebrew tx/rx, tx wkg, rx needs attention, all in case, £15. Also mains psu, 300V, on chassis, £4. G8CLJ, QTHR. Tel Stevenage 723934.

Eddystone 830/7 plinth spkr, offers. G4CG, QTHR.

Eddystone EC10 mk1 with Solid State Modules 2m converter, £35. HR22 Marconi ssb rx, 2-32MHz with mechanical filter, £55. Murphy Rover 2m a.m. tx, £12. G8EUH, QTHR. Tel Elland 3062 after 6pm.

Low-band a.m. Ranger, £5. Hi-band a.m. Ranger, £5. Pye low-band a.m. base station, £30. Pye hi-band a.m. base station, £40. 12V/24V hi-band a.m. Cambridge plus control box and cable, xtal on 145, £25. Mains psu, suit FT200, £10. G3WXI, QTHR. Tel 074-15-2609.

FR50B and FL50B, exc, £100, would split. G3LBT, QTHR. Tel 0268 412177 (Essex).

FTDX401, as new, little-used, protective cover still on, will be sad to see it go, genuine reason for sale, £250. G4BKP, QTHR. Tel Mildenhall 712063.

Frequency counter, Racal type SA540, £45. RTTY CRM1 tuning unit in new cond, comp with handbook, £15. Morris, 3 Astley Road, Bradshaw, nr Bolton, Lancs. Tel Bolton 52384.

Storno Viscount, single channel, comp, £30. Two 4A vavivacs, new, boxed, £4 each. QQV03-20A, £5. Densei 500Ω dynamic mic, with stand, £5. PA3 preamp, £3. QQV06-40A linear amp chassis, £20. 9MHz HC6U xtal, £1.50. G8HZK, QTHR. Tel 0432 67361.

Creed 7B teleprinter, £10. Buyer collects. *Wanted:* Manual and circuit for Yaesu FLDX2000 linear. G4BPY, QTHR.

Base/mobile station: Codar AT5, ac/dc PSUs, T28 rx, remote-control box, £35. G6TQ, QTHR. Tel Tonbridge 2713.

2m a.m./cw station: Heathkit GR-78 rx, as new, £50 ono. Sentinel dual gate mosfet converter 28-30MHz, £10 ono. A.M./cw tx, 20W i/p, mains, built-in swr bridge and power o/p meters, xtals 8MHz range, 144·036, 144·126, 144·576, 144·738, 144·864, 145·098, 145·26 145·458, £20 ono. G3PLL, QTHR. Tel Cottesmore 513.

Good homebrew 160m ssb cw transverter, 5B254/M pa, suit FT200 or similar, £8. Steve, G3ZZD. Tel Tunbridge Wells 34117.

Top band G-whip, £4. Top band Tavasu, £3.50. Eddystone 898 slide-rule geared drive, unfinished project, £7.50. Codar transmit/receive switch unit for mobile, £2.50. G3OBI, QTHR.

Marconi wave analyser TF455D/1, 0-16kHz, has very narrow 50kHz xtal filter, offers. DC psu with two 7-15V and two 7-30V 2A outputs, offers. Sig gen, 0·1-30MHz, £2. G3UFW, QTHR.

Complete 2m mains mobile station, vfo, a.m./fm/cw, TC9/TC7 mk2, G8AEV converter, band scanner, quick sale, £135 secures. Tel 0429 4842. G3NWU, QTHR.

HW17A Heathkit 2m tx, phase-modulated rx, fet in i.f., £38. Katsumi MC701 speech compressor, £10. Trio 9R59DE, £30 ono. Cambridge boards: 10·7 i.f., £1; mixer-osc, £1; fm 455 i.f., £1; squelch, 50p. Home-made 2m converter 9·6 to 11·6 i.f., £5. Sherratt, 32 Springfield Way, Cranfield, Beds, MK43 0JN.

Little-used FT101, manual, £230 ono. Complete Sony CV2000 vtr outfit including camera, monitor, portable tv, hours videotape, £350 ono. Ferrograph 4AH, maker overhauled, altered to 3·75/7·5ips, offers. Factory-built HW17, not wkg, offers. G3AUX, QTHR. Tel Cheltenham 22764.

FT2FB, mint, rx preamp, mobile mount, works well, 10 channels, £95. G4AKG, QTHR. Tel 01-686 1756 on Sunday mornings only.

KW Vanguard, 160-10m, £25. Trio 9R59D rx, £25. G3JBI, QTHR.

"CQ" magazine complete, calendar years 1967 to 1971 inclusive, £5 per year. Also April to December 1972 inclusive, £2. Buyer to collect. Kingston-upon-Thames area. G8DFT. Tel 01-942 1234 after 5pm.

Microwave Modules a.m. tx with six xtals, £30. Microwave Modules preamp, £5. 2m 8-over-8 slot, £6. 70cm Parabeam, £8. Prefer buyer collects aerials. G8HPD, QTHR. Tel Wheathampstead 3307.

KW Vespa 2 with KW psu, two spare 6HF5, mint cond, £85. G4CHY/A. Allisette, c/o 142 Orchard Road, Southsea, Hants. Tel Portsmouth 811891.

Repeater tone generators, cmos, dual switchable frequency 1700/1750Hz, 53mm by 30mm, adjustable duration frequencies and output level, new, £3.75. Xtals, pair 145·500 S20, tx 18MHz, rx 14MHz, HC25U, FT2FB/Ultra Cub, new, £2.90. G8FHN, QTHR. Tel Medway 63365 (Kent).

Valves KT66 (five), FW4/500 (four) and L63 (three), will split if necessary, £7 plus carriage. *Wanted:* Valve rectifier type **UU6,** your price paid. Steve Blake, 37 Chaucer Drive, Aylesbury, Bucks. Tel Aylesbury 88381 evenings only.

Sentinel X dual-gate mosfet vhf 2m converter, 28-30MHz. Codar PR40 preselector. Koyo eight-band portable, air/pb etc. Four-way amplifier, 15rms. All mint cond, offers. L. D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 236.

2m linear, pair 4CX250Bs with PSUs, professionally built, £150. Other vhf/uhf items, sae for list. G3LAS, QTHR. Tel Hertford 56122.

FT2 auto with LO/R7 144·36, 144·48, 144·60, 145·00, 4 months old, £130. Xtals FT2 auto, FT2FB, 145·2, S20, S21, S22, R5/SN, R6/PI, £3 pair. FR400SDX, £125. FT101, £200. Unused coaxial cable: WR67, 40m, £8; RG-58W, 20m, £2. H. Richardson, 18 Forestdale, London N14 7DT. Tel 01-886 4186.

Codar AT5 tx, £14. Codar T28 rx, £10. Codar 12V mobile psu, £15. All three, £35. Codar PR30X preselector, £7. Pye Ranger, xtal-controlled, 10W a.m. on 2m, £12. Carriage extra. Harding, Stable Flat 2, Heathlands, Nine Mile Rise, Wokingham, Berks.

No time to operate KW2000B, used 10 hours, £175 ono. Drake R4B exc, £150 ono. Ten-tec KR5 keyer, £10. KW TU1 filter, £5. Dummy load, £3. SWR meter, £3. McCreery, 10 Lawn Road, London NW3. Tel 01-732 2761.

600W p.e.p. linear amp with separate psu, exc cond, picture and circuit on req, £60. G3RUN, QTHR.

Xtals 2m: 6,000·25, 6,066·66, 6,076·50, 12,041·7, 36,444·44, 48,462·50, 8,002·5, 8,006·67, 8,007·69, 8,020·00, 8,021·42, 8,044·00, 8,046·67, 8,047·5, 8,050·00, 8,071·43, 8,072·730, 8,078·57, 8,081·250. 4m: 7,806·66, 11,710, 11,750, 11,764·5, 11,778·75, 70,652·02, £1.25 each. Others available. G3YWT (new QTH), 6 Cherry Orchard Lane, Salisbury.

888A with matching spkr, £60 carriage at cost, or exchange linear with cash adjustment. G2FOS, QTHR. Tel 051-677 4542.

FT243 2m xtals 8,000, 8,006·667, 8,025, 8,040, 8,050, 8,073·33, 8,075, 8,100, 8,106·7, £1 each or 80p for 3 (or more). FT241, ch44, ch45, ch46, ch47, 50p each plus p & p. Low band fm Pye Vanguard, no control gear, £10. G3LCS, QTHR. Tel 0908 313379.

Telford TC10 multimode, £130. Carriage extra. FR400SDX with SP400 spkr, mint cond, £140, carriage extra. 8-over-8 2m Jaybeam, £5. Letters only please. G8IQO, QTHR.

RCA scope, 7in tube, £5 ono. Liner linear, less preamp, with mod for non-continuous inverter, wkg, six months old, £30 ono. Sentinel 28-30MHz 2m converter, as new, £12. 40·66MHz, 35·0MHz, 70·0MHz min xtals, £1. G8FBL, QTHR. Tel Lichfield 23919.

Heathkit HW12A tx, ac psu, dc psu, mic, spkr, connecting leads, manual, wkg fb (has worked ZL this year), £70. G3UUZ, QTHR.

FL2100, one spare 572B, £150. 12V dc input PSUs. SAE details. G5RP, QTHR. Tel East Hendred 384.

Pye Ranger. 4CX250Bs, QQV06-40As, QQV03-20As plus lots more, send sae for list. 38 set, £1. ZC1, rx only wkg, £3. *Wanted:* SSB tx KW2000/A/B NCX5 etc or tx Viceroy HT32A etc, will pay any reasonable price. G4BXX, QTHR. Tel 0482 883371.

Sommerkamp 912G 28·5MHz walkie-talkies pair at £30 ono. Bantam HP1AM 12·5kHz low band, inc case, £60 ono. McCoy Silver Sentinel 9MHz ssb filter usb/lsb and 9·000MHz xtals, unused, £18 ono. G3VGH, QTHR. Tel York 769245 after 10pm.

Spacemark sstv monitor, hardly used, £100. Home-built flying-spot scanner free to purchaser. Prefer buyer inspects wkg and collects. G3CHM, QTHR. Tel 061-437 1185.

Claude Lyons TS3 ac automatic voltage stabilizer, input 198-258V, output 240V ± 0·25 per cent at 32A. Stabilized output can be varied 200-254V, instruction manual, £60. Carriage extra. G3ZZS, QTHR.

HRO-MX xtal, new, £3 ono. 6-40A, brand-new, original carton, £7, 3-20A, new, unused, £3. All plus postage. *Wanted:* SP600 model JX17 or 19, also JX6, in poor cond for spares, but must be complete. Hallicrafters R274B/URR (SX73). Details and price please. G3GUU, QTHR.

Quantity of 813 valves, air tested and ok, singly or larger numbers £2.50 each or £4 a pair plus postage. GI3GTR. 3 Rhanbudy Park, Craigavad, Holywood, Co Down, Northern Ireland. Tel Holywood 3890.

Magnum Six for FT101, as new, £55. *Wanted:* Large wide-spaced capacitors. G3MPN, QTHR. Tel Wymondham 3382.

FT2FB, 6 months old, channels fitted 145·50, 145·525, 145·55, 145·575, 145·60, GB3LO, GB3SN, built-in switchable tone burst, £80 ono. Reason for sale: going G4. Buyer inspects and collects. G8ICM, QTHR. Tel Bourne End (Bucks) 26377.

Gear of late G6XL: HT32A, £60. G3BXI three-section telescopic tower with spare centre section plus all lifting gear, motor, compasses, boom switches, vertical whip etc, £200 ono. Tel M. Garnett, Bradford 612204 during business hours.

KT320 (HE30) communications rx, wkg, £15. KW EZ match, £14. 136MHz 28-30MHz i.f. satellite-band converter (mwm), £12. Carriage extra. G3WDI. 16 Beverley Court, Carlton Colville, Lowestoft, Suffolk. Tel Lowestoft (0502) 63216.

Magazine back copies, wide selection from 1965 of *Radio Communication, Radio & Electronics, Gramophone* and others. Contact with requirements. *Wanted: Radio Communication* bound volumes 41, 42, and 43 (1965-67) in good cond, and *Short Wave Magazine* Vol 23. G3YMM, QTHR. Tel 01-689 4471.

2m gear: HW17A, fm disc, mosfet front end, plus mobile psu and manuals, £50. Vanguard, not wkg but complete with mains psu and vfo, offers. Digital bug key, very neat, sidetone, psu plus Bauer paddle, £10. Gordon Morse. GM8EIR. The Stables Cottage, Balruddery, Invergowrie, Perthshire.

KW 103 meter, 52Ω, £11. Dummy load 52Ω, £6. TE15 dip meter, £12. All as new. G3STB, QTHR. Tel Preston 35049.

KW Vespa mk2, £85. KW Ezee match, £16. AR88D and manual, £25. GW3YKX, QTHR. Tel 0633-54145.

19 set mk3 plus vhf section rx/tx, comp, good cond but untested, also similar model, 99 per cent complete, seems pity to break for parts, beautiful units, pair £12. Buyer collects. G3YPO, QTHR. Tel Darton (022-678) 2874.

Olympic T100 and T50. Trio 9R-59 rx. Collection preferred. *Wanted:* KW2000A dc psu. G3AQW, QTHR. Tel 0782-533136.

KW swr meter, 52Ω, £12. *Wanted:* Vox unit for tape recorder, type once sold by Henrys preferred. G3IES, QTHR. Tel Bristol 622544.

FT200 including 10m xtals, with FP200 ac psu, also SSM Europa transverter for 2m, both exc cond, £290 or might separate. Prefer buyer collects. G8EFQ, QTHR. Tel Southport 68385 evenings.

Calculator buyers: Got Privileg 66 from Drayton rally? Data including circuit, component details, 50p. Above data plus details for increasing facilities, decimal selection, source for new keyboard etc, £1. SAE to Richard Tinson, 98A Davies Road, West Bridgford, Nottingham.

Hudson FM208 4m tx/rx, wkg on 70·48MHz, vgc, £16. Command tx on 160m, £3. PSU, mains input, output 550V, 300V, 6·3V, originally built for use with hf tx, wkg ok, £8 ono. G4BUW, QTHR. Tel Ashford (Middx) 59853 evenings.

Sinclair scientific calculator, mint cond, £12. Mod trans, two EL84s to QQVO3-10, £1.50. G8HYF, QTHR.

FT101, mk2, good cond, £250 ono. Hamtower, 30ft, £50. PSU, chassis with transformer, 510-0-510 275mA, 375-0-375 83mA, 6·3V 9A, £7 ono. G4CYR, QTHR.

Petrol generator, Briggs and Stratton, 240V ac, 1·2kW unused, £185. Will del 50 miles Andover, G8CPJ, QTHR. Tel Andover 64825.

HW100 tx, £120. Philips 3302 cassette tape recorder, £10. Many copies of *Radio Communication* August 1971 onwards. G4AXA and G4CMM. 166 Farnaby Road, Ravensbourne, Bromley BR2 0BB. Tel 01-460 0410 (home), 01-432 2034 (office).

FT401 and Europa tx, £250 ono. Xtals, few each: 8,075kHz for 145·350MHz, 75p each; 8,081·25kHz for 145·462MHz, 75p each; 12,129·167kHz for 145·55MHz, 75p each; 11·22083MHz for 145·350MHz, £2. Stolle auto rotator, 6 months old, £24. G8ILC, QTHR. Tel 061-998 5825.

Europa transverter, comp with own psu (commercial), £65. Hy-Gain 18AVT vertical, £24. G3RDW, QTHR. Tel 021-353 7427.

Vanguard, high band, wkg, comp, £19 ono. Mullard valve tester, £12 ono. Heathkit valve voltmeter, probe, £14. Cabinet suitable for transmitter 15 by 18 by 8½ in, £3. Philips cassette psu, new, £3. All items, buyer collects or delivery up to 30 miles. G3UCS, QTHR. Tel 0562 64393.

Pye Rangers, one comp, partially converted 2m, other needs work or suitable spares, with 2m conversion details, pair for £4. Transmit chassis with valves, suitable 4m conversion, £1. G4DPT, 76 Cleevelands Avenue, Cheltenham, Glos GL50 4PS. Tel Cheltenham 38942.

Exchange or sell Oscar 6 10XY/2 beam for 20/15/10m 1-3 el beam or why? 2m tx Pye base fm/a.m. 6-40 pa, JR310 front panel, 8MHz vxo, meter, Pye slim mic, eight xtals, prof finish, offers over £42. Prefer buyer inspects and collects, but can del. D. Crompton, Hill-Top, Carnforth, Lancs.

Transistor vhf radio, covers 80-176MHz in three bands, very fine performance, this includes the 2m amateur band, £17.50, carriage paid. Sae with enquiries. G8JDU. "Sunnyfields", Lighthouse Road, St. Margarets Bay, Dover, Kent.

Highgain "Hamcat", 80-10m mobile aerial, comp with all glass-fibre loading coils, extra heavy-duty base spring and bumper mount, £20. G3LMO, QTHR. Tel Selsey 4768.

Shure 401A, £5. 4/125A, £3. 1-valve radio rx, variometer-tuned *Wireless World* design, beautifully made, parts worth far more, £2. *RSGB Bulletins* 1950-1970 complete, £1 per year plus postage. *Wanted:* Coaxial relay 75Ω 12V, suitable vhf. G6XY, QTHR. Tel Kenilworth 52679.

50W Pye nbfm base station tx, blower, 6/40 pa wkg 2m, with four HC6U xtals, 6·0465, 6·054, 6·069, 6·0765MHz, xtals will vxo, £25. 10XJ xtal 8·036111MHz, 75p. G8GTP, QTHR. Tel 061-766 6269.

Dipole, C4 vertical, 30ft feeder, £10 plus carriage. *Wanted:* Heath or Ten-Tec QRP rig, also Shure 444. GM2HFV, QTHR. Tel 0382 455839.

CR100 gen cov rx, good clean cond, given reliable service, smooth flywheel tuning, illuminated S-meter, scope output, built-in spkr, good value at £20 ono. *Wanted:* manual for Lafayette KT340, loan or purchase. G8HUP, QTHR. Tel Southport 67849.

Creed 54RP printer with reperf plus cover, immaculate; Creed 7B, less motor, otherwise perfect, both friction feed; 6S6 reader; 25 punch; all mains motors, tu, tone osc, serial parallel convtr, with circuits, £50 the lot, might separate. Buyer collects. G3UFY, QTHR.

Leak Delta 30 stereo amp, exc cond, £40 ono. Will del 50 miles. R. Birkett, 40 Blencathra Street, Keswick, Cumbria. Tel Keswick 72113 office hours only.

Trio TS520 tx/rx, mint cond, £280. Hallicrafter SR400 Cyclone tx/rx, features rit, notch filter, calibrator etc, with 230/115V PS500 psu and loudspeaker, first owner, good cond, new finals, £210. Rudkin, G3XHX, QTHR. Tel Liskeard 43749.

SSM Europa, immac, little-used, £65. DC6HL tx/rx kit, 2m, inc KVG 9MHz filter and all xtals, £55. SAE for details. G3YPS, QTHR.

Sentinel mf 144MHz converter, £9. Valve 144MHz converter, 7-9MHz i.f., £3. Midland aircraft band converter, tunes 108-136MHz with mw output, £2. PB lw/mw car radio, £5. All postage extra. Haywood, 14 Lynton Avenue, Flixton, Manchester.

Liner 2 with preamp, £110. Sommerkamp FTDX505 tx/rx, 80-10m, ssb/cw/a.m., 560W fan and cw filter plus citizens' band, a better spec than the FT401B, £220. YD844 mic, £10. AR22R rotator, £20. Heath IB1100 counter, £65. Parabeam 50Ω, £10. GW4BXE, QTHR. Tel 04955 57450.

HW32 with Heath ac psu, vgc, £65. Brand new Burns 2m converter, 14-16MHz i.f. with lo output, £18. Pair PF1s wkg on 433·2, £20. All ono. G8IFN, QTHR. Tel 01-554 4497.

Comp fixed/mobile 4m station. Creed 7B compact psu for valve ccts. Solartron CD5235 scope. Oil-filled transformer, 265-0-265V, 6·7V 7A, 4·1V 2·5A. Offers. Cordingley, Flat Two, 6 Pittville Crescent Cheltenham, Glos.

B40 rx, good, £20. DX40U tx, VF1U, £25. Tel Guildford 69432. G4BOR, QTHR.

FT75 with extra xtals and ac/dc PSUs, G-whip mobile 80m-10m comp, £175. Heathkit GR-98 airband monitor, £30. Ernest Turner 150V dc meter, 4in dia, £2. Workshop manual of S-type Jaguar, £2. G3URE, QTHR. Tel 089-426 3044 evenings.

AR88D, vgc, £32. Marconi HX55N, 50W 4m tx, a.m./cw, mains, £12. HR55N rx, xtalled for 70·375MHz, mains, £7. Hallicrafters S27 gen cov vhf rx with wideband preamp, £22. *Wanted:* R216. G3PGN, QTHR. Tel Blackmore, Essex (0277) 822891.

Microwave Modules 5W 2m tx with 6 xtals and vfo for same giving fm or a.m., comp with mic, ideal rig for new G8s, £30. Buyer to collect. GW8CGH, QTHR. Tel Bridgend (0656) 58474.

Collectors/service men. Echo A44 wkg. 900 "Trader" service sheets 1951 to 1970. 180 assorted charts, household equipment. 16 transmitter valves 100TH. Cossor db scope model 1049 mk4. Taylor-meter valve tester model 45A. Offers. SAE please. 4a Rowland Road, Cranleigh, Surrey.

9R59DS plus spkr. HW17 plus 12V psu. 4CX250Bs, bases, chimneys (Eimac). 3kV 750mA transformers. 50V beam indicators 360° scale, 3¼in diameter. 2m and 70cm beams. TV equipment, tubes. SAE for list. G3KHU, QTHR. Tel Plymouth 43426.

TCS5 tx, £5. Transformer 620-375V ct, 5V 3A twice, 278W, £5. Meters, 300mA, 2·5A rf. Chokes 10H 180mA and 50mA. Various xtals, 50p. SAE list. David Cohen, Coomtata, Combe Park, Kingston-on-Thames, KT2 7EP.

KW108 Monitorscope, 6 months old, little-used, perfect cond, comp with manual, £55. *Wanted:* Xtals for FT75, state freq and price. G4CVZ, QTHR.

2m mobile: Pye Vanguard, control box, long cable, mic, tx/rx xtals for 145/145·5, two other tx channels, £16. Pair Fidelity UA1 hi-fi spkr units, as new, £16. G2YS, QTHR. Tel 76864.

WANTED

Dc psu for Yaesu FT200. GI4AAT, QTHR.

Back copies of *Radio Communication*, *Wireless World* and *Short Wave Magazine*. Thomas, 50 Rhyddwen Road, Craig Cefn Parc, Clydach, Swansea, Glam.

Original marine band xtals, including 9·1MHz, and psu for Redifon GR286A vhf radiotelephone. Also KW107 atu. Lee, 400 Edgware Road, Paddington W2. Tel 01-723 5521 or 01-904 2104 (evenings).

Loan of modified circuit diagram of JR-310 ie no xtals in bfo. Will be returned immediately and post refunded. Manual would also help. I. McMahon, 21 Slemish Way, Tonagh Estate, Lisburn, Northern Ireland.

Rotator and control for vhf beam as Channel Master, Stolle, CDR etc. G3PZN, QTHR. Tel Basingstoke 21600 or 3131, ext 2439 office hours.

RCA valve type 7094. Also 455kHz filter, 500MHz bandwidth or less, Collins "bath-tub" style preferred. G3SMI, QTHR. Tel Wigan 57445.

Elan beam, Akai tuner-amp 8080 or 8030, 750 rx, Heath SB640 vfo. 8 Heythrop Drive, Middlesbrough.

Vacuum variable capacitors, 1000 by 500pF for QRO linear, large air spaced variable capacitors, large RFCs, small powerful blowers, new cond Pye Bantam cases, large ht and mod transformers, gdo. G4DQY, c/o Mr R. Smith, 98A, West Green Road, Tottenham, London N15.

Codar T28 rx or "Pipsqueak" as *Radio Communication* August 1973 or any other top band rx capable of ssb and a.m. Details and price to P. G. Morgan, 21 Trafalgar Road, Portslade, Brighton, Sussex BN4 1LD. Tel Brighton (0273) 415305.

Eddystone EC10, cheap, non wkg, broken etc. KW Atlanta tx or similar. Also 50Ω coaxial cable, 25m plus. G8HPE. Tel Romford (Essex) 45733.

Bendix RA-1B manual or any information, willing to buy or borrow and photo. G8EVK, QTHR.

HRO dial and gearbox. Details of price and cond to M. L. Ayres, 18 The Oaks, Chippenham, Wilts.

KVG filters, one each XF9-B, XF9-B, Also one each HC18/U xtals, 9·0025MHz and 8·9975MHz for half-lattice filter. G8AFA, QTHR.

Comm rx with 28MHz-30MHz bandspread over whole of dial sweep, must be perfect electrically and mechanically. G3KI, QTHR. No phone.

Manual for Tektronix scope type 545, unavailable from manufacturers, could copy and return promptly. Also interested few BNC plugs for plug-ins and useful associated accessories. Mail refunded. Mott, 7 Farm Way, Hornchurch, Essex.

Well-balanced hand key. G3AIV, The White House, Boyle Farm, Thames Ditton, Tel 01-398 7482.

Linear for 430MHz, around 100W output. Details to G3CDK, 153 Boundary Road, Wallington, Surrey.

Young licence swotter wants: Recent RSGB/ARRL *Handbook*. Junker HRO complete. BC453/4/5. Geloso 150W pi-coil or Labgear E5023B coil-turret. Data for Geloso 4/102. TV wobbulator. New HRO valves, four 6D6, three 6C6, one 6B7. 453·5kHz xtal. 45 Chanel Road, Artane, Dublin 5.

Heathkit gdo or homebrew as per *Radio Communication Handbook*. Also Electroniques front end (type QP166), amateur bands. Patterson, 16 Norton Road, Stourbridge, West Midlands. Tel Stourbridge 2689.

RF a.m. meters, thermocouple 0-1 and 0-2A urgently reqd. Good price offered, all letters answered. G3ERE, QTHR.

American general-class licence holder (50 mile radius Bedford, Beds) to administer FCC test for Conditional Licence. I have all relevant information. Amos. Tel Welwyn 6367 during daytime.

Bound volumes "Radio Communication" Vols 41, 42 and 43 (1965-67) in good cond, urgently needed to complete collection (not Easibinders). Also need *Short Wave Magazine* Vol 23 (1965/66) and January 1972, and *Practical Wireless* Vols 41-49 (loose copies or Easibinders). Can you help? G3YMM, QTHR. Tel 01-689 4471.

VFO 5 unit for TS500, in good cond. Elliott, "Oatlands", Southend Road, Howe Green, Chelmsford. Tel 0245-71604.

Pye Bantam, high band a.m., wkg or repairable, also battery holders for same. G2AFD, QTHR. Tel Malvern (06845) 3242.

FT200 plus psu, KW204 or similar tx/rx or tx reqd by schoolboy, should be in good electrical cond, appearance does not matter. Contact anytime from 20 June afternoon (O levels). G4CWH, QTHR. Tel 01-642 5179, ask for Colin.

Two mica capacitors 0·01μF, 5kV wkg, and two rf chokes, 2·5mH, 1A, for G3SZC PL509 amplifier. Please help. All letters answered. 9H4H (Malta), QTHR.

Noise generator CT82 circuit diagram and gen, information photocopied and returned. G3FIH, QTHR.

Heathkit HW101 in good cond, with psu and spkr if possible. Also KW107 atu/swr unit and Eddystone EC10. Price and details to G4CSG, QTHR.

Linear FL2000, FL2000B, KW1000 or similar, mint cond essential. G4DCI, QTHR. Tel Nottingham 231430.

To hire or borrow, Liner 2 or similar 2m ssb tx for dxpedition during July. It will be fully insured. Amateur Radio Society, Brentwood School, Brentwood, Essex CM15 8AP.

FT200/250 tx/rx plus psu, good cond essential. Cash waiting. GM8HYC (GM4DZX), QTHR. Tel 041-959 4455.

Liner 2, must be in perfect wkg order and good cond. Write stating price etc to GI8IFP, QTHR.

Marconi TF2002, Racal RA137, Collins R389, Redifon R145, Eddystone 850, Racal RA337, ITT Mackay 3010A, modern page printer such as Teletype 32KSR, rx AN/URR45. Passfield, 30 Greenleaf Close, Tulse Hill, London SW2. Tel 01-674 5825.

HQ170a rx in good mechanical cond, with manual. G4DAN, QTHR. Tel 0245 421031 evenings after 6pm.

For marine use, small boat radar unit (tx/rx only or comp station). Also high band fm radiotelephone. G3SMK, QTHR. Tel 021-744 6381 evenings.

Urgently needed: any If coils, transformers etc pre-1935, and any magazines pre-1935. Details of cond and price, sae please. P. G. Morgan, 21 Trafalgar Road, Portslade, Brighton, Sussex BN4 1LD.

IC22 or FT2FB or any similar fm mobile tx/rx in good cond. State price and spec, all letters answered. G8HKC, QTHR. Tel Maldon (Essex) 54080.

Exchange 40 LPs, mint cond, choice from my collection for FR50B or any rx considered. McMahon, 21 Slemish Way, Lisburn, Northern Ireland BT28 1UL.

Exchange DH3-91 crt for 5FP7 or 7BP7. G3LTZ, QTHR. Tel 0793 762559 evenings.

Mobile rallies calendar

8 June —Elvaston Castle Rally. Talk-in on 2 and 160m by G3ZBI/P and G3EEO/P. Details from G4CTZ, QTHR.

15 June —Bangor & D Rally, Castlewillan Forest Park.

15 June —Humberside Radio Rally,High School,Boothferry Road, Goole, North Humberside. Talk-in: G8HSG on 2m ssb and a.m., G4CQG on 160m. Many events for all the family. Organized by Goole & D ARS; details from G8ERX, QTHR, or G3VBI, QTHR.

29 June —Longleat Mobile Rally, Longleat House, Longleat Park, near Warminster, Wiltshire. Commences 10am. Talk-in stations: G6YB/P on 1,920kHz; G3JMY/P on 3,775 kHz, G3TAD/P on 145·00MHz, 145·50MHz plus vfo. Walking df hunt on 160m commences 3pm. Trade stands, RSGB bookstall, bring and buy stand (all goods to be marked with price, and name and callsign of seller), refreshments.

Wild life park, stately home, gardens, children's zoo and pets corner. Plenty of parking and picnic space. Overnight camping from 6pm 28 June. Car parking for rally adjacent to marquees but outside roped-off site area.

Organized by City of Bristol RSGB Group which makes no charge for entrance to rally, although visitors must pay entrance fee to Longleat Park. Further details from G3ULJ, QTHR.

6 July —Upton Rally, organized by Worcester & D ARS. Details from G8ASO, QTHR.

20 July —Cornish RAC Rally, Cornwall Technical College, Pool, Camborne. Talk-in on 2m, 80m and 160m from 10am. All the usual attractions. Details from G3NKE, QTHR.

20 July —Polegate Steam Engine Rally (A27 Polegate to Lewes). Southdown ARS. Exhibition station GB2SS, talk-in on 2m and 4m on GB3SS. Details from G8CFZ, QTHR.

20 July —Anglian Mobile Rally, Stanway School, Stanway, Colchester, Essex. From 10am to 6pm. Talk-in on 80m and 2m. Bring and buy, trade stands, junk sale, and entertainment for all the family. Organized by Colchester Radio Amateurs; details from G3YAI, QTHR.

3 August —Woburn Rally, coach park, Woburn Estate. Details from G3MVV, QTHR.

10 August—Bromsgrove Mobile Picnic, Avoncroft Building Museum. Free parking. Bring picnic meals. Talk-in on 160/80/2m. All the usual attractions. Details from J. K. Harvey, 22 Elm Grove, Bromsgrove B61 0EH. Tel 76941.

17 August—Derby & D ARS Rally, Rykneld School, Bedford Street, Derby. From 12 noon. Talk-in on 2m and top band. Admission and parking free. All the usual attractions, including a monster junk sale. Details from G3FGY, QTHR.
24 August—Torbay ARS Rally.
31 August—Preston ARS Rally. **NOTE CHANGE OF DATE.**
21 Sept —North Ulster Group Rally, Castle Grounds, Antrim. Details from GI8AYZ, QTHR.
28 Sept —Harlow & D ARS Rally, Netteswell School, Harlow. Details from G8JXU, Mark Hall Barn, Harlow, Essex.

Special event stations

Camerton Traction Engine Rally, 14-15 June

GB3CTR, organized by the Bath & DRG, will be operational on 80, 20 and 2m at this rally near Bath. Special souvenir QSL cards will be available and contacts will be welcome.

Banbury Carnival, 28 June

The Banbury ARS will be operating special event station GB2BC in conjunction with Banbury Carnival Week. Operation will be on all bands 80 to 10m, and on 2m ssb.

GB2BRC at Sanders Park, 5 July

Bromsgrove & DARC will be operating this station on 80/10 cw/ssb and 2m, and slow scan 20/80. Special QSLs for all contacts and swl reports. Admission free. Attractions include helicopter flights, go-karts, cycles, 5-a-side football, archery, tug-of-war and athletics.

ELECTRONICS

DAVE
G8ELP

VHF AND UHF

IC-210

A fully VFO controlled FM transceiver operating from mains or 12V battery. Full 600kHz repeater shift facility and automatic tone burst gives full repeater coverage. Still one of the best buys on the FM market. NOTE: IF YOU BUY FROM US OR ONE OF OUR AGENTS YOU GET A TONE BURST FITTED FREE AND AN *ENGLISH* MANUAL. Still £200.00 + VAT.

IC-225

The ultimate in mobile rigs with 80 channel operation as it stands plus the availability of extra channels if required, or full VFO coverage on transmit and receive when used with the PL-V1 (or a home brew 12MHz VFO). Automatic 600kHz Tx frequency drop and introduction of a tone burst when switched to REP give full UK repeater coverage without needing extra crystals. Tx power 10W, Rx sensitivity 0·4μV for 20dB quieting. Spurious response and radiation better than −60dB. Superb audio tailoring and clipping. £195.00 + VAT.

IC-21A

The updated version of the IC-21 using crystals or the DV-21 VFO £178.00 + VAT.

DV-21

Digital frequency synthesiser VFO for the IC-21A, IC-21, IC-22 or IC-22A (the last three rigs require modifications). Output 18MHz on transmit and 44MHz on Rx. Transmit or receive frequency displayed on LED display. Can be programmed for separate Tx and Rx frequencies, or for simplex operation, in 5kHz steps. Alternatively it will scan the band in 10kHz steps looking for stations on which it will lock for a pre-set period adjustable from 4 to 30 secs. There are also two built in memory frequencies which are easily programmed by the user. These memories are not erased when the device is switched off. £172.00 + VAT.

IC-320 **INOUE HAVE GONE UHF** 70cm 10watt mobile FM transceiver similar in appearance to the IC-22A. 12 channel capability, fitted with 4 channels including 433·2MHz. Extra channels available at £4.00 + VAT. Ideal for the new 70cm repeaters. £169.00 + VAT.

IC-31 Base station version of the IC-31, similar in appearance to the IC-21 and IC-210. Built in mains PSU, or 12V operation. Coming shortly £220.00 + VAT.

LONDON AGENT We are pleased to introduce Terry Barnett, G8BAM, as our London agent. Terry will hold a representative range of our stock and will be available for demonstrations and sales evenings and weekends by telephoned appointment only. We will be also opening agencies in South Scotland and South Wales shortly.

AGENTS

(by telephoned appointment, evenings and weekends only)

NORTH
Peter Avill, G3TPX,
7 Moorland Crescent,
MAPPLEWELL, Barnsley, Yorks
Tel: DARTON (022678) 2517

LONDON
Terry Barnett, G8BAM,
7 Cochrane Court,
Leyton Grange,
LONDON E10
Tel: 01-556 9366

WE'VE MOVED . . .

AMATEUR RADIO BULK BUYING GROUP

PLEASE NOTE NEW TELEPHONE NUMBER

We have now moved into larger premises—giving us room to expand our activities and offer an even better service to our many customers
Callers are welcome at our Carshalton office—but please telephone first, Mail orders and enquiries should continue to be sent to our Old Coulsdon address

We regret the 15.75% increase in most of our prices but this, of course, is due to the new 25% VAT on most components. Some of our components are in fact DOWN IN PRICE this month, but the extra VAT has more than made up for this. AT LEAST WITH US YOU DO KNOW WHAT THE FULL COST WILL BE!!

THE G3ZVC SSB TRANSCEIVER

PCB, **£2.20** CRO71-8A Toroid, **18p** MD108 Ring Mixer, **£6.80** XF-9B Filter, **£30.80.**
MiniKit 1 (containing all the above), **£39.85** **MiniKit 2** (semiconductors), **£28.40**
MiniKit 3 (Rs & Cs), **£3.65.**
SPECIAL PRICE FOR COMPLETE KIT, £71.50.
Also available—but not included in kits: *Reprint of article (September 1974)*, **20p** plus SAE 25Ω Loudspeakers—2½", **£1.56** or 5", **£2.03** Metal Cabinet, **£1.55** Min. 50Ω coaxial connectors—PCB mount socket, **51p** and plug, **99p.**
The first of a series of add-on units for the G3ZVC SSB Transceiver are now available:
2m Preamplifier Kit with tailored bandpass and gain to suit G3ZVC Board. PCB size: 3·5" × 1·8". **Price £4.65.**
12V to 6V Regulator/1W Audio Amplifier Kit to power the G3ZVC Board from + 12 volt supply and provide increased audio output. PCB size: 3·5" × 1·8". **Price £6.95.**
2m V.F.O. Kit (by DJ5HD-VHF Communication, Edition 1/71).
This V.F.O. is of the mixer type, having VFO tuning 11 to 13MHz and a crystal oscillator of 62MHz. The 135-137MHz output is fed into the MD108 mixer stage on the G3ZVC board. It is designed for operation on 12V supply. **Kit price £36.50**
VHF Communications Edn. 1/71 75p extra
Components for H.F. Preselector Unit also available—write for details.

G3TDX 2m TX/RX

PCBs: RX, £2.02 TX, 98p 3 gang x 17pF, £2.50 Drive Drum, 34p C.D. Spindle, 36p Cord Spring, 8p 4mm coil Formers, 8p each or 75p for 10 Cores, 1½p each or 13p for 10 Ferrite Beads, 1p each or 45p for 50 Trimmers: 10pF, 20p 35pF, 45p Filter, 55p 2½" Loudspeaker, £1.56 Crystals: Rx, £3.10 Tx, £3.15 (72·05, ·3, ·35, ·4 ·625, ·675, ·75, ·9MHz).
MiniKit 1, RX, £11.50 TX, **£5.45** (State Xtal frequency required).
MiniKit 2, (Semiconductors), RX, **£5.80**; TX, **£4.55**; MOD **£2.10.**
MiniKit 3, (Rs. & Cs.). Rx, **£3.10**; Tx, **65p**; MOD, **£1.75.**
Special price for complete kits, RX, £20.10; TX, £10.50; MOD, £3.80.
(Modulator kits do not include PCB or transformer.)
Also available, but not included in kits: *Reprint of article (April 73)*, **20p** *plus large SAE:* Ni-Cad Batteries, **£24.50** for 10. (£2.65 ea £15 for 6)

G3XGP MINI D.F.M.

PCBs: I/P Amp, £1.27 Display, £1.74 Clock: 100kHz or 1MHz, £1.40. Minitron, £1.68 Led, 29p Transformer, £2.00 Switch, 64p Pointer knob, 17p Round Knob, 30p 10 turn pot. 1KΩ, £4.00 1MHz Crystal, £3.75 35pF trimmer, 45p.
MiniKit 1 (containing the above), 100kHz (without Xtal), **£19.10.**
1MHz (including Xtal), **£22.80.**
MiniKit 2 (semiconductors), 100kHz, **£21.40**; (Add **55p** if 30MHz i.cs required—1MHz **£21.65**; DM7490 & 74HOO)
MiniKit 3 (Rs & Cs), **£2,30.**
Special price for complete kit (1MHz Clock version), £46.00 (+55p for 30MHz i.cs)
Also available, but not included in kits:
Reprint of article (June 73), **20p** *plus SAE:* Metal Cabinet, **£5.50**; 74196, **£1.85.**

FILTERS IN STOCK

We are now the leading UK stockist for KVG Filters and normally hold the following range in stock (—9B model may be subject to temporary shortages):

Model	Application	6dB BW	Supplied with	Price (inc. VAT)
XF-9A	SSB TX	2·5kHz	2 × Xtals	**£22.85**
XF-9B	SSB RX/TX	2·4kHz	2 × Xtals	**£30.80**
XF-9E	FM	12kHz	None	**£28.65**
XF-9M	CW	500Hz	1 × Xtal	**£22.00**

We also now have Marata **SFW-10·7MA** in stock at **£1.20** (equivalent to SFG-10·7MA).

CMOS I.C.'s at LOWEST PRICES

4000, **30p**; 4001, **30p**; 4002, **30p**; 4009, **73p**; 4010, **73p**; 4011, **30p**; 4012, **30p**; 4013, **30p**; 4017, **£2.03**; 4018, **£2.27**; 4020, **£2.27**; 4023, **30p**; 4024, **£1.41**; 4025, **30p**; 4026, **£3.23**; 4027, **£1.09**; 4028, **£1.76**; 4029, **£2.44**; 4030, **76p**; 4033, **£3.23**; 4049, **67p**; 4050, **67p**; 4055, **£1.35**; 4056, **£1.69**; 4511, **£2.63**; 4518, **£2.71**; 4520, **£2.71**;
The above is a selection from our wide range, full details in our price list.

REPEATER ACCESS GENERATOR

2 tone version available with the following features: *2 separate oscillators for improved stability, both presettable for frequency (despatched set to 1700Hz and 1750Hz) with provision for a third tone by adding 4 components *each frequency individually selectable by switch *switchable repeat time—approx. 45s econds (for European repeaters and >/1 min. (for UK repeaters) *provision for adjusting "on" time *built in stabiliser and reverse polarity protection diode *small size—approx. 1·6" × 2·4" × 0·5", *100mV into low impedance with optional high impedance link output. Requires 9-15V supply.
Price £8.50. Availability: Generally from stock.
Single tone version previously advertised still available at **£5.50** (state 1700Hz or 1750Hz).

SEMICONDUCTORS

The following is a selection from our range of brand new semiconductors—all carrying full manufacturer's warranty:
BC213, **23p**; BF224, **28p**; BF245A, **69p**; BF245C, **69p**; LM309K, **£2.50**; LM380, **£1.26**; SL610, 611, 612, **£2.00**; SL613, **£4.30**; SL620, 621, **£3.00**; SL622, **£7.55**; SL623, **£5.57**; SL624, **£2.83**; SL630, **£1.87**; SL640, 641, **£3.65**; SN72741P, **49p**; TIS88A, **36p**; 2N3919, **39p**; 2N3866, **£1.08**; 40673, **61p.**

'VHF COMMUNICATIONS'

Current 1975 subscription is **£3.20**
Binders to hold 12 edition (3 yrs) **£1.35** } Post free
A number of PCBs are stocked in the UK as follows:
DC6HL001, **£4.30**; DC6HL003, **£2.35**; DC6HL007, **£2.60**; DC6HL009, **£2.87**; DJ4BG006, **£1.82**; DJ6ZZ001, **£3.90**; DJ6ZZ002, **£4.30.**

JAYBEAM AERIALS

We generally have the full range of 'Jaybeam' aerials in stock for both 50 & 75 (state which required) at the following prices:

4M, 4Y	**£8.50**	Mobile, HO	**£2.31**	Phasing, PHM/2C	**£3.56**
2M, 5Y	**£5.38**	HM	**£2.75**	Harnesses, PMH2/2	**£4.94**
8Y	**£7.00**	⅝ Whip	**£8.80**	PMH2/7	**£4.13**
10Y	**£13.75**	70CMS,D8	**£11.25**	MASTS, etc, SPM	**£7.00**
PBM14	**£21.13**	PBM18	**£13.63**	SVMK	**£2.75**
5XY	**£10.25**	MBM46	**£15.13**	ROTATORS Auto	**£38.75**
8XY	**£12.75**	MBM68	**£20.13**	Multi	**£43.75**
10XY	**£17.63**	12XY	**£20.88**	Cable	**22p/yd**
D5	**£9.90**				
D8	**£13.13**				
XD	**£7.19**				
UGP	**£5.19**				

Add CARRIAGE as follows:
Phasing Harnesses & Halos-50p, Rotators and all other aerials: To: UK Mainland only, £1.00, Isle of Wight, £1.50, N. Ireland, £2.00, Elsewhere, at cost.

NEW PRODUCT CORNER

This month, the SL613C from Plessey.
The SL613C is a low noise limiting amplifier intended for use as an RF clipper, a limiting stage in IF amplifiers, or an RF Compressor in SSB transmitters. It contains a detector which may be used to detect AM but is particularly intended for use as an AGC detector. The amplifier, which has a gain of 12dB when not limiting, has upper and lower 3dB points of 150MHz and 5MHz respectively. It limits when its input exceeds 120mV r.m.s. The detected output during limiting is 1mA.
In stock at **£4.30**, ask for free data sheet.

We are also agents for **Mini-Beam** HF aerials, **Microwave Modules** converters etc and **Swan Transceivers.** Write for free Price List (SAE please). **All prices include VAT at current rates.** Please note that our minimum UK post & packing charge, except where indicated is 15p.
Cheques and P.O's should be crossed and made payable to "Amateur Radio Bulk Buying Group" or **pay by GIRO**—Account no. 31 523 4008.

ADMINISTRATION ADDRESS ONLY:
39 POUND STREET, CARSHALTON, SURREY

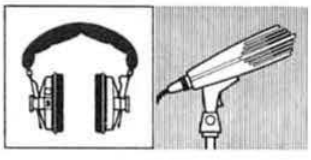
ALL MAIL ORDERS AND ENQUIRIES to:
20 THORNTON CRESCENT, OLD COULSDON, SURREY

NEW TELEPHONE NO.—01-669 6701 (10 a.m. to 7 p.m.)

professionally canned from ear to ear

The DT 100 is only one of an extensive range of headphones manufactured by Beyer Dynamic, in use in studios throughout the world . . . . . setting a new sound standard.

- Frequency Response: 30-20,000 Hz
- Output Level at 100 HZ and 1 mW: 110 db over 2. 10^{-4} µ bar
- Rated Input: appr. 600m V per cartridge
- Peak Power Load: 1W or 20V per cartridge
- Impedance: 2 x 400 Ω (2 x 8, 2 x 100, 2 x 800, 2 x 2,000 Ω upon request)



BEYER DYNAMIC

BEYER DYNAMIC (GB) LIMITED
1Clair Road, Haywards Heath, Sussex. Tel: Haywards Heath 51003

GAREX (G3ZVI)

PRICES INCLUDE POST, PACKING & VAT AT 25%

PYE CAMBRIDGE AM10DV/6, dash mount, hiband, (ideal for 2m) 6 channel, excellent condition, tested, **£33** inc post & VAT.

THE GAREX Mk II TWOMOBILE FM/AM TX-Rx

Brief technical details:

Tx, Rx and PSU for 12V DC input contained in one unit 12 × 4½ × 8" deep.

Tx Transistorised crystal oscillator (8MHz), multipliers and modulator, quick-heat tetrodes YL1080 driver and PA. No standby current. 6 switched crystal positions. Fist mic. with press-to-talk. Switched AM or FM. Tone-burst generator—2 tones + off switch.

Rx Fully transistorised. Continuous tuning from 144 to 146MHz directly calibrated dial. VFO supplied from i.c. voltage regulator for improved stability under mobile conditions. 2 RF amplifiers, FET 1st mixer, 1st IF 10·7MHz, crystal controlled 2nd FET mixer, 2nd IF 455kHz, squelch, audio output to drive external 3Ω speaker. FM/AM reception selected by switch independent of Tx mode, utilising i.c. quadrature detector on FM.

35 transistors, 3 i.c's, 15 diodes. Floating supply for pos. or neg. earth.

Price complete with one Tx crystal and detailed handbook **£150.00** inc. VAT. Securicor delivery £3.50 extra.

Garex Loudspeaker Unit. Matching style to Twomobile, dual-purpose table-top or mobile mounting 5 × 3" 3/5Ω drive unit. Ideal for popular R/T equipment **£5.00.**

Printed circuit boards from Pye R/T equipment, with circuits. All transistor, all in good used condition, unless otherwise stated.

FM AF board provides audio for FMTx also Rx audio preamp, suitable valve or transistor Tx **£1.45**
Rx Rf board 148–174MHz for Cambridge and AM 25T **£6.25**
10·7MHz I.F. board **£2.15**
2nd mixer 10·7MHz to 455kHz with 11·55MHz xtal **£2.40**
455kHz block filters 25kHz chann. spacing, low impedance **£2.05**
25kHz chann. spacing, high impedance **85p**
12½kHz chann. spacing—details & prices on application
455kHz A.M. I.F. board (ex AM25B) **£1.25**
455kHz A.M. I.F. board ex AM10, AM25T **£1.80**
Squelch boards (ex Cambridge) AM **40p** (ex AM25T) **50p**
(ex AM25B) Type A or B, **17p.** 2 for **30p**
Mic. amplifier board ex AM25B **95p** ex AM25T **95p**
Mod. output board ex AM25B or T **50p**
Rx Audio board ex AM25B **50p**; ex AM10 **£1.70**; ex AM25T **50p**
6kHz Audio block filter ex AM25B **30p**
AGC Assembly ex AM25B **30p**
Mic. preamp board, 2 transistor, emitter follower output **60p**

NOTE—Apart from providing spares for the specific equipment, all the above boards are an ideal basis for home-brew equipment.

6 channel xtal plate & switch assembly, hiband, for dash Cambridge, complete **£3.75**
Modulation transformers with connection data
p.p. NKT404/OC28/OC35 to QQV03-10 **£1.45** Driver to suit **45p**
Single EL84 to QQV03-10 **£1.50**
p.p. EL91 to QQV03-10, + 3Ω LS & 15Ω pub. address **£1.50**
p.p. EL84 to QQV03-20a ex-Murphy **£2.60**
Mod. and **Driver Transformers** pp NKT404 to QQV03-20A **£1.45 the two.**
Audio Transformers 6AQ5 to 3Ω & 10Ω, pp NKT404 to 3Ω, small or large. Drivers to suit, small or large. **40p** ea, any **2** for **70p, 3** for **£1.00.**
Lt Choke 3A 0·1Ω, for psu or hash filter, **40p** each, **3** for **£1.00.**
Camera video board (Lynx) new **£4.40**
Rectifier plug in valve replacement stack of silicon diodes, full wave 2·6kV p.i.v. at 400mA. Int. oct. base, wired as 5U4, easily moded. **90p**
Circuit breakers, panel mounted, 0·3, 0·5 and 2 amp (new) **50p**
Reed switch S.P.C.O. 33mm × 5mm dia. (75mm over leads) 10VA rating **40p**
Reed realy coils to match above, 24V (2·5k res.) **25p**
Low loss SP reed and 24V coil glass encap. **60p**
Painton (min. Jones) connectors, chassis mtg. 18 way female **35p**
ditto, 6 way (2 pins at rt. angles) male or female **17p**
Toggle switches, SP biased off **17p**
Crystals HC6U: 12·700MHz, 11·155MHz **50p**
HC6U for 2m Tx 9·0656, 9·0688, 9·0719MHz **£1.70**
Valves (New or tested ex. equip.) EB91, EC91, ECC91, ECF80, ECH83, ECH84, 6AT6, 6BH6, 6BJ6, 6CB6, EZ81, EY81 **17p** each, any 4 for **60p**
Transistors (tested, with mtg. kits) NKT404 **17p** each, 4 for **60p**
Integrated circuits (new, full spec.)
723 voltage reg. TO5 metal case, 2/37V out at 150mA for 5/40V in **90p**
SN76660 FM quadrature detector **£1.45**
CD4001 AE quad. 2-input NOR gate for tone-burst gen. **60p**
NE555 Timer for tone-burst gen. or time-out indicator **95p**

Relays 12V 2 pole co 6A contacts, ex-Cambridge **30p**
Miniature 12V plastic cover SPCO **40p**; 4PCO **45p**
25 AMP 6V single make 6V double make 12V d/make 12V s/make **45p**
Type 2400 ex AM25, please specify coil/contacts required **30p**

Mains transformers multitap prim. unless stated otherwise
HT Transf. 5 windings: 35V 0·2A, 75/115V 0·15A, 50V 0·5A, 150V 0·3A, 170/220V 0·3A (13lb) **£6.55**
(For quick heat QQZO6-40 Tx) 7 windings 232V, 276V (300mA); 60V, 50V (50mA) 2·1V 8A 17·5V 1A 12·6V 4A (11·5lb) **£5.70**
170–0–170V 90mA, 50V 50mA, 5·3V 3·3A, 5V 2A (5.5lb) **£2.25**
0–146–232V 160mA, 26·5V 1A, 13·9V 5A, 50V 50mA (10·5lb) **£4.00**
Small 110V Pri. 30V 100mA sec. **40p** each, 2 for **75p** (series pri. for 240V)
230/240V Pri. 72V 40mA, 6·8V 10A, 6·3V 4·6A C core (7lb) **£5.45**
200/250V Pri. 31·5–0–31·5 ½A tapped 22, 24, 25·5, 28·5V **£3.40**
Auto 0–100–110–150–200–230–240–250V 200VA **£3.40**
345–0–245V 150mA, 5V 2A (POF) **£5.45**
6·5–0–6·5V 2.3A, 6·5–0–6·5V 2·9A, 6·5–0–6·5V 4·25A, 6·5V 2·7A, 37V 30mA (POF) **£5.45**
515–450–0–450–515V 240mA, 50V 50mA, 5V 2A, 6·3V 4A (12lb) **£6.30**
Charger transf. 240V in, 17·5V 1A out **£1.10**
Selenium bridge rectifier for above **25p**
HT chokes 5H 80mA, 4H 240mA, 1H 240mA, 1·25H 350mA, 1·8H 125mA **£1.10**
Top grade types: 9H 250mA 107Ω **£2.60** 10H 20mA 100Ω **£1.56**
8H 240mA (POF) **£2.60,** 35H 25mA (POF) **£1.55**
N.B. POF = Potted, oil-filled.

Toroidal inverter transformers (with circuits)
Input 6/12V DC, output 265V 150mA (Cambridge) **£2.05**
Input 12V DC, output 170/375V 180mA (Vanguard) **£2.05**
Input 12V DC, output 80/130V 150mA (Ranger) **£1.95**
Pye Continental type **£2.80**
HT choke suitable for 2–3kHz Inverters **60p**

Rectilinear pots multiturn, preset, p.c. mtg. (new)
10, 20, 25, 100, 250, 500, 1·5k, 2k, 2·5k, **35p** each, any 4 for **£1.**
Neons, min. wire ended, **6p** ea., 10 for **50p,** 100 for **£4.50**
Diodes CS3A–A **40p**
Air spaced Trimmers (ex) small: 2–20pf, 2·4–30pf, large: 10pf, 25pf **17p**
small 2–20pf with spindle ¼" × ¼" **30p**
Butterfly trimmers large 2 × 17·5pf, 2 × 10pf **80p**
Beehive trimmers 2–8pf **5p**
Tetfer trimmers 2–10pF, multiturn, OK for UHF. **70p**
Tx Multiplier Transformer for AM10, AM25B or T, High or Low Band **35p**

Other Pye coils and transformers also available

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Ventilated steel cabinets 12 × 12 × 18" high, with wall-fixing lugs, internal chassis frame 11½" × 11" × 13". New condition **£2.30.** Buyer inspect and collect by appointment.
Pye Ranger spares IFT's 10·7MHz, 2MHz, Noise lim. assy., Rx osc. mult. transformer: all at **35p**
Tubular split stator pa capacitor **45p**
BNC 50ohm free sockets (new) **15p** ea; 12 for **£1.30,** 50 for **£4.50**
Paper block capacitors (Mfd/voltage) 0·5/400, 1/500, 1·5/500, 2/350 at **60p** 8/600, 8/800, 8/1,000 at **£1.25**
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Rotary Converters 12V DC to 320V 160mA DC **£1.70**
Fist mike, PTT db carbon insert, curly lead, octal plug, for Murphy, also BCC69 Reporter **90p**
Input transformer for above mike **40p**

Unless stated otherwise, components are ex-equipment, in good condition, your satisfaction guaranteed. Wherever possible, full supporting data is given. Prices quoted are inclusive of UK post & packing & VAT at 25%

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NOW IN USE IN OVER 50 DIFFERENT COUNTRIES!

2 metre, 4 metre or 6 metre receive and transmit converters to 28-30MHz

Exotic calls like A2, C31, 5WI, 9HI, 5BC, 2D8, KV7, KH6, TF, YB, VP8, VE8, etc.

Many of these people never use the receive converter—they have no local VHF activity and use their Europas exclusively for OSCAR work.

The Europa can be used with any normal HF equipment ★ Europa B features:

- ★ An aerial change over relay and SO239 antenna socket.
- ★ Adequate power for OSCAR work.
- ★ High transmit power. Up to 200W input, 50% efficiency.
- ★ Highest receiver sensitivity available—2dB N.F.
- ★ 28–30MHz I.F. standard.
- ★ Cleanest output spectrum.
- ★ Extremely stable circuitry.
- ★ Well established and reliable design.
- ★ Additional crystals can be switched for extended frequency coverage.
- ★ Size: 9" × 4½" front panel, 4½" deep.
- ★ Low price, **£88.00** complete to plug into Yaesu/Sommerkamp equipment Ex stock.
- ★ **£74.00** less valves (2 off QQV03/10 and 1 off QQV06/40A required. Ex stock.

For use with 6·3V Yaesu equipment (FL400, FT401 etc) you feed in 12·6V ac at 2 amp into the control socket. A suitable transformer is **£3.24** or in a case to match the Europa, **£6.37.** All from stock.

NEW! We how have in stock a complete AC PSU for the Europa, Type CSP 10. This supplies all the voltages to power the Europa or Europa B. It also contains a 50 ohm adjustable dummy load power attenuator and change over relay to reduce the 10 metre output power to a suitable level for driving the Europa.

This makes the Europa B compatible with HF equipment without transverter output sockets with NO modifications.

Size: Same as the Europa B.

Price: **£38.50.** Ex stock.

EUROPA 70—70cm TRANSMIT CONVERTER
Designed like our Europa B to provide sufficient power for Oscar working—70W input hybrid design valve for transmit—transistors for oscillator amplification. Size: 6" × 6" front panel, 12" deep. Price **£43.20.**

All the prices include British Isles delivery. We export goods daily, so this is no problem. We can give same day C.O.D. service (£50 limit). All our products carry a 12 month guarantee. HP a pleasure. If you have any doubts, ring or write for assistance. See you at Leeds and Drayton Manor rallies. Please do not hesistate to contact us if you think we can help. Paul, G3MXG.

PLEASE SEE NOTE BELOW RE VAT

Our own tests carried out on laboratory test equipment, and independent tests, have shown that these units provide the highest performance you can buy on the amateur market.

CONVERTERS 2 metres, 4 metres, 70cm, Satellite Band (136–138MHz), Marine Band from stock. Other frequencies to order.

SENTINEL DUAL GATE MOSFET 2 METRE OR 4 METRE CONVERTERS

★ N.F. 2dB. Gain 30dB. ★ Dual gate MOSFETS in RF and MIXER stages.
★ No oscillator frequency multiplication.
★ 2 metre I.F.s: 28–30MHz, 2–4MHz, 4–6MHz. ★ 4 metre I.F.: 28–28·7MHz.
★ Size: 2½" × 3" × 1½" except 2–4MHz and 4–6MHz being double conversion are 4" long. ★ Price only **£16.20.** Esx stock.

SENTINEL X DUAL GATE MOSFET 2 METRE CONVERTER. A de-luxe version of our Sentinel converter, containing a mains power supply or external battery operation. It has front panel RF gain control. Technical data is the same as the Sentinel. Size: 5" × 1½" front panel, 4" deep. Stock IFs: 2–4MHz, 4–6MHz, 28–30MHz. Price: **£21.06.** Ex stock.

THE SENTINEL 2 METRE CONVERTER KIT, 28–30MHz—Ex stock. The kit is supplied with printed circuit board drilled and all coils mounted to make assembly so simple. All components, metalwork, nuts and bolts etc. are supplied. Performance data is the same as our Sentinel converters. Price: **£11.00.** IF it doesn't work, send it back with **£2.00** and we will fix it for you.

THE SENTINEL MF DUAL GATE MOSFET 2 METRE TO MEDIUM WAVE CONVERTER. Receives 2 metres on a conventional MW BC receiver, very good used with a car radio. IF output of 0·5MHz–1·5MHz for 144–5 and 145–6MHz in two switched bands. Size: 5" × 1½" front panel, 4" deep. Price: **£20.25.**

SM 70 FET CONVERTER

★ IF output 144–146MHz. Noise figure 3·5dB. Gain 30db.
★ Size: 2½" × 3" × 1½".
★ By using the SM70 with your 2 metre receiver you get excellent 70cms receiving performance for only **£16.20.** Ex stock.

EUROPA 70CM FET RECEIVE CONVERTER. Can be used as a receive converter on its own or in conjunction with our Europa transmit converter for transmit operation as well.

★ IF output 28–30MHz. Noise figure 3.5dB. Gain 30dB.
★ Two FET RF amplifiers and FET mixer.
★ Oscillator chain uses a 101MHz crystal with oscillator output socket to drive the Europa 70 transmit converter. ★ Size: 2½" × 4" × 1½".
★ Price of this extremely high performance unit, **£20.52.** Ex stock.

PRE-AMPLIFIERS. 2 metres, 10 metres (Oscar), 70cms, Satellite (136–138MHz) from stock. Other frequencies to order.

SENTINEL LOW NOISE FET PRE-AMPLIFIER—Ex stock. If you want the ultimate in 2 metre sensitivity and selectivity:

★ Built in a box which matches our converters.
★ Isolated supply lines make it compatible with any existing polarity.
★ Low noise figure—1dB. Gain 18dB.
★ High selectivity tuned circuits. ★ Price: **£7.36.**

THE PA3 DUAL GATE MOSFET PRE AMPLIFIERS—Ex stock

★ Small (about one cubic inch) printed circuit board pre-amplifier developed to fit inside transceivers where it can be wired into the receiver aerial lead after the c/o relay.
★ Low noise figure—2dB. Gain—18dB. Price: **£5.94.** Supplied with fitting data.

SM 71 70CM PRE-AMPLIFIER—Ex stock. A selected 2 stage FET pre-amplifier.

★ Noise figure 3·5dB. Gain 18dB. ★ Size: 2½" × 4" × 1½". Price: **£9.72.**

★ **THESE PRICES INCLUDE VAT** ★ **MEMBER OF ARRA** ★

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

CRYSTALS FOR AMATEUR AND PROFESSIONAL USE

V.A.T. AS A RESULT OF THE BUDGET VAT AT THE RATE OF 25% MUST BE ADDED TO OUR PRICES WHICH ARE NOW SHOWN EXCLUSIVE OF VAT. HOWEVER WE ARE PLEASED TO ANNOUNCE THAT AS A RESULT OF A NEW AGREEMENT WITH OUR SUPPLIERS WE HAVE BROUGHT DOWN THE BASIC COST OF MANY OF OUR STOCK ITEMS.

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CRYSTALS TO COMMERCIAL SPECIFICATIONS

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30–7 p.m. and ask for Mr. Norcliffe. (Regret no phone enquiries May 26–June 23.

TERMS : CASH WITH ORDER—PRICES EXCLUDE VAT WHICH SHOULD BE ADDED AT THE RATE OF 25%—S.A.E. WITH ALL ENQUIRIES—MAIL ORDER ONLY—PRICES INCLUDE P. & P. EXCEPT WHERE STATED.

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MICROWAVE MODULES (inc VAT)

NEW! 70cm transverter	£77.55	(50p)
2m converter 2-4/4-6/28-30	£19.00	(25p)
4m converters 28-28·7	£19.00	(25p)
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2m dual o/p pre amp	£11.25	(25p)
1,296MHz converters 28-20	£29.99	(25p)
2m converter 28-30/116 osc o/p	£17.60	(25p)

Well lads, they've well and truly taxed our hobby this time—some would say clobbered it! The flood of orders we received after the budget was fantastic and really taxed (excuse the pun) our normally speedy mail order service. I am afraid that we have now got to get used to the new prices. Mind you I reckon that much of the gear at present available still represents remarkealbe value. A top Dolby cassette deck carries a similar price tag to the FT101B transceiver, but take a look inside both and see which represents better value!

Lets mention a couple of items that must be bargains at the present price. The LOWE MONITOR RECEIVER at only £24.95 is a complete 6 channel fm monitor receiver with built in speaker—'xtals are extra. Another item for the 2 metre enthusiast is the KEN HAND HELD FM TRANSCEIVER—6 channels, superb aduio quality, very compact and over 2 watts output for a good punchy signal. Our latest addition to the TECHNICAL ASSOCIATES range is an audio filtering unit for ssb and cw signals that simply plugs into the receiver and looks like being another big seller. The companion speech processor has been a sell-out and is the only unit available with a noise gate and all this at half the price of its competitors. All these items are normally ex stock so just pick up the telephone and quote your credit card number for instant despatch.

73's Peter Waters
Jeff Stanton

SOLID STATE MODULES

2m or 4m Europa B	£88.00	(1.00)
As above less valves	£74.00	(1.00)
Matching power supply	£34.00	(1.00)
2m converter 2-4/4-6/28-30	£16.20	(25p)
70cm converter 144-146	£16.20	(250)
2m pre amp	£7.36	(25p)
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70cm pre amp	£9.72	(25p)

MICROPHONES

Shure 201	£6.95	(30p)
Shure 444	£16.25	(50p)
Yaesu YD844	£18.66	(50p)

MFJ PRODUCTS (USA) (inc VAT)

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SBF-2BX boxed ssb audio filter	£18.23	(30p)
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B24 2 element yagi 10-15-20	£44.00	(1.50)
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