September 1977

radio communication

journal of the Radio Society of Great Britain

NFD 1977

Results in this issue

Thames Valley ARTS operated with all the home comforts of a member's caravan at Kempton Park Racecourse; G3GTX on the key, with G3OGP

Keenness and determination on the face of Tommy Boucher, jnr op of G3OLB, at the Bristol Contest Group's HF NFD station. *Photo: G3TKF*

Verulam ARC's HF NFD station was visited by an "official" RSGB inspector (G4BOU) complete with standard bearer (G3JKB). They carried out a most thorough inspection of a great many things that did not really concern them and made use of an unbelievable amount of test gear they brought with them! Needless to say, G4BOU and G3JKB are well-known members of the Verulam Committee. *Photo G4EEI*

Dundee Kingsway Technical College RC HF NFD station being operated by (l to r) GM3VEY, GM4BAG and GM4CUZ. Great concentration seems to indicate a difficult contact

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CONTENTS

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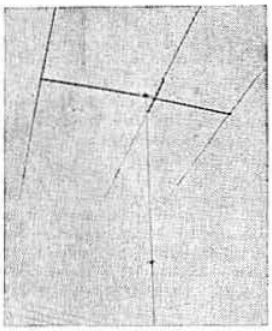
A • •

Communications Ltd

OF PROFESSIONAL EXPERIENCE

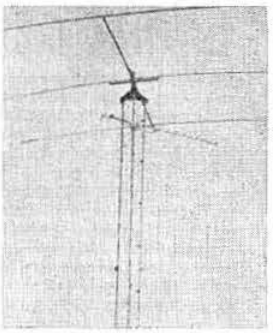
YAESU

TELOMAST WITH TA33 TELESCOPIC GALVANISED



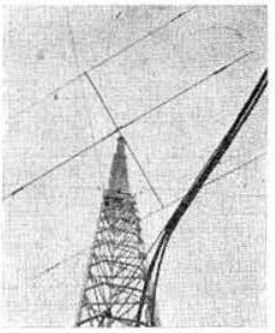
10′ telescope heavily galvanised steel mast supplied with guy rings etc. or c/w full rigging kit.
Carriage **£2-£7** ex-stock VAT 8%
30′ **£25.00** or **£43.85** c/w rigging
40′ **£32.50** or **£56.85** c/w rigging
50′ **£42.00** or **£74.50** c/w rigging

HAMTOWER with TH3 Jnr. SELF SUPPORTING



Galvanised lattice 10′ sections.
Free standing with climbing steps.
Carriage **£3-£20** ex-stock 8% VAT
30′ c/w base grillage **£192.35**
40′ c/w base grillage. P.O.A

TELETOWER with TH3 Mk. III TELESCOPIC GALVANISED



Carriage and rigging (RX) extra

42′	£121.00	(RK £28)
57′	£174.00	(RK £28)
79′	£224.50	(RK £49)
101′	£303.50	(RK £76)

VERSATOWERS

TELESCOPIC & TILTING

SEE FAR RIGHT
THE MAJORITY OF DELIVERIES ARE NOW MADE BY OUR OWN TRANSPORT.

Telescopic (20′ sections) with full tilting facility allowing for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resorting to concrete. Large scale efficient production offers you a wide range of towers at minimum cost (+ 8% VAT, EX WORKS) e.g.

Standard P40	£212.00
Standard P60	£252.00
Heavy Duty P40	£286.00
Heavy Duty P60	£333.00

G WHIP HF MOBILE (Carriage 90p) VAT 12½%

Tribander 10-20m (+ LF) ..	£16.10	LF40, 80 or 160	£4.87
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Flexiwhip 10, (+ FF) ..	£13.35	FF15, 20, 40, 80 or 160 ..	£5.04
Basemount ⅜" hole mount	£2.65	Telescopic whip for coils	£1.85

CABLES RF FEEDERS (Carriage extra) VAT 8%

UR67 50ohm Heavy ..	36p yd	UR39 75 ohm Medium ..	24p yd
UR57 75ohm Heavy ..	42p yd	T3278 75 ohm Distribution	20p yd
75 ohm Flat Twin ..	10p yd	UR43 50 ohm Solid Cent ..	16p yd
300 ohm ribbon	12p yd	UR76 50ohm Strand Cent.	16p yd

GEM QUAD FIBREGLASS QUAD (Carriage £2-£9) VAT 12½%

GQ3E 2 element	£119.00	GQ4E 4 element	£238.00
GQ3E 3 element	£178.00	CK1Q 1 ele. Conv. kit ..	£66.00

AERIAL WIRE (Carriage extra) VAT 8%

14SWG hard drawn cu ..yd.	11p	7/.044 cad cu standard ..yd.	20p
Cu terylene braid .. ..yd.	13p	7/.036 cad cu standard ..yd.	14p

HY GAIN HF RANGE (Carr. extra) VAT 12½%

BN86 1 : 1 ferrite Balun ..	£12.00	18AVT/WB 10-80m. Vert. ..	£64.50
103BA 10m. 3 element ..	£43.50	TH2MKIII 10-20m. 2 ele. ..	£94.40
153BA 15m. 3 element ..	£54.50	TH3JNR 10-20m. 3 ele. ..	£96.00
203BA 20m. 3 element ..	£103.40	TH3MKIII 10-20m. 3 ele. ..	£137.00
402BA 40m. 2 element ..	£146.00	TH6DXX 10-20m. 6 ele. ..	£164.50
18V 10-80 Load Vert. ..	£24.50	HY QUAD 10-20m. 2 ele. ..	£151.80
12AVQ 10-20m. Trap Vert.	£33.50	DB1015A 10-15m. 3 ele. ..	£99.00
14AVQ 10-40m. Trap Vert.	£47.50	HY TOWER Vert.	£162.80

SMC TRAPPED DIPOLES (Post 45p) VAT 12½%

S 500W P.I.P. 14 SWG.. ..	£19.60	P500W P.I.P. Cu/Terylene	
HP IK P.I.P. 14 SWG	£21.75	braid c/w 75′ feeder, etc.	£21.75

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TA33 3 ele. 200W R.M.S. ..	£85.00	TA32 2 ele. 300W. A.M. ..	£58.50
MUSTANG 3 ele. ..	£108.00	MUSTANG 2 ele. 1kW ..	£87.50

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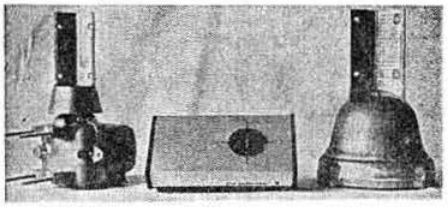
2½" polyprop ribbed ..	18p	SMCP1 8" carbon polyprop	£1.15
"T" porcelain centre ..	38p	3" porcelain ribbed	38p

CD44/HAND II

CDE AR33



AR20/30 AR30/40 AR22/40/33

ROTATORS

Ex-Stock in Totton for fast delivery.
VAT: Rotators 12½%. Cable and deliv. 8%.
Carriage (BRS or post) FREE. Securicor delivery £1·25 extra (mainland). All rotators supplied complete with appropriate control box and instructions.

CDE ROTORS

AR20 Light VHF/UHF	£32.00
AR30 (illus. far left and centre)	£39.50
AR22 VHF light HF	£40.00
AR40 (illus. left centre and near)	£46.00
AR33 (de-luxe control AR40) ..	£57.00
BTI Medium Duty..	£79.50
CD44 med. duty	£95.00
Ham II heavy duty..	£129.00

STOLLE ROTORS

2010/220 Stolle though Rotator type	£41.25
2030/220 De-luxe Stolle ..	£45.50

BEARINGS

CD562 CDE (up to 2" and 1⅝" rot.)	£4·50
RZ100 Stolle (ballrace)	£10·00

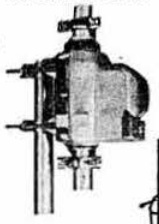
MOUNTING KIT

AK121 Mounting plate ..	£3.60

CABLE

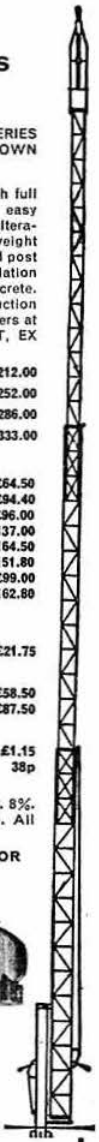
5 core—AR30/40/33 2030 ..per yd.	£0.22
8 core—CD44, Ham II ..per yd.	£0.35

RZ100 BEARING



STOLLE ROTOR

2010/220 and Cont. Box STOLLE



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THE NAG 144XL LINEAR

The NAG 144XL-220 is the finest 2m Linear Amplifier of its type we have yet seen. Identical in size to the FT-221 it produces about 250W RMS of clean stable output from a grounded grid 4CX 350F for a nominal 10W drive. The mains PSU using a large cut-core power transformer is built in and provides a 12V 3 amp fully protected and stabilised output for 21V only exciters.

A switchable, 10dB gain, low noise Mosfet, receiver amplifier (filtered by a large three section helical filter), a large coax change over relay, RF sensing (with adjustable delay) and manual control, an excellent directional coupler (for the inbuilt SWR bridge), thermal delay on switch on (anode current meter illuminated red for first 60 seconds), a thermal cut out situated in the valves exhaust stream (optical timer available to leave blower on for 90 seconds after switch off), a grid current sensing ALC output socket, are but a few of the star features.

EX STOCK £355 + VAT. (12½%)

DIGITAL II from KYOKUTO

SCANNER AND CRYSTAL T.B. OPTIONS

The Digital 11 offers complete 5kHz step coverage across 2 metres and now with the Scanner 33, 25kHz channels from 145MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 10 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs.

Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (rx to 149MHz) from a tiny 6¾" × 2" × 7½". Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.

DIGITAL II, £235; CRYSTAL TB, £10; SCANNER, £49.50
ALL PRICES EXCLUDE VAT (12½%)

For strong handling, and low noise the R.F. mixer, first I.F. (16·9MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (±8kHz at —6dB ±15kHz at —70dB). Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 circuit block construction (for serviceability and screening). Selective calling socket.

SOLID STATE MOBILE LINEARS (UHF & VHF) FROM KLM and AMPERE

2 or 70. Superb RF sensing and dc bias arrangements for all modes. C/w mounting bracket 12V dc 10W drive 2·5" × 5·2" × 7·5" (8·5")
(+ VAT at 12½%), free delivery.

APB82A	145MHz	80W out	£99.00
APB57A	432MHz	45W out	£99.00
APB87A	432MHz	80W out	£214.00

2 metre, SSB/CW/FM, RF sensing with manual override, "Microstripline" techniques
12V D.C. 10W drive 2" × 6" × 10" (11")
(VAT + 12½%), free delivery.
(Over 15 different models—S.a.e. details)
PA10/160/BL 145MHz 160W output **£160**

◀ VHF HANDHELD

KEN KP202 TRANSCEIVER

144MHz, FM, 2W of RF and ½W of audio. Immunity to image and IF breakthrough and performance to rival all walkie-talkies and many a mobile sets.
C/w F plug, leather handle/whip case and telescopic whip.
Fitted 6 channels S20 & S21 + choice S (0, 21, 23, 24), R (3, 4, 5, 6, 7) **£109.50.**
R channel only crystal tone burst **£10.00.**
Flexible stubby ant. **£5.80** Case **£4.90.**
Base charger KCP2 **£11.75** Ni cads **£8.50.**
F to UHF adaptor **£1.65** (all + VAT).

VHF MONITOR RECEIVER ▶

SEIWA MR2 AND MS2 (+ VAT prices)

Ideal for the SWL, the YL or even the XYL as the monitor receiver to keep you in touch Tiny (2½" × 1½" × 4½") and light (8 ozs.) slip into your pocket or onto your belt with the optional case. Sensitive double conversion superhet with 12kHz. band width, auto squelch, and generous audio output c/w Nicads, Mains Charger, Earpiece, Antenna.

MR2(4) 70MHz. 12 switched channels	£53
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MS2 144MHz. 4 scanning channels	£62
Leather Case **£1.90** Crystals each	£2.00

MR2

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(personal cheques, money orders, master charge, Viza etc)

MMA70	4M	Pre Amp. Two isolated outputs	£13.00
MMC70/**	4M	Converter. 4, 14, 18, 28 MHz IF	£18.00
MMC70/**/LO	4M	Conv. 28, 50 MHz IF with LO out	£20.00
MAA144	2M	Pre Amp. Two isolated outputs	£13.00
MMC144/**	2M	Converter 12, 14, 18, 24 MHz IF	£18.00
MMC144/*	2M	Converter 2 or 4 MHz IF Dble conv.	£18.00
MMC144/**LO	2M	Conv. 28 or 50MHz IF 5 mW LO out	£20.00
MMT144/**	2M	Transverter 28 or 50 MHz 10W out	£79.00

MMC432/**	70cm Converter 14, 18 28, 144 MHz IF	£22.00
MMC435/51	70cm Converter 51 MHz IF for TV	£23.00
MM432/**	70cm Transverter 28 or 50 MHz 10W	£97.00
MMT432/141	70cm Transverter Dble convsn. 10W	£13.00
MMC1296/***	23cm Converter 28 or 50 or 144MHz	£25.00
MMV1296	23cm Tripler varactor 30W input	£30.00
MMD050	Freq. counter miniature 50 MHz 12V	£62.00
MMD050/500	As the 050 but to 500 MHz	£79.00
MMD500P	Divide by 10 12V 2·5V pp output	£25.00

Coax Slide Switches

Up to : 1kW, 1·5 GHz, 0·3dB less, 1·2 : 1 VSWR, 50dB isolation, 50 ohm "N" or "PL" fittings. Ex-Stock P. & P. 30p (VAT + 8%)

TW2S10	1 in 2 out nickel SO239.. ..	£5.40
TWS150	1 in 5 out nickel SO239.. ..	£11.50
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Coax Relays

12v DC 50 ohms. Silver plated. 4 weeks. P' & P. 30p (VAT + 8%)

Power crosstalk (at 500 MHz)

CX120	50W	35dB	Cable entry	£9.50
CX230	300W	40dB	BNC sockets	£17.90
CX600 N	600W	40dB	N sockets	£21.50

SMC-HS VHF Antennas

(VAT 12½% Carr. 95p)

250 (29 or 145 MHz) ¼λ, effective DC short, snap mount, matching transformer, shock spring, tapered whip, c/w 12" cable and PL259 plug ONLY £11.75

GDX1 80 to 480MHz Discone, omnidirectional, 3dB¼. Excellent VSWA £37.50

260 (70 or 145 MHz) High gain, gutter mount, tapered coil and whip, 90° spring fold over joint £17.15

25 Trunk lip mount for snap bases £2.95

265 Gutter clip adj. angle .. £3.95

111 Gutter clip base, c/w shock spring, 10' cable, PL259, etc £4.95

250 260

JAYBEAM 70 (4m), 144 (2m), 432 (70) (Carr. about £1) VAT 12½%

D5/2m 5 over 5 slot feed ..	£11.00	PBM10/2m 10 ele Para ..	£20.50
D8/2m over 8 slot feed ..	£14.75	PBM14/2m 14 ele Para ..	£25.20
5XY/2m 5 element crossed	£12.90	D8/70 8 over 8 slot feed ..	£12.50
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10Y/2m 10 ele long yagi ..	£17.20	4Y/4m element yagi ..	£10.20
14Y/2m ele long yagi ..	£22.00	PMH2/70 2 way harness ..	£4.75
Q4/2m element yagi ..	£13.20	PMH2/C Circ. phasing ..	£4.10
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CUSHCRAFT VHF OMNI (Carr. 90p) VAT 12½%

Ringo Ranger ARX 6dB gain (over ½) ultra low angle radiation, excellent 50 ohm match. Uses 3 × ¼λ in phase and ¼λ stub. 145MHz version approx 9' 6" (& 1½lbs) 432MHz approx 3' 6" (illus. left)

ARX2 Ringo Ranger 145MHz	£21.50	ARX450 Ringo Ranger 432MHz	£21.50
AR2 3dB Ringo Vert ..	£12.75	ABW144 2m Big Wheel ..	£14.50
AR25 QRO AR2	£15.00	ABW12S ABW harness ..	£7.30
CX1000 29MHz Ringo ..	£25.75	ASQ1 2m Squalo	£11.75

BANTEX VHF WHIPS (Carriage 90p) VAT 12½%

B5 ¾ 145MHz	£6.35	70½ ¼ 70MHz	£4.00
BGA f.g. ¼ 2m fibreglass	£8.75	Trunk Lip Mount	£5.75
BGA s.s. ¼ 2m stainless steel	£8.50	Magnetic Base Mount ..	£8.50
B5U ¾ 432MHz	£5.00	Standard base unwanted deduct	£0.50
144½ ¼ 145FG or SS	£3.50	UCL Mid loaded	£8.00

COAX PLUGS (p & p 30p) VAT 8%

PL259	Standard UHF Plug	£0.48	258	Back to back female	£0.80
UG175	Reducer UR43/76	£0.12		Back to back male	£1.20
UG176	Reducer UR70	£0.12	'T'	Adapt (2F1M)	£1.20
PL259R	Fix reducer plug 58CU	£0.56	'T'	Adapt (3F)	£1.48
PL259S	"Solderless" UHF UR76	£0.51	Angle	90°(1M + 1F)	£0.90
PL259S	"Solderless" UHF UR67	£0.51	239	Socket to Phono/car	£0.60
PL259P	Push fit UHF	£0.69	239	Socket to 3.5mm Jk	£0.70
SO239	4 hole socket	£0.40	SO239	2 hole socket	£0.37

Crystal Filters and Crystals only £3.75 a pair (P & P 20p VAT 12½%)

YAESU

FT2F, FT2FB, FT2AUTO, FT224, FT223 (6, 12, 18 MHz Tx, 14, 44, 52 MHz Rx).

SIMPLEX S (0, 12, 16, 19, 20-24).

DUPLEX R (0-9) and IR (0-9) T & R.

FT200B, FT301(S), FT221(R). FT101 (EX), FT75(B), FR101(S) all £2.20 each.

OTHERS

TR2200(GX), C146A, C826MB, MS2, MR2. (12 MHz Tx and inc. 44 MHz Rx).

SIMPLEX S (0, 20-24)

DUPLEX R(3-7) at least. A large selection of inverse receive crystals.

CONVERTER CRYSTALS £2.20 38·666(2m), 42(4m.), 50·5 (70cm.).

YF30F350	350Hz	F*101	CW	8pl	£18.80
YF30H350	350Hz	F*101	CW	8pl	£20.75
YF30F600	600Hz	F*101	CW	6pl	£18.00
YF30H12	12kHz	F*101	FM	8pl	£20.75
YF90H600	600Hz	9MHz	CW	8pl	£16.00
YF90F2·4	2·4kHz	9MHz	SSB	6pl	£16.00
YF90H12	12kHz	9MHz	FM	8pl	£18.00
YF107H600	600Hz	10·7MHz	CW	8pl	£16.00
YF107H2·4	2·4kHz	10·7MHz	SSB	8pl	£16.00
YF107H12	12kHz	10·7MHz	FM	8pl	£18.00

Carrier crystals (9 or 10·7MHz) HC18/U ea. £2

YF90

A POSTSCRIPT

As you may have seen on television, radio, in the newspapers or in last month's ad, we suffered a severe fire which destroyed the majority of our stocks of antennas and fittings here in Totton. We are glad to report that we have succeeded in replacing the bulk of our stock lost in the fire and that the staff have now returned to their normal duties. We apologise for any inconvenience this disruption may have caused and would like to thank customers and friends who arrived with boiler suits and gum boots to help and for the messages of sympathy and offers of assistance from suppliers and our direct trade competitors alike.

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TRIO WHEN QUALITY COUNTS ABOVE ALL ELSE TRIO

TR-2200GX

The TR2200GX represents the very best of TRIO design. It is the latest in the line of continuous progress from the first TR2200 and maintains the TRIO tradition of top quality at a reasonable price. The TR2200GX has all the features that you would want—high power output; sensitive receiver; flexible use from internal batteries or external power using the lead supplied; built in removable telescopic antenna with flexible whip available; built in metering of signal strength, transmit output and battery condition; fitted with twelve channels at low, low prices, in short, all that you could want.

All operator controls are placed for maximum convenience on the top face of the rig and a protective carrying case is included in the price.

The matching accessories include a 10W amplifier for mobile use, which incorporates SWR protection and a regulated supply for the TR2200GX; a quick release mobile mount and a low cost rechargeable battery pack.

TR-2200GX fitted 12 ch. **£160 inc VAT**
VB-2200GX 10W amp **£45 inc VAT**
MBIA mobile mount **£9.45** Nicad pack **£9.72**

The VB2200GX is the matching 10W mobile amplifier for the TR2200GX. It will also match any of the previous TR2200 series equipment. Small size and low weight for easy fitting in any vehicle make the VB2200GX a must for the operator who wants the very best of all worlds, portable and mobile.

TR-3200

The TR3200 from TRIO. Not content with having the lead in 2 metre handy portables, TRIO have gone a step forward and produced the best 70cm portable to match.

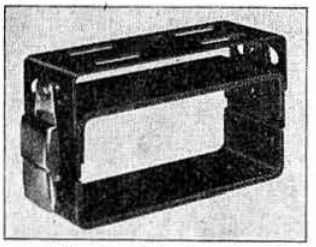
The TR3200 is a really terrific rig; over 2W out, with switched reduction to 400mW for local contacts; tailored speech response with a new limiting amplifier and new microphone, gives the crisp speech quality you like.

Excellent receiver performance with double IF filtering at 10·7MHz and 455kHz with no less than five limiters to guarantee noise free performance on even the weakest signals.

12 channel capability with three channels fitted. (SU8, 18, 20.) Supplied complete with all the usual accessories as the TR2200GX and including the new 5/8 wave high gain removable antenna.

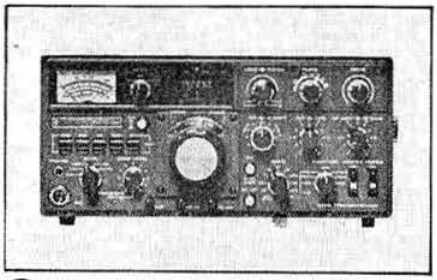
TR-3200 fitted 3 ch. **£171 inc VAT.**
VB-3200 10W amp. and RX pre-amp **£95** MBIA mobile mount **£9.45** Ni-cad pack **£9.72**

MBIA mount



Don't forget, the following accessories are provided with the TR2200GX and TR3200

Removable antenna	free
Carrying case	free
Shoulder strap	free
Battery charger	free
External power lead	free



TRIO TS-820

The ultimate transceiver . . . TRIO's TS-820. No matter what you own now, a move to the TS-820 is your best move. It offers a degree of quality and dependability second to none, and as the owners of this superb unit, you will have at your finger-tips the combination of controls and features that, even under the toughest operating conditions, make the TS-820 the leader that it is.

Unprecedented demand plus the painstaking care TRIO lavishes on each TS-820 created an initial backlog of orders, but happily we can now supply the TS-820 from stock. Once you have operated the TS-820 you will not be satisfied with anything else.

FEATURES

Following are a few of the TS-820s many exciting features.

SPEECH PROCESSOR ● An HF circuit provides quick time constant compression using a true RF compressor as opposed to an IF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control.

IF SHIFT ● The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820 the pacesetter that it is.

PLL ● The TS-820 employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now, PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

SPECIFICATIONS

Frequency range: 1·8-30MHz (160-10 metres)
Modes: USB, LSB, CW, FSK
Input powers: 200W PEP on SSB
160W DC on CW
100W DC on FSK

Antenna impedance: 50-75 ohms, unbalanced

Carrier suppression: Better than 40dB

Sideband suppression: Better than 50dB

Spurious radiation: Greater than −60dB (Harmonics more than −40dB)

Receiver sensitivity: Better than 0·2μV

Receiver selectivity: SSB 2·4kHz (−6dB)
4·4kHz (−60dB)
CW* 0·5kHz (−6dB)
1·8kHz (−60dB)

* With optional CW filter installed.

Image ratio: 160-15 metres: Better than 60dB
10 metres: Better than 50dB

IF rejection: Better than 80dB

Power requirements: 120/220 VAC, 50/60Hz, 13·8 VDC (with optional DS-1A DC-QC converter)

Power consumption: Transmit: 280W. Receive: 26W (heaters off)

Dimensions: 13¼" w × 6" h × 13 3/16" d

Weight: 35·2lb (16kg)

TS-820 **£625 inc VAT**

DG-1 optional digital readout **£126 inc VAT**

HEAD OFFICE **119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE. Tel (0629) 2817 or 2430, 9 a.m. to 9 p.m.**

AGENTS Alan GW3YSA, 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newtown Llantwit 3809
EVENINGS AND WEEKENDS John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071
Sim GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

(NOTE: ALL MAIL ORDERS TO MATLOCK, PLEASE)

Send 48p in stamps for full catalogue, price lists and our antenna booklet

PAUL
G3VJF

ICOM

Can you listen on the input channel at the flick of a switch? The IC-240 is still the best value in synthesised transceivers

£198
INC VAT

DIMENSIONS
6·15" wide
2·28" high
8·59" deep

IC-240 THE WORLDBEATER FOR FM MOBILE

THERE ARE SEVERAL CHEAPER ALTERNATIVES BUT IF YOU LOOK CAREFULLY INTO IT YOU WILL FIND THAT TO BUY ONE IS FALSE ECONOMY

★ **Can be easily programmed to any channel of your choice.** The IC-240 contains a synthesiser instead of banks of crystals. This contains a programmable divider which can be programmed by YOU for each of the 22 channel positions merely by putting diodes in the appropriate places as indicated by a chart provided in the handbook.

★ **Quick, easy selection of channels.** The IC-240 has a single knob, 22 position, channel selector. Anyone who drives in traffic and wants to change from one popular channel to another knows the problems of channel changing when this involves several knobs or even a single one when it has to be used in conjunction with a digital display which requires peering at.

★ **Instant facility for listening on all repeater input channels at the flick of a switch.** It is a tremendous advantage to be able to listen on the INPUT channel of a repeater in order to determine whether a direct QSO is possible. With the IC-240 this is possible merely by flicking the control switch on the front panel from DUP to SIM.

★ **Built in tone burst which can be completely automatic.** The tone burst is easily made automatic so that the tone is placed at the beginning of each transmission when on Duplex. This is a necessary feature while some UK repeaters need feeding with a tone at the beginning of each over rather than only for initial opening as recommended by the RSGB. We do this mod for you if you buy from a THANET agent or shop.

★ **Second-to-none receiver.** The receiver on the IC-240 is really sensitive. Simply comparing maker's specs will not give you the true picture. The re-designed discriminator circuit makes the 240 by far one of the best receivers on the market. Ask someone who has one!

★ **Excellent modulation and clipping.** The modulation and clipping on the IC-240 are designed to provide a high quality, easy to read, signal without over deviating. Many sets neglect this point with the result that you either have to turn up the mod to be read at all, and then find that you over-deviate on peaks, or you keep the deviation down and are accused of mumbling! The ICOM quality of modulation is well known and is hard to beat.

★ **Really solid construction.** There is nothing cheap and nasty about the IC-240. It is a really solidly built piece of gear which is highly reliable. Of the hundreds already sold very few had to come back for repair under warranty, their record in this respect being much better than many crystal controlled sets.

★ **Automatic PA protection.** The PA has a continuously variable PA protection system which gradually cuts down the output power as the set is fed into a worse VSWR.

★ **Very adaptable for adding a cheaply constructed scanner to cover the whole fm band.** The greatest asset of the IC-240 is the way it lends itself to the experimenter in digital logic. It is easy to design peripheral equipment to do interesting things such as scan the band or provide other frequencies which are not programmed into the set already. Several circuits for scanners will no doubt be published shortly and we hope to be able to offer a kit for a scanner with six digit frequency display for something in the region of £20. You can soon spend this on crystals!

IT WILL **HAVE** TO BE AN IC-240 FROM **THANET** — YOUR **ICOM** SUPPLIERS

FOR DETAILS LEAVE YOUR NAME AND ADDRESS OR CALLSIGN ON OUR ANSAFONE (02273 63850) DURING THE EVENING WHEN CALLS ARE CHEAP

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THANET ELECTRONICS

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Access

Electronics (UK) Ltd

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★ STANDARD TYPES, RATED AT 75 MPH WITH FULL LOAD QUOTED
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★ STANDARD MODEL 40% STRONGER THAN SIMILAR TYPES.

A Heavy Duty is well worth the extra . . . Compare . . .

Size	Head Load at 75mph	Price (inc. VAT)
3S (58ft)	125 lbs.	£322.92
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Head Loads are for unguyed towers. Prices are for framed-post models (FP) and are carriage paid except to Scotland, Devon and Cornwall. Over-water deliveries also extra.

Heavy Duty is up to 100% stronger than Standard

Other WESTERN Products. . . . (Prices inc. post and VAT)

DX-33 3 band (10, 15, 20m) 3-element beam, 2kW pep **£84.37**
BA-1 1:1 Balun, 1kW rated, SO239 socket **£5.91**
AT-40 40m. dipole traps, 1kW rated (per pair) **£5.91**

CONNECTORS:
WE-588 (SO239) UHF coax socket (single-hole) **27p.**
WE-592 L-Adapter for UHF connector, **86p**
WE-596 UHF-to-Phono Adapter **27p**

Plus 32p post up to 10 items. 50p over 10. Over 50 items post free.

STOP PRESS!! PM2001 VHF PEP meter coming—WATCH THIS SPACE

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WATERS & STANTON

TELEPHONE HOCKLEY (03 704) 6835 (2 LINES

UHF FM?

MULTI-U11
12Watts output
23 channels (9 fitted)
4 Autoscan channels
Receiver incremental tuning
Automatic tone-burst + mic brackets, power cord etc—£249 inc Vat and delivery.

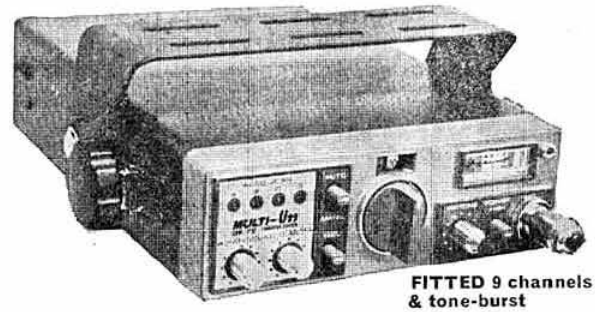
STOP PRESS

Mosley Super TA33 High Power Beams in stock complete with balun 10-15-20m £110 delivered free.

THE NUMBER ONE CHOICE

Note receiver incremental tuning is an absolute must on 70cms—some transmitters are not quite as stable as the U-11!

FDK for 70 cms Multi-UII



FITTED 9 channels & tone-burst

QUARTZ-16... SAVE £30

Never before has such value in 2M FM been offered at such a low price. Exactly the same power output (perhaps a little more in some cases!) receiver sensitivity and size as its competitors but £30 cheaper. What's more it is supplied with 20 xtals giving you complete absence of spurious tx and rx responses whilst giving you the ability to add any channel frequency at a later date whether it be 25kHz or 12½ spacing. You also get a microphone, mounting bracket, power cord etc! Beat that for value.

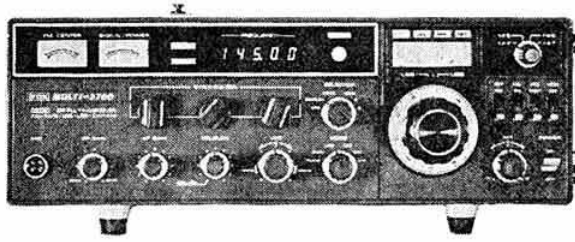
FDK QUARTZ 16 10 channels fitted (25 channel capability)

£169 inc Carr & VAT

IF YOU MUST SPEND ANOTHER £30 OR SO— — —.

then we think you have a right to expect a few additional features. Compare the Multi-11 with any other model. Does it have:- 23 channels plus 4 auto-scan: receiver incremental tuning; tx monitor switch for audio and frequency checking; built-in rf pre-amp for 20dB quieting at 0·3µv; 12 watts output minimum, remote vfo socket; centre-zero and S-meter; channels fitted indicator light? If it does then it must be another M-11 . . . If it doesn't perhaps you'd better buy a quartz-16 and save £30!

FDK Multi-2700 Mk II



SEPTEMBER OFFER

Want all modes 2m or 70cms? During September we are offering the M2700 plus the MMW 144/432 transverter at £599 inc VAT!
Act now and save £'s.

FDK for 2 metres Multi-II

Fitted 7 channels & tone-burst £209 inc. VAT. Additional 3 channels £10.

YOU DONT HAVE TO SPEND £489 FOR M2700 PERFORMANCE

Although we sell many Multi 2700 transceivers we have to admit that you can buy other 2 metre all-mode rigs at less than £489. In fact for around £380 we can sell you other models having all-modes and complete coverage of 2 metres. Of course you'll have to buy one or two extras to match the Multi 2700 performance. The vox unit may be extra—not a lot—perhaps £20 or so; the speech processor is a must at about £50; you'll have to purchase the synthesizer unit to really appreciate the benefits of its clear digital readout and instant QSY facility—let's be conservative and say £90 to £100 should cover this item; for low power you can modify the rig (be careful not to do it until the guarantee has run out) fairly simply; the OSCAR converter works out quite reasonably at £20 and a simple switch mounted on the front panel plus a relay is all that is needed for instant selection; finally you will find that the receive pre-amp at £10 will make a World of difference. So for £380 plus about £200 you can match the performance of the Multi-2700. For £100 less you can have the real thing!

ELECTRONICS

TELEX 897406

FAST MAIL ORDER SERVICE

FDK

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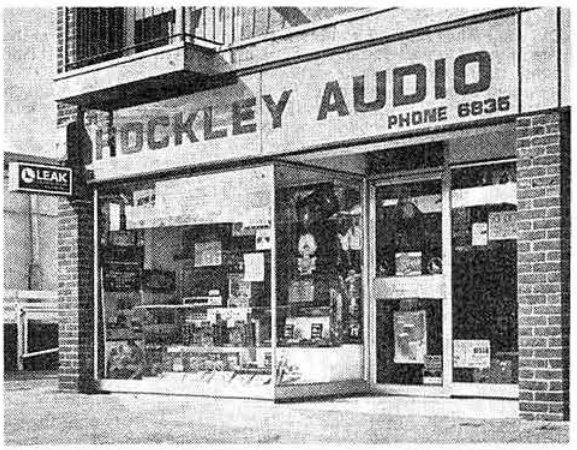
LARGEST MAIL ORDER SERVICE IN THE UK



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BY POST Simply write, giving details of your requirements and including a cheque, postal order or credit card no. for instant despatch.

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OVERSEAS CUSTOMERS. We export daily to most European countries. All documentation is taken care of by our office staff and deliveries can be made to you by road sea or air.

JUST PART OF OUR EXTENSIVE STOCKS

ASK ABOUT OUR INSTANT CREDIT SCHEME

JAYBEAM VHF/UHF ANTENNAS

4M ANTENNAS

4Y/4M 4 el yagi	£11.45 (1.75)
PMH2/4M 2 way harness	

2M ANTENNAS

C5/2M 5db colinear	
5Y/2M 5 el yagi	£6.96 (1.00)
8Y/2M 8 el yagi	£9.10 (1.00)
10Y/2M 10 el yagi	£19.35 (1.50)
PBM10/2M parabeam	£23.00 (1.50)
PBM14/2M parabeam	£28.35 (1.75)
5XY/2M 5 el x'd yagi	£14.50 (1.25)
8XY/2M 8 el x'd yagi	£18.10 (1.50)
10XY/2M 8 el x'd yagi	£23.95 (1.75)
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D5/2M 5 el slot	£12.35 (1.25)
D8/2M 8 el slot	£16.55 (1.50)
SVMK/2M vertical slot kit	£3.45 (75p)
XD/2M x'd yagis	£6.40 (1.00)
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HO/2M halo head	£3.09 (50p)
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PMH2/2M 2-way harness	£6.15 (75p)
PHH4/2M 4-way harness	£14.85 (1.00)

70cm ANTENNAS

D8/70cm 8 el slot	£14.05 (1.25)
PBM 18/70cm Parabeam	£16.95 (1.50)
MBM48/70cm Multibeam	£19.65 (1.50)
MBM88/70cm Multibeam	£26.30 (1.75)
12XY/70cm 12 el x'd yagi	£27.00 (1.50)
PMH2/70cm harness	£5.30 (75p)
PMH4/70cm harness	£11.10 (1.00)
C8/70cm 8db colinear	£36.55 (1.50)

1296MHz ANTENNAS

D15/1296 Yagi	£20.92 (1.00)

CHIMNEY KIT

DL lashing kit (Heavy duty)	£8.58 (1.25)

WALL BRACKETS

W6 6" wall bracket	£2.50 (75p)
W21 21" wall bracket	£9.90 (1.50)
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SPM 16' Portable mast	£9.45 (1.25)
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A10 10' × 2"	£8.42 (1.50)
A12 12' × 2"	£10.15 (1.50)

MAX £2 carr. any quantity

Brackets etc——

full range stocked send SAE for catalogue

HF BEAMS

Hy-gain TH3 MK3 10-20	£154.00 (3.00)
Hy-gain TH3 JR 10-20	£108.00 (3.00)
Mosely TA33 High power 10-20	£110.00 (3.00)

HF VERTICALS

Hy-gain 12 AVQ 10-20	£37.68 (1.50)
Hy-gain 14 AVQ 10-40	£53.43 (1.50)
Hy-gain 18 AVT/WB 10-80	£72.50 (2.00)

ROTATORS

CDE AR30	£44.43 (1.25)
CDE AR40	£51.75 (1.25)
CDE CD44	£106.87 (1.50)
CDE HAM-2	£145.12 (2.00)
Stolle 2010	£46.40 (1.25)
Stolle 2030	£51.18 (1.25)

H.F. MOBILE ANTENNAS

G Whip tribander helical	£18.11 (1.00)
G Whip multimobile	£21.37 (1.00)
LF coils for above whips	£5.48 (55p)
Resonator whips	£2.08 (55p)
Basemounts	£2.47 (55p)

VHF MOBILE ANTENNAS

Jaybeam TAS 5/8th 2m	£11.81 (1.00)
Jaybeam U5 70cm	£18.90 (1.00)
Bantex ¼ wave 2m	£3.93 (50p)
Bantex 5/8th wave 2m	£7.14 (1.00)
Bantex 5/8th wave 70cm	£5.62 (50p)

COMPACT HF ANTENNAS

HQ-1 Mini-beam 10-20	
C4 vertical 10-20	
EL40X dipole 80-40	

MICROWAVE MODULES

MMT432/28 Transverter	£109.10 (n.c.)
MMT432/114 Transverter	£149.60 (n.c.)
MMT144/28 Transverter	£88.87 (n.c.)
MMC144/2 or 4 or 28-30 1F conv.	£20.25 (n.c.)
MMC144/28 conv. LO	£22.50 (n.c.)
MMC70/28-30 1F conv.	£20.25 (n.c.)
MMC432/28-30 or 144 conv.	£24.75 (n.c.)
MMC1296/28-30 or 144 conv.	£28.10 (n.c.)
MMD050 50MHz counter	£66.96 (n.c.)
MMD050/500 500MHz counter	£85.32 (n.c.)
MMA144 2m pre-amp	£14.62 (n.c.)
MMD500P Pre-scaler	£27.00 (n.c.)
MMV1296 70-23cm tripler	£33.75 (n.c.)

VHF MONITOR RECEIVERS

BELCOME AMR104 8 ch's	£106.87 (n.c.)
NR56 vfo & 11 ch's	£54.00 (70p)
TM56B 230v/12v d.c.	£85.00 (1.00)
Xtals for above	£2.40 (15p)

SHORT WAVE RECEIVERS

Trio R30C 0·5—30mth	£184.50 (3.00)
Drake SSR-1 0·5-30mth	£149.50 (3.00)
Yaesu FRG7 0·5-30mth	£163.00 (3.00)

CABLES & PLUGS

75ohm VHF		£0.11m
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50ohm UR43	Carriage	£0.18m
50ohm UR67	Up to 20m	£0.40m
75ohm twin 200w	80p	£0.08m
75ohm twin 1Kw	Over 20m	£0.24m
300 ohm twin feeder	£1.25	£0.09m
5 core rotator		£0.22m
8 core rotator		£0.35m
PL259 plug		£0.50 (15p)
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SO239 back-to-back		£0.85 (15p)
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4 pin socket		£0.84 (15p)
Reducers for UR43		£0.16 (15p)
3 terminal Jock plug		£0.27 (15p)

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ALL PRICES INCLUDE VAT — CARRIAGE AT COST

AGENTS—G3XTX J.R. Electronics, 198 Collier Row Lane, Romford, Essex. Tel. Romford (0708) 68956.
G3OQT Bredhurst Electronics, Willowbrook, School Lane, Bunbury, Cheshire. Tel. Bunbury (0829) 260708
GM3GRX Eric Simpson, 6 Drossie Road, Falkirk, Stirlingshire. Tel. 0324-24428

BARCLAYCARD — Access

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SEM

P.O. BOX 6, CASTLETOWN, ISLE OF MAN Tel. PORT ERIN (0624) 833714

Did you realise that the conductivity of solder is ten times more than the conductivity of copper? You will know that it is standard practice to use double sided printed circuit boards in V.H.F. and U.H.F. construction with one side used as an earth plane to provide a high conductivity path between earth points.
It is also standard practice to "tin" printed circuits with a coating of solder. This is done to stop the copper oxidising, to make the soldering easier. It also increases the resistance of earth by about ten times.
We discovered this fact some years ago, when production equipment on "tinned" boards didn't meet the performance of prototypes on plain copper boards. That's why all our V.H.F. and U.H.F. equipment is manufactured with an earth plane which is cleaned in an acid bath, washed, dried and finished with a solder through protective coating.
It takes longer, but it's just one of the reasons why our equipment has the edge.

NEW! The only one available

SENTINEL TOP BAND CONVERTER

Top Band (Marine Band) to 20 metre converter. If you miss being able to listen on 160 metres this provides the answer. 1·8MHz–2·3MHz in, 14–14·5MHz out. Price **£18.00** + VAT = **£20.25. IN STOCK.**

2 METRE CONVERTERS

Sentinel D. G. Mosfet converters. These provide a performance that cannot be beaten. N.F. 2dB, Gain 30dB. Supply 12V(9-15) 15mA. Size is 2⅜″ × 1⅜″ × 3¼″. IFs: 28–30MHz, 4–6MHz, 2–4MHz. These are also in stock for Marine Band to 28–30MHz and Satellite Band to 20–22MHz. 4 metres to 28–28·7MHz. Price: **£18.00** + VAT = **£20.25. IN STOCK.**

SENTINEL 2 METRE CONVERTER

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

SENTINEL 2 METRE CONVERTER KIT IF 28–30MHz.

Performance as above converters. Complete unit with box, connectors etc. Price: **£11.50** + VAT = **£12.94.** We will get them going if you have trouble for **£2.50,** so you can't go wrong. **IN STOCK.**

70cms CONVERTERS

The most economical method of listening on 70cms is our 70cm to 2 metre FET converter. N.F. 3dB, Gain 30dB. Price: **£18.00** + VAT = **£20.25.** Size: 2⅜″ × 1⅜″ × 3¼″. **IN STOCK.**

SENTINEL 70

70cms to 28–30MHz, N.F. 3dB, gain 30dB. Size 2⅜″ × 1⅜″ × 4″. Price: **£20.00** + VAT = **£22.50.**

PRE-AMPLIFIERS

These must be the most cost-effective items being advertised in these pages.

THE SENTINEL AUTOMATIC 2 METRE PRE-AMPLIFIER

Contains an RF operated relay for connecting straight into your transceiving aerial co-ax. Performance: 1dB N.F., 18dB gain from selected FETS. Supply 12V nominal. Price: **£13.00** + VAT = **£14.62.** B/L sockets standard, SO239s **£1.50** + VAT = **£1.69** extra.

THE SENTINEL STANDARD 2 METRE PRE-AMPLIFIER

Same circuit as the one above but without the RF switching. Price: **£7.75** + VAT = **£8.72. IN STOCK.**

THE PA3

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

SENTINEL H.F. PRE-AMPLIFIER. These are wideband pre-amplifiers from 1–40MHz. N.F. 1dB, gain 15dB. Input and output impedances 50/75 Ohms. Size: 2⅜″ × 1⅜″ × 3″. Price **£7.00** + VAT = **£7.87.**

SENTINEL H.F. PRE-AMPLIFIER with change over relay. Same specification as above but including a change over relay for switching straight through. This can be operated by your transceiver for direct connection in your aerial co-ax. Price: **£9.00** + VAT = **£10.12. IN STOCK.**

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FROM NORTH. Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yards vere again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.
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MMT144/28 — 28 MHz TO 144 MHz 10 WATT TRANSVERTER

As you may already know, we are now manufacturing 144MHz all-mode solid-state linear transverter, MMT144/28, as pictured here.

This 144MHz unit is fully compatible with any 28MHz drive source and provides 10 watts continuous power output from power transistors capable of withstanding severe mismatch.

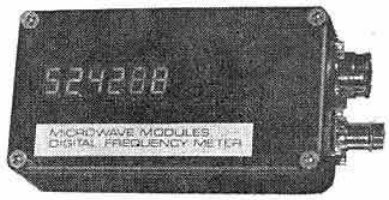
An internal aerial changeover relay of the PIN diode type is incorporated which has a through-loss of less than 0·2dB. The combination of a low distortion balanced transmit mixer incorporating protected dual gate MOSFETS, to produce a spurious-free linear signal and a low noise receive converter, makes the unit ideal for all modes of transmission at 144MHz, particularly where a high degree of stability, linearity and sensitivity are of prime importance.

The use of high Q circuitry throughout ensures an extremely good spurious rejection and selectivity.

The unit is housed in a highly durable black diecast case, and all circuitry is constructed on high quality glass-fibre printed circuit board. The high power linear amplifier stages are housed in a separate internal compartment, thus ensuring excellent electrical and thermal stability. If you have an HF Bands rig and you're thinking of moving on to 2 metres, the MMT144/28 must be the transverter for **YOU**.

SPECIFICATION:

Frequency range: 144-146MHz
Input modes: SSB, FM, AM or CW
Input frequency range: 28-30MHz
DC power requirements: 12 volts nominal
Current consumption: 2·2 Amps peak
Receiver converter noise figure: Better than 2·5dB
Power connector: 5-pin DIN
RF input/output connectors: 50ohm BNC
Size: 187 × 120 × 53mm
Weight: 800g
Power output: 10 watts continuous rating
Drive requirements at 28MHz: 500mW or 5mW
Relative 116MHz output: −65dB
Other spurious outputs: −65dB
Receiver converter gain: 30dB



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GENERAL DESCRIPTION: Recent advances in MOS technology have made possible the development of this extremely compact frequency meter which for the first time offers the user a convenient cost-effective means of frequency measurement.

A close tolerance quartz crystal in the 5MHz range together with CMOS binary divider integrated circuits generate the accurate 400ms gating period for the main counter MOS LSI circuitry.

This LSI circuitry drives a multiplexed 6-digit LED display through current amplifiers. This display is fed from an internal store which is constantly updated from the main counter register and thus the display is continuous and flicker-free for a constant frequency reading. The display uses the latest high efficiency red LEDs with a digit height of 10mm and overall display width of 45mm.

The counter has two ranges which are selected by supplying +12 volts to one of two pins on the DIN socket. Internal diode switching brings the input in the 0·45-50MHz range to a wide-band amplifier which drives a high speed TLL divider in the main counter logic. On the 50-500MHz range the diodes switch in a high speed ECL prescaler and the decimal point is changed accordingly.

A low angle AT cut quartz crystal is used giving a typical temperature stability of 0·5ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 200Hz at 50MHz, or 2kHz to 500MHz.

The counter has reverse polarity protection and operates satisfactorily from a nominal 12V dc supply. A suitable 5-pin DIN plug is supplied.

SPECIFICATION:

Digit Height: 10mm **Display Width:** 45mm
Case Size: 111 × 60 × 27mm
Frequency Ranges: 0·45-50MHz; 50-500MHz
Sensitivity: Better than 50mV RMS over 0·45-50MHz
Better than 200mV RMS 50-500MHz
Input Connector: 50ohm BNC **Input Impedance:** 50ohm
Power Connector: 5-pin 270 locking DIN socket
Power Requirements: 11-15 volts dc at 300mA approximately

PRICE: £85.32 inc. VAT

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CURRENT COMMENT

Following the letter received from the Home Office, and reproduced on page 594 of the August issue, the various aspects of the matter have been considered by the VHF Committee, the Repeater Working Group and the Telecommunications Liaison Committee.

A meeting with the Home Office has taken place and we are now awaiting the reaction of the administration to the proposals made by the RSGB.

QTC

amateur radio news

GB2RS

At its last meeting Council approved the suggestion of the Membership & Representation Committee that an *ad hoc* committee be formed to investigate thoroughly the matter of the Society's news broadcasts. It is intended to consider the following aspects: geographical coverage, frequencies, modes, times and contents.

It would be appreciated if members, or indeed any listeners to the service, who have thoughts on the subject or have suggestions to make, would send their comments to: Mr B. O'Brien, G2AMV, "Tanglewood", Anthony's Way, Heswall, Wirral, Merseyside, L6O 0BP.

Observations from news-readers are particularly sought.

All views will be carefully considered by the committee, whose final recommendations will be placed before Council in due course. It is hoped to publish details in *Radio Communication* but no date is given for this as the committee wishes to have time to make a thorough job of the exercise.

Aerial and mast planning problems

These problems abound among our members and assistance is urgently required from those members who are both willing and qualified to give advice.

It would be appreciated if any members who are solicitors or otherwise qualified, and who possess some experience of planning procedures, would offer their services to the RSGB by initially contacting Mr R. W. Price, G4BSO, 31 Broomy Hill, Hereford, HR4 0LJ, who is a corresponding member of the Telecommunications Liaison Committee with special responsibility for planning.

The intention and hope is that a number of members in different areas of the country will become available to give initial advice to members as to the best method of dealing with their particular problems.

G4BSO will be very happy to give further information to any members who think they may be able to assist.

North Bedfordshire VHF Group

This group has been formed to stimulate the building of equipment for the vhf/uhf bands in north Bedfordshire. The secretary is Mr M. Dannatt, G8MCY, 83 Sandy Road, Potton, Beds SG19 2QQ.

"RADIO COMMUNICATION"

CHANGE OF ADDRESS

Since 1 August the *Radio Communication* editorial office has been transferred to Chelmsford, and all contributions, Members' Ads, and correspondence concerning the **CONTENT** of the journal should now be addressed to:

The Editor,
Radio Society of Great Britain,
88 Broomfield Road,
Chelmsford,
Essex CM1 1SS.

It is stressed that all other RSGB matters, **INCLUDING "RADIO COMMUNICATION" DISTRIBUTION, and subscriptions,** will continue to be dealt with at RSGB headquarters. Editorial material addressed to headquarters and non-editorial matters sent to the new editorial office will result in unnecessary delay and expense.

Netherlands licences

A new callsign allocation system for foreign amateurs has been introduced in the Netherlands. The use of the PA9 prefix is discontinued and the callsign will consist of the visitor's home callsign followed by /PA or /PE depending on the class of the original licence. Applicants for a temporary Netherlands licence must send a copy of the original home country licence verified by the applicants' administration and also a copy of the official information concerning the terms of the licence in the country of origin. Applications must be made on a special questionnaire and accompanied by a remittance of D.Fl.50 which secures a one-year licence. At least two months notice is required. Copies of the questionnaire and other information concerning the new arrangements may be obtained by sending a 8½ by 4in sase to RSGB HQ.

At a time when efforts are being made to ease the formalities necessary to obtain reciprocal licences, the new requirements of the Netherlands administration seem to be a backward step.

Slow scan television convention

The British Amateur Television Club is organizing a slow scan television convention, to be held at the University of Aston, Birmingham, on Saturday 19 November 1977 from 10am to 5.30pm

It is hoped that many amateurs will bring pieces of equipment to exhibit and demonstrate. All known suppliers of commercial sstv equipment have been invited to exhibit. Lectures are being organized for the afternoon.

Non-club members welcome. Admission charge 50p. For further details and maps of the area send stamp for return postage to: Mike Crampton, G8DLX, 16 Percival Road, Rugby, Warwickshire CV22 5JS.

Scottish Amateur Radio Convention

Adam Smith Centre, Kirkcaldy

10 September 1977

Exhibition and trade stands: 9am-6pm
Convention: 1pm-5.30pm
Dinner: 7.30pm

Admission: Convention and Exhibition, £1 payable at door. Convention, Exhibition and Dinner, £4.50, obtainable only in advance from Andrew Givens, GM3YOR, 41 Veronica Crescent, Kirkaldy, Fife KY1 2LH.

Facilities for the disabled. Bar open throughout the day

The centre is situated close to Kirkcaldy railway station, which is on the main Aberdeen—London railway line, and on one of the main roads through the town quite close to the main shopping centre.

Third old-timers 3·5 and 7MHz activity event

Contacts between British and Dutch old-timers will be renewed during the period 3-5 October 1977 inclusive of the annual event arranged by RAOTA and the OTC of the Netherlands. Activity periods will be (a) 0900-1130gmt, (b) 1330-1530gmt, (c) 1730-1930gmt.

Working frequencies, and the times that co-ordination and information stations will be available each day, are:

3·5MHz telephony, Periods (a), (b) and (c): 3,605–3,695kHz with co-ord/info on 3,600kHz from G2PT or G2NR and PA0DK or PA0YZ.

3·5MHz cw. Periods (a) and (c): 3,550–3,570kHz. Co-ord/info on 3,550kHz from G2PT or PA0PN or PA0ZQ.

7MHz telephony and 7MHz cw. Period (b) only: 7,075–7,095kHz and 7,025–7,035kHz. Co-ord/info on 7,075kHz (ssb) or 7,025kHz (cw) from G2RQ or PA0PN.

Participants (all welcome) are asked to call first on the appropriate co-ord/info frequency and then QSY up for contacts within the bands given above.

UK FM Group Legal Fund

At a joint committee meeting of the UK FM Group (London) and UK FM Group (Southern) which was held recently, it was decided that a joint legal fund should be set up in order to have funds available with which to take legal action to stop jamming and interference to repeaters. The fund has been set up jointly by the two groups and will be administered by four trustees, two from the committee of each group. Cheques should be made payable to "UK FM Group Legal Fund" and can be sent directly to: Barclays Bank, 17 High Street, Frimley, Surrey.

Alternatively, donations can be handed to the treasurer or any committee member of either the London or Southern FM Group. A record will be kept of all donations (which may be made anonymously if desired) and all monies will be returned if the fund is wound-up, otherwise the fund will be disposed of at the discretion of the trustees.

Wartime activities

The BBC at Norwich is researching a television programme on the wartime (1914 to 1945) activities of radio amateurs who were involved in intercept or surveillance duties, and would appreciate contacts from radio amateurs or SWLS who worked or who are now resident in the East Anglian area. This is the area bounded by lines from north London to Rugby and the Wash. Those wishing to give information or assistance should seek further information from either of the following: Mr P. J. Wright, G3SEM, c/o BBC (East), St Catherines Close, All Saints Green, Norwich NR1 2ND, or Mr A. Othen, G8FSZ, RSGB HQ.

Welsh Amateur Radio Convention

Oakdale Community College, Oakdale, Blackwood, Gwent

10am-6pm, 25 September 1977

Trade exhibition **Exhibition station**

Exhibition of early radio equipment

TV and rtty display **RSGB bookstall**

LECTURES

"A visit to the Seychelle Islands", by R. Brown, G3LQP/VQ9RB. "The launching and post-launch control systems for Ariel 5, one of the UK satellites", by J. Wright, G3VPW, of the Appleton Laboratory. "Layman's guide to amateur radio" (BBC Wales film).

Increased parking space this year. Talk-in from 9am, GW3WTZ/A on S22 and GB3BC/R6.

Overnight accommodation details from R. B. Davies, GW3KYA, 16 Vancouver Drive, Penmain, Blackwood, Gwent NP2 OUQ, tel 225825.

Admission: 50p at the door

Put pen to paper

Ideas for new books on subjects of amateur interest are always welcome and should be sent to: The Book Editor, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE.

All that is required in the first instance is a short description of the book (approximately 200 words) and a suggested

The Cardiff RSGB Group present their JUBILEE CABARET

7.30pm for 8pm, 17 October

Roath Conservative Club, Cyril Crescent, Roath, Cardiff

Members and their guests will enjoy:

Ragchew
Chicken and chip supper

CABARET (including BBC artists)
Treban
Dave Burns
Bernard and John
Guest comedian

Dancing

(RSGB publications will also be available)

Tickets £2 each (including raffle), from Cardiff RSGB Secretary, M. Fereday, 9 Mill Race Close, Lisvane, Cardiff

contents list. Each proposal will be carefully evaluated and the book editor will be pleased to give prospective authors any further advice or assistance required.

Hilomast Ltd

Clarbrook Engineering Ltd have transferred their tower and mast building business to a new factory at Maldon, Essex, where in future the company will be known as Hilomast Ltd, reflecting the considerable interest in this product. The full address is Hilomast Ltd, The Street, Heybridge, Maldon, Essex, CM9 7ND. Tel Maldon (0621) 56480.

RSGB BOOKS

Whatever are they talking about?

"Without a doubt, this is the standard textbook on the subject and anyone with only the slightest interest in vhf/uhf operation should have a copy on his bookshelf."

Radio ZS

"No serious vhf-er should be without this book. The reviewer's copy is always kept close at hand."

QST

The RSGB VHF/UHF Manual *of course! Got your copy yet?*

404 + xii pages Third edition £6.65 inc p & p

Radio Data Reference Book

(4th edition)

by T. G. Giles, G4CDY, and G. R. Jessop, G6JP

It is a sad fact of life that the more textbooks one has, the longer it seems to take to dig the odd fact out of them, whether one wants to know the input resistance of a common-emitter stage, the attenuation of UR77 cable, or just the BBC1 channel number of the Llanddona uhf tv transmitter! Then again, one might be left struggling through a pile of dusty volumes trying to find the melting and freezing points of soft solder, the transconductance equation of a fet, or the clearance size of an M5 screw. Phew!

As you have probably guessed, all these little gems are in this new edition of the *Radio Data Reference Book*, and much more. As before, the aim of the book is to present a wide range of essential reference data in convenient form without needless repetition of basic theory.

The text has been completely revised and a good deal of new material added, including sections on transistors, heatsinks and modern filter design. For greater ease of reference it has also been rearranged into nine subject areas, as follows: Units and symbols; Basic calculations; Resonant circuits and filters; Circuit design; Aerials and transmission lines; Radio and tv services; Maps and meteorological data; Materials and engineering data; Mathematical tables.

190 + x pages £3.00 plus 65p p&p

NEW BOOKS FROM RSGB

OSCAR—Amateur Radio Satellites

by Stratis Caramanolis

Already a best-seller in its original German edition, with over 7,000 copies sold, the first-ever book on amateur radio satellites has now been translated into English and up-dated for this edition.

The first half of the book discusses the background to the subject, including orbital geometry, satellite anatomy, communication principles and telemetry, in some detail. Only after the reader has a clear understanding of the basic principles of communication satellites does the book go on to describe satellites of the Oscar series and how they can be used for communication and experimentation, including QRP tests and sstv. Various methods of plotting Oscar orbits are discussed and the reader is shown how to interpret published orbital data.

Although the treatment of the subject matter throughout the book is essentially non-mathematical, relevant equations and worked examples are given where desirable, and the text is amply illustrated with many diagrams, charts and photographs.

Chapter titles are as follows: Planets and their orbits; Satellites and their orbits; Anatomy of a satellite; Satellites as relay stations; Fundamentals of telecommunication via satellites; Telemetry systems; Satellites of the Oscar series; Operating with amateur satellites; Learning with AMSAT-Oscar satellites.

192 pages £3.80 + 40p p&p

Radio Amateurs' Examination Questions and Answers

Compiled by the RSGB Education Committee

This book is a collection of model answers to typical Radio Amateurs' Examination questions, and should prove invaluable to candidates as a revision aid. It demonstrates that adequate answers to such questions need not be "long winded", and will assist the candidate in developing a concise answering style which could save valuable examination time.

The book is arranged in the same format as the examination, with chapter titles as follows: Elementary electricity and magnetism; Elementary alternating current theory; Thermionic valves and semiconductors; Radio receivers; Low-power transmitters; Propagation; Aerials; Measurements.

120 pages £1.70 + 30p p&p

The "Radio Communication Handbook" costs the earth!

Actually, we must confess that it *is* "dirt" cheap when one considers the amount of information packed into its 816 large-format pages. For less than the price of a simple station accessory one gets a superb reference library in two handy volumes, created by radio amateurs to help you get the best out of your hobby. Happy digging!

Volume 1 464 + xvi pages £9.36 inc p&p
Volume 2 324 + xii pages £8.12 inc p&p

A channel scanning arrangement for quartz crystals

by I. J. DILWORTH, BSc, G3WRT*

THE units to be described allow scanning of up to nine channels and are applicable to transmitter or receiver oscillators which can be crystal or vfo controlled. For nbfm a squelch circuit is described which can be used to stop the scan on a channel when a signal appears. A switching circuit allows skipping of unwanted channels or halting the scan on a single channel. The circuitry is readily adapted for use in commercial vhf/uhf transceivers which incorporate diode crystal switching or alternatively can be used as an "outboard" unit, connected via the vfo socket.

Switching circuitry

The requirement for the crystal switching configuration is that parallel or series mode crystals can be switched without loading the crystal and hence affecting its activity. Fig 1 illustrates the basic arrangement used for parallel and series mode crystals in the range 4-60MHz. The standard load capacitor is assumed to be 30pF.

A voltage applied to point A sufficient to drive the diode into conduction effectively connects the crystal to the oscillator. By using a fast switching diode with small residual capacitance, the no bias condition isolates the crystal and hence exhibits only a very small loading effect on the oscillator. The rf chokes provide an ac block and hence are required to be a high impedance at the crystal or overtone frequency. Combining nine of the basic configurations leads to Fig 2, the full switching circuit.

Oscillator configurations

An almost universally applicable oscillator which has presented little difficulty in experimentation is the Colpitts arrangement. Not surprisingly this is used in very many commercial designs. Figs 3a and 3b illustrate values which have been found suitable for 8MHz using parallel mode crystals and 45MHz using series mode crystals.

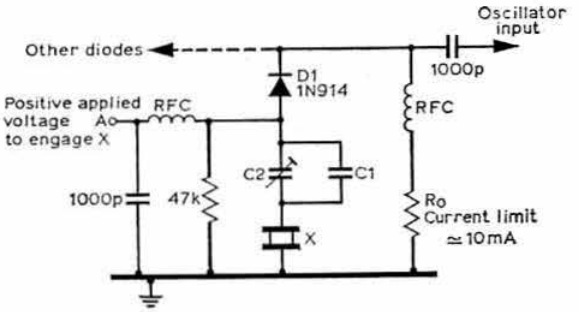


Fig 1. Basic arrangement

The output of these oscillators is in the range of 0·8-2V peak to peak and should prove adequate for receiver local oscillator drive and transmitter multipliers while still maintaining adequate stability of the quartz crystal.

A perennial problem associated with switching techniques of this type is parasitic oscillations which are caused by stray inductance and capacitance. Consequently it is important to keep lead lengths short in order to avoid any instability.

Scanning system

Reference to Figs 4a and 4b will indicate how the system is arranged. Fig 4a illustrates the led type display of the channels, a mos type shift register provides the heart fo the design. This simply scans sequentially along its outputs recycling at the end of the sequence. The squelch circuit detects the presence of a signal and via the control circuitry stops the scanner on that channel. Switching is incorporated to allow missing a channel or holding etc.

The seven-segment version in Fig 4b is identical to the above excepting the seven-segment decoder and additional circuitry to provide synchronization, colon flashing etc.

Scanning circuitry

As briefly mentioned, a mos type shift register can be used to good effect in this application to drive the crystal switches, and while this can be used directly with little current consumption, it does not provide enough current capability to simultaneously drive indicator lights, which are necessary for channel identification. Because this is an essential feature,

* University of Essex, Dept of Electrical Engineering Science, Wivenhoe Park, Colchester CO4 3SQ.

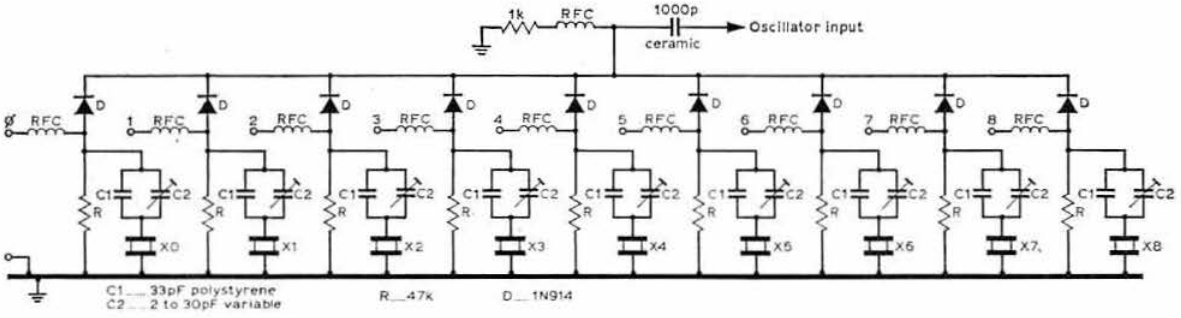


Fig 2. Full switching bank

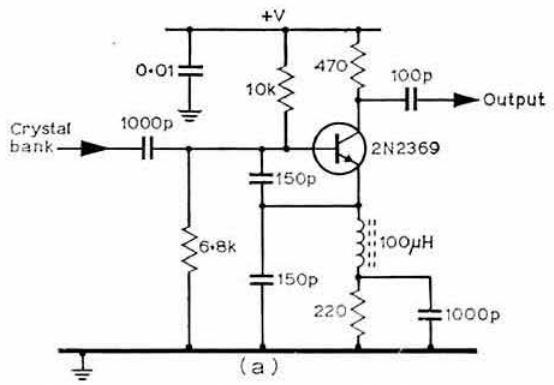


Fig 3a. 8MHz parallel-mode crystal oscillator

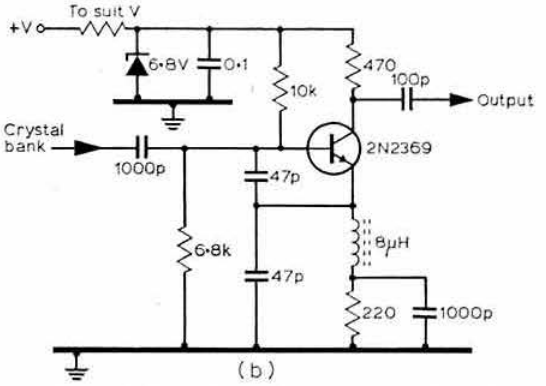


Fig 3b. 45MHz series-mode overtone crystal oscillator

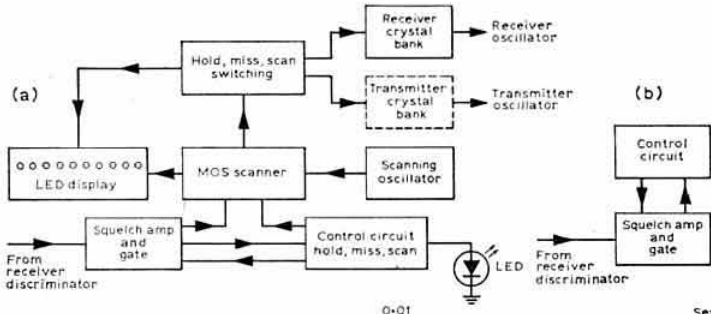
transistor drivers are used which not only switch the diodes but also provide enough current for led type diodes. Fig. 4c illustrates the arrangement. It is worth noting that by connecting pin 15 to the relevant output stage, scanning of 2, 3, 4 . . . 9 is possible, the nine-stage sequence is shown here.

The mos circuit can be powered from any convenient source in the region of 3-15V and so does not have to be stabilized at +5V as in the case of ttl, and of course requires a fraction of the power.

The CD4001 package contains four NOR gates, two of which are used to form the clocking oscillator. Because of squelch considerations the clocking rate is made deliberately slow and with the values illustrated each channel is scanned for 0·1s approximately; in practice this has been found satisfactory.

The mos outputs drive BC108 type devices directly. Strictly, base resistors of 100Ω or so should be incorporated in order to limit the base current, but with the loading used in this application they are superfluous and are therefore omitted. With a 9V rail, 30mA drain current through one BC108 is permissible, ie 10mA for the diode switch and 10mA for one led indicator (see Fig 6).

The scan stop function is performed by TR1, TR2, while TR3 allows holding the scan on a specific channel. The led in TR1 collector glows when the scan has been stopped, indicating that the squelch is inoperative, this proves very useful when accessing repeaters for example. A small standing current is present through the led to provide bias for TR2 when the circuit is scanning; however, this is not sufficient to cause confusion between the off and on states of the led. A



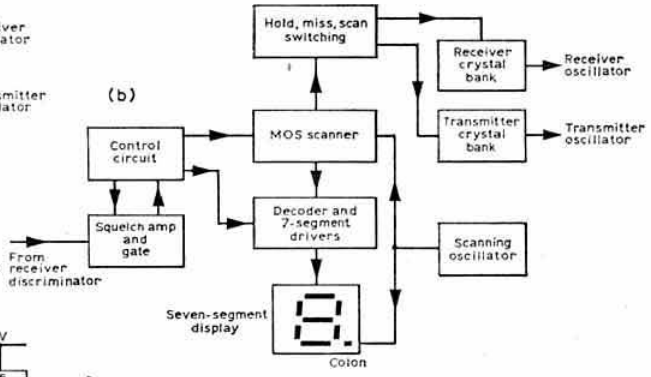
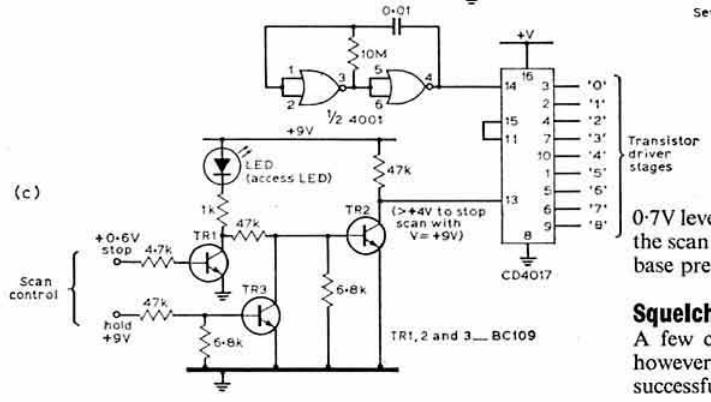


Fig 4. Scanning circuit



0·7V level is required to stop the scan. If it is required to hold the scan on a specific channel a similar voltage level on TR3 base prevents TR2 being biased on.

Squelch circuit

A few circuits have been experimented with; generally, however, the configuration in Fig 5 has been found very successful. A broadly tuned LC network selects the high

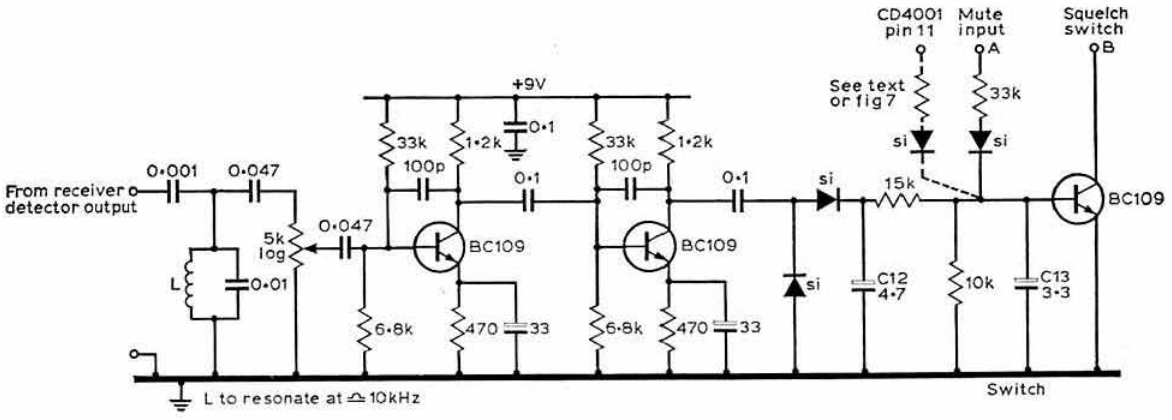


Fig 5. Squelch circuit plus switch

frequency components at the receiver detector (ie noise) which (hopefully!) disappears when a signal appears. With noise present the squelch level control RV1 selects the required level of gating and the signal is amplified by TR4, TR5. The rectifier and integrator generate a voltage which switches TR6. To miss out a channel D3 is used. By applying a positive voltage via this and the 33kΩ resistor a channel can be missed whether a signal is present or not, ie rendered inaudible provided the af section is muted by the squelch switch.

The time constants associated with the noise rectifier ensure positive squelch action. It is quite permissible to increase or decrease the time constants by varying the capacitors C12, C13, but the scanning oscillator period may then have to be adjusted to ensure positive action. The sensitivity of the squelch circuit is excellent and can be adjusted to stop on very noisy signals.

Channel indicator systems

Two methods are readily implemented.

(a) A single led using different colours for simplex and repeater channels, and a third (say, yellow) for the local repeater provide a pleasing display. These can be driven directly from the transistor driver on the scan board via a 1kΩ resistor. However, this does not provide any sophistication of channel switching.

The reader will no doubt be able to configure his or her own arrangement; a suggested circuit which provides simple operation is illustrated in Fig 6. The use of one pole two-way centre-off switches can provide all the functions required; which, together with diode switching, allows blanking of missed channel LEDs. This arrangement proves to be much neater than using two switches (ie hold and miss) for each channel, and operationally it is more convenient.

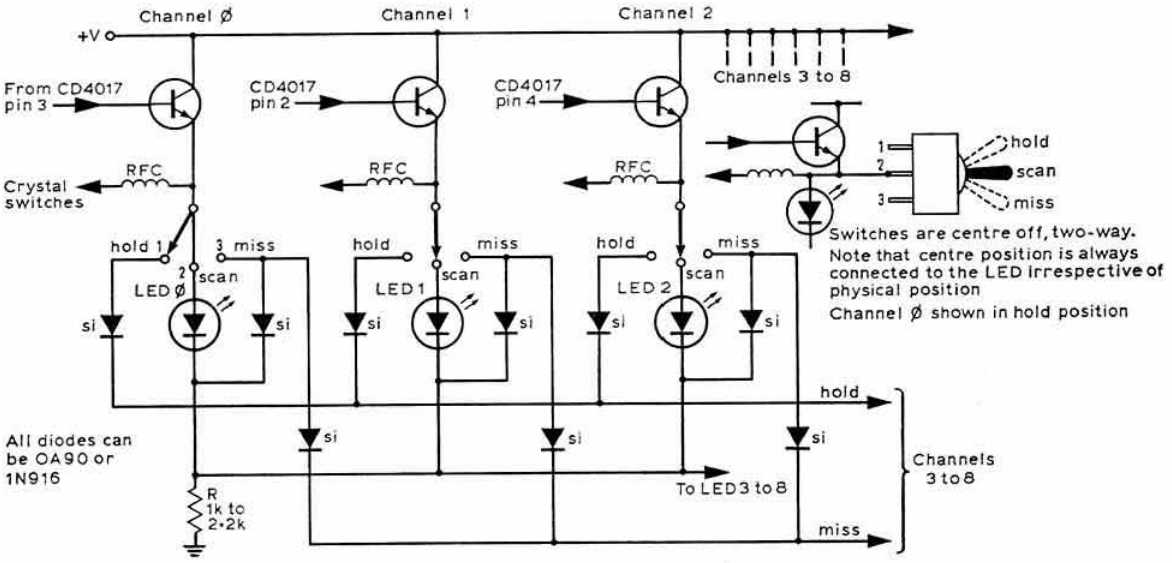
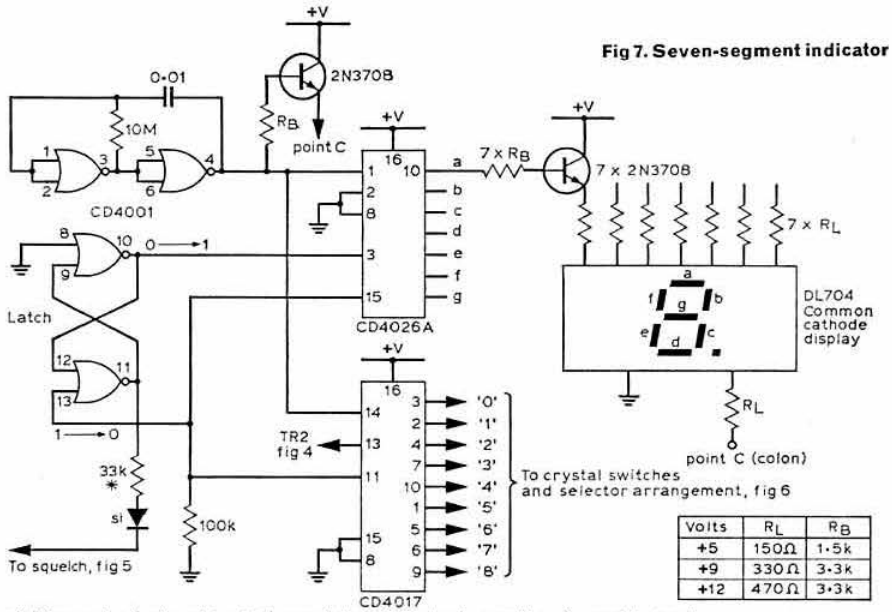


Fig 6. One possible switching arrangement (see text)

(b) A more sophisticated display using a seven-segment led display has the advantage of providing numbered channels; using a cmos decoder minimizes the current requirements and one has the added advantage of not needing a stabilized high current 5V supply rail. Fig 7 illustrates the circuitry involved.

As before, two NOR gates are used as an oscillator in the same configuration using the CD4017 as a decimal output for the crystal switches. A 4023A device contains all the circuitry to decode the input clock pulses for display of 0 to 9 using a seven-segment DL704 type common cathode display. Current drivers are necessary, however, to drive the display, a cheap driver device being a 2N3708.



Volts	R_L	R_B
+5	150Ω	1·5k
+9	330Ω	3·3k
+12	470Ω	3·3k

Fig 7. Seven-segment indicator

* May need adjustment to obtain equal charging rate of capacitors in squelch circuit

The last output digit of the 4017 is used to reset the 4026 counter to zero, simultaneously the display is enabled via the remaining two NOR gates in the 4001 device connected to form a latch. In this way synchronization is assured and the display will not be activated until this condition is reached in the count. The colon segment is arranged to flash at the clock frequency and serves to indicate channel scanning even if synchronization of the two counters is not complete and hence the main display is blanked off. Pin 11 of the 4001 latch can be used to ensure the squelch does not open before synchronization is achieved by routing another resistor-diode combination parallel to path A in Fig 5.

Further sophistication

One useful modification would be to include selectable delay on the squelch switch in order to prevent the scan starting when listening to a fluctuating signal. This can be achieved either by keeping the squelch open or by inhibiting the scanning clock. Operationally it is better to have this facility switchable. Fig 8 shows one possibility in principle.

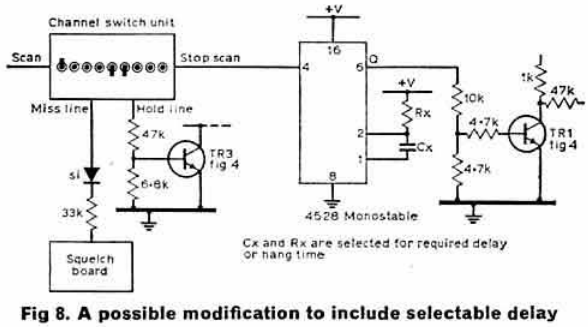


Fig 8. A possible modification to include selectable delay

The crystal switching arrangement can be used for a vfo/vco input to allow reception of channels for which crystals are not available. The circuit of Fig 9 has been used to good effect although great care in the stability of construction and rigidity of leads is necessary to achieve useful results.

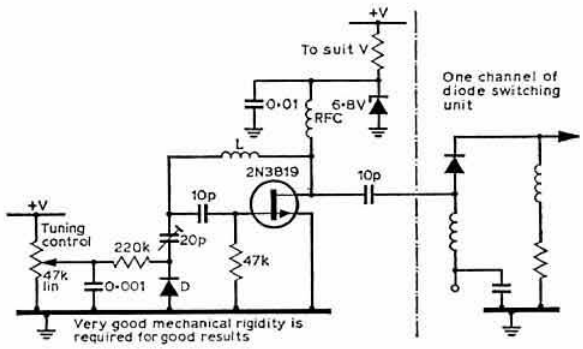


Fig 9. Variable local oscillator. Tuning diode D is varactor type or IN916 with reduced frequency swing

Conclusion

The circuitry presented has been in use for over a year. Needless to say, it has proved a very useful means of monitoring many channels at "once". Parallel connection of transmit crystals to the receive bank ensures the maximum convenience in operation.

Impatt Electronics, PO Box 12, Lincoln, have available printed circuit boards and component kits in addition to ready-made units for this project. □

Simple circuits for the beginner

by R. S. McMILLAN, GM8JUY*

Introduction

This article was written with the beginner to vhf in mind. The author's own experiences as a new G8+3 who does not work in any branch of electronics, gave rise to a hunt for simple, functional and relatively cheap designs. The article describes some equipment the author found, and still finds, handy in the shack:

A simple, easy to make swr bridge for tuning transmitters and monitoring antenna conditions in the shack.
A noise limiter for inclusion in older or basic receivers.
A noise generator to aid receiver alignment and performance checking.
An audio filter to assist the copying of ssb or cw on older or basic receivers.

No claims are made as to the originality of the material. It is simply a collation of ideas from various sources which have fulfilled the requirements of the moment.

A simple swr bridge (Fig 1)

The bridge is built in a die-cast box; the one used in the prototype being similar to the RS Components 509-305. Two SO239 rf connectors (4-hole mounting) are fitted directly opposite each other halfway down the long sides of the box and high enough up from the bottom to allow all four mounting screws to be fitted. The box sides should be marked off and drilled to give four mounting holes for each connector. These holes should preferably be threaded to accept BA bolts which will pass through the holes on the SO239s. The box sides must also be drilled to clear the rolled-over flange which secures the insulator on the rear of the SO239s. When fitted, the SO239s must lie with their flanges flat against the outer surface of the box sides (see Fig 2). The two screws on each SO239 nearest the open top of the box are also fitted with solder tags.

Bridge unit

The bridge element is made from a piece of UR67 coaxial cable into which two pick-up lines (L1 and L2) are introduced. The lines are connected to diode detectors and, after decoupling, the output is fed to a 500 μA meter. A potentiometer is included to allow the unit to accommodate various power levels.

Bridge construction

The outer cover is removed from a piece of UR67 about 6in long. The braid is then "bunched"; that is, the two ends

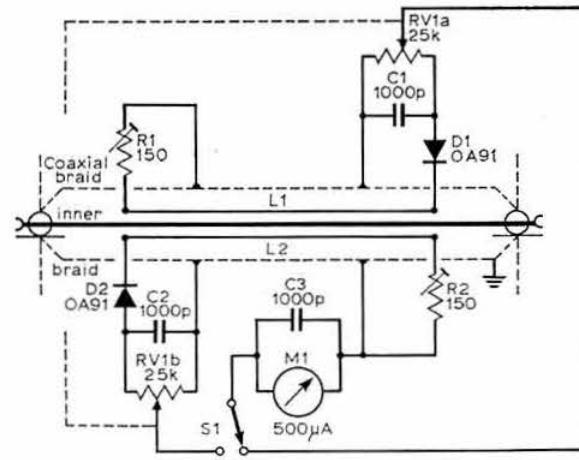


Fig 1. SWR bridge circuit diagram

R1,R2	150Ω min skeleton pre-set
D1,D2	OA91
RV1a,b	25kΩ tandem linear pot + knob
C1,2,3	1,000pF disc
L1,L2	3½in lengths of 16swg bare copper wire or $\frac{1}{16}$in copper coated steel welding rod
M1	500μA moving-coil meter
S1	SPST min toggle
Die-cast box	5½in by 7½in or similar
Solder tags	4
Sockets	2 off SO239
BA bolts	8 off to suit the SO239 sockets
Coaxial cable	6in of UR67

are gently pushed towards each other, causing the braid to increase in diameter and decrease in length. The braid can then be removed and stored, still bunched, until required for refitting.

The inner core of the cable, complete with polythene insulation, is then cut to match the distance between the pins of the two SO239s **plus** ½in. Bare and tin ¼in at each end of the cable.

Measure and cut two pieces of 16swg copper wire 3½in long to form L1 and L2. The prototype uses $\frac{1}{16}$in copper-coated steel welding rod (easily available from garages) which have the advantage of being straight compared with coiled copper wire. Copper wire can be straightened by clamping one end of the coil in a vice and pulling hard on the other end of the required length. Clean and tin ⅛in at each end of both lengths.

Place two 1½in strips of pvc tape, sticky side up, parallel on the bench. The tapes should be approx 2in apart. Place the UR67 inner across the tapes so that the tapes are an equal distance from both ends of the UR67, and at right angles to it, then press the inner on to the tapes.

Centralize L1 lengthwise to the UR67 inner and lay L1 parallel to and tight up against the inner. Roll the inner over L1 to make the tapes hold L1 tight against the insulation of the inner. **Do not roll it too far** since the same tapes must also hold L2. L2 is fitted in the same way as L1 but is spaced 180° round the inner from L1 (see Fig 2). Once both L1 and L2 are secured, cover the entire length of L1 and L2, **except** the ⅛in tinned at each end, with one turn of tape, applied in the same way as the original two strips.

Remove the right-hand socket. Locate one end of the

* 64 Eglinton Street, Coatbridge ML5 3JF

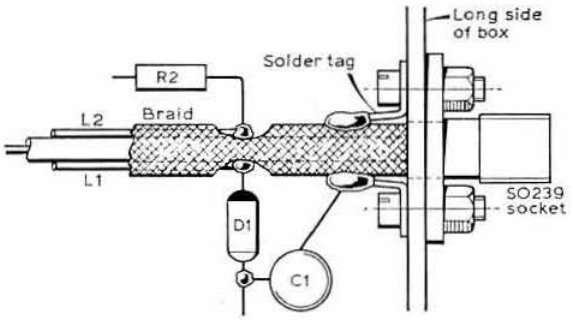


Fig 2. SWR bridge construction

UR67 inner into the left-hand SO239 pin and position the inner so that L1 and L2 lie equidistant from the bottom of the box. Solder the inner to the pin of the left-hand SO239 and place one turn of pvc tape round the joint. Slide the braid, still bunched, over the UR67 inner and L1 and L2 by passing it through the hole drilled to accommodate the right-hand socket. Refit the right hand socket and its solder tags. At the same time locate the end of the inner in the pin of the socket. When the socket is secured, solder the inner to the pin and tape the joint in the same way as the left-hand socket. Spread out the braid, making it as tight as possible over the inner/L1 and L2 assembly. Locate the left-hand end of the braid against the box side, covering the pin of the SO239, and after bending down the solder tags to contact the braid solder the tags to the braid at the left-hand socket. **Caution**: solder the braid as quickly as possible to avoid overheating it! Stretch the braid out tight and trim the right-hand end of it as required to allow the braid to completely enclose the right-hand SO239 pin/UR67 joint and contact the box side. Check for any "rogue" strands which might cause a short to the inner. If none is found, bend down the right-hand solder tags and quickly solder them to the braid.

Carefully locate the ends of L1 and L2 and, using a small pair of nail scissors, cut holes in the braid strands to expose the tinned ends of L1 and L2. Carefully fold back the braid strands to create holes of about $\frac{3}{8}$in diameter. **Lightly** solder the area around the holes to trap the folded strands. This gives short-free access to the ends of the pick-up lines.

Solder D1 and R1 to L1, and D2 and R2 to L2, as shown in Figs 1 and 2. **Caution**: use long nosed pliers or other heat-sink on the lead of the diodes when soldering or damage may result! The diodes should be as close as possible to the pick-up lines. The layout of the components from L1 and L2 should be as uniform as possible. Fit C1 and C2 as close as possible to the diodes.

Install M1, RV1, S1 on the top of the box: the layout may be altered to suit the user. Take care that when the box is closed the components on the top do not foul the bridge unit. Wire the components on the box top to the bridge unit as per the circuit diagram. Carefully check all wiring for faults, then close the box and secure the lid. Check the bridge element for any short between the inner and the braid. If all is in order the bridge can be connected to a transmitter and tested.

Testing

The pick-up lines must be correctly terminated. This is done by adjusting the terminating resistors for minimum reflected power pick-up as indicated on the meter.

Open the box to allow access to the bridge element. Connect the transmitter and a dummy load, known to be 50Ω **at the operating frequency,** to the SO239s. Power the transmitter and select the position of S1 which gives the **lowest** reading on the meter: this should be the reflected power. Adjust R1 or R2 (depending on which line is selected by S1) for minimum meter reading. If required, increase the reading on the meter by adjusting RV1 to ensure that the minimum point is observed correctly. The pre-set resistor should be sealed with nail varnish **or** measured with an ohm meter and replaced with an equivalent fixed resistor. The fixed resistor should be of the moulded carbon type.

Stop the transmitter, remove the cables connecting to the bridge sockets and connect them to the opposite socket, ie if the transmitter was connected to the left-hand socket, it should now be connected to the right-hand one. Select the other position of S1. This reverses the direction of pick-up from the bridge, allowing the second line to sense reflected power. Adjust the second line exactly as the first. Seal or substitute the resistor, then close and secure the box sections.

Set RV1 for full scale on the meter, using the position of S1 which gives the **highest** reading on the meter with the connections to the bridge as they will be in the normal situation. It may be that it will be found more convenient to connect the transmitter to the left-hand socket when in normal use, in which case this is the way it should be connected for this step.

Having set RV1 to give fsd on the meter, reverse S1 and observe the meter. With a good dummy load, there should be very little showing on the meter, indicating a good swr.

This position of S1 should be marked REFLECTED or REVERSE. The other position of S1 (the one which gave fsd), should be marked FORWARD. A scale may be marked adjacent to the knob of RV1 giving a useful reference to the transmitter output, into the same load conditions, over a period. Any change in transmitter output would require an adjustment to RV1 to obtain fsd. The scale does not need to be calibrated, merely marked at the point where fsd was obtained when using, for example, one specific antenna.

Results

Tests carried out by GM3KMG and GM4AUP showed a very low insertion loss at 144 and 432MHz. The accuracy of the bridge was not checked at 432MHz, since it was intended for use at 144MHz, but it was accurate at 144MHz.

A simple noise generator

What is a noise generator? It is a simple yet effective method of obtaining a signal of constant amplitude over a wide range of frequencies. The unit described covers from 90MHz to beyond 500MHz. This signal is **not** on a spot frequency like a signal generator or a transmitted signal but on **all** frequencies between these points simultaneously.

What use is this? If the generator is connected to the antenna socket of a receiver via a piece of 50Ω coaxial cable, and the receiver tuned to, say, 145·5MHz, the S-meter reading can be noted and compared with the reading obtained at, say, 144·5MHz. Since the generator output is constant between 90 and 500MHz, any variation in S-meter reading will be caused by the receiver. This gives a useful check of receiver performance over the band and, if the readings are

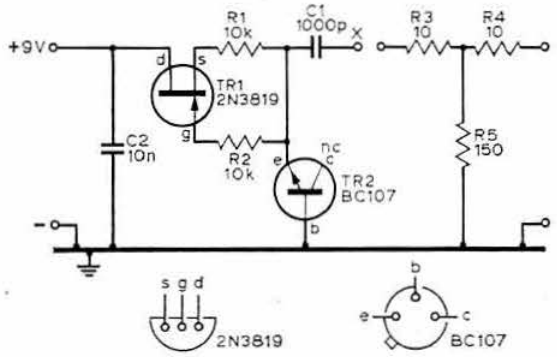


Fig 3. Noise generator circuit diagram

recorded, the same test done over a period of time will show any deterioration in receiver performance. The same test could be done to compare 144 and 432MHz converters on an hf rig.

The noise generator can also be used as described to tune up a receiver, since the receiver will accept it as a normal signal on the frequency to which the receiver is tuned. The S-meter can simply be peaked for maximum. The unit gives an output of approximately 2μV up to and beyond 500MHz.

The circuit uses the base emitter junction of a silicon transistor, reverse biased, as a noise source. The noise is amplified by a fet (TR1) and fed via C1 to point X. Point X can be used as the output or, if a lower output is required, it can be fed through a 3dB attenuator formed by R3, 4, 5. The prototype gave about 2μV at point X. This was reduced to 1μV by an attenuator.

The circuit can be built on Veroboard and should be housed in a diecast box. A small switch in the battery line and a Belling Lee or other rf connector can be fitted in the lid. The Veroboard can be supported from these inside the box, giving easy access to the components when the lid is removed.

A noise limiter

A noise limiter is something which some people swear by and some people swear at! It is not a magical device which removes all the QRM from a received signal (the author wishes it was!). Where it can help is with pulse noise, eg electric motor or ignition interference.

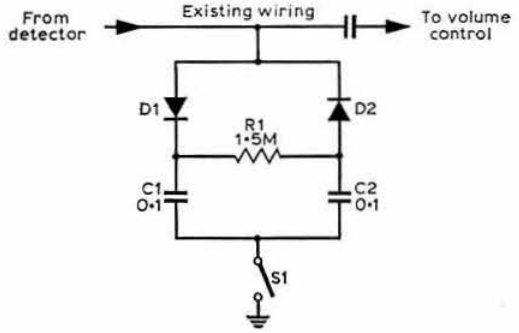


Fig 4. Noise limiter circuit diagram

In the author's case the QRM comes from a central heating pump in the house next door. Depending on the pump load the level of QRM can blot out even local signals. With the noise limiter switched in, the signals are at least readable, although by no means noise free.

This circuit has one advantage in that when the spst S1 is open, the module is completely out of circuit and therefore cannot produce "funny effects", a problem with some circuits which are merely bypassed when not required.

The circuit can be built on Veroboard and connected to the receiver on the detector side of the capacitor feeding the volume control. Switch S1 should be mounted where convenient. D1 and D2 are BA100/BA114 or 1N916 types.

An audio filter

This filter is very useful for inclusion in the cheaper type of hf receiver, especially a general coverage rig. It can be adjusted to cope with ssb or cw. It also has the advantage of providing some amplification, sufficient to drive hi-z phones direct, which compensates for any insertion loss.

The circuit is based on a 741 dil op-amp with a "bridge-T" filter built into the feedback line. Do not be put off by the dual supply configuration, the −9V line consumes only 2mA and does not even require to be switched off. It can be nothing more than a PP3 battery. This has lasted, in the prototype, more than a year without being switched off.

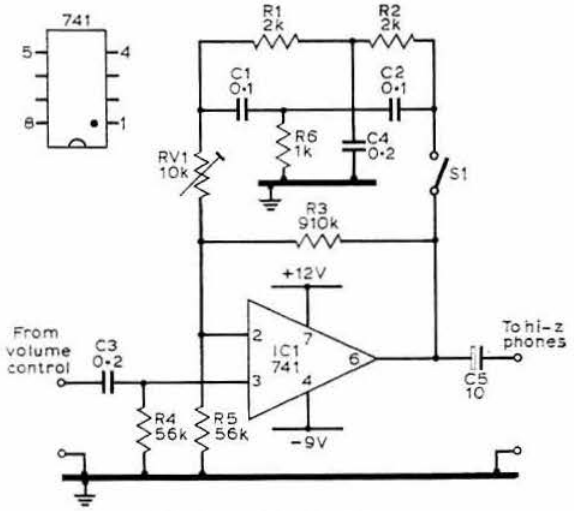


Fig 5. Audio filter circuit diagram

S1 (min spst) switches the filter network on and off and RV1 adjusts the bandwidth. Layout is non-critical and can be built on Veroboard or similar. The + 12V and −9V supplies are, of course, with respect to the circuit ground rail.

It should be noted that an ic holder (8-pin dil) is used. This makes it very easy to install and remove the ic with no risk of damage due to heat from soldering. All unused pins on the ic are left open circuit.

Capacitors C1, 2 and 4 are polyester, C3 disc ceramic, and C5 electrolytic. □

Some experiments with high-frequency ladder crystal filters

by J. A. HARDCASTLE, G3JIR*

Part 4. SSB transmitter filters

Feedback

Since the publication of the first three articles on ladder crystal filters [1-3] correspondence [4] and published suggestions [5] have pinpointed a need for a cheap ssb transmitter filter using crystals which are not necessarily identical in frequency. These notes describe briefly two filters which use crystals removed from an ITT 445LQU901A filter.

445LQU901A 50kHz channel filters

These filters contain eight crystals whose reference numbers indicate that there are four pairs of nominally identical crystals. As shown in Table 1 they fall into two groups of four frequencies which are sufficiently similar to allow them to be used in a four-crystal ssb filter.

SSB filters

Figs 16 and 17 [3] showed how a high performance could be obtained from a few crystals if all the selectivity were concentrated on one sideband. They were adjusted to provide uniformly high selectivity over a wide stopband and it has been pointed out by John Haine, ex-G8CEG, [4] that the rate of cut-off can be further increased by tuning all the crystals to the same peak loss frequency. Fig 22 shows the circuits which were used. They are slightly different from Figs 16 and 17 because of the need to trim each crystal to the peak frequency. C1 to C4 are 40pF compression trimmers although the actual capacitance setting is noted by each trimmer because it reflects the amount by which each crystal's frequency was shifted and may be helpful to constructors.

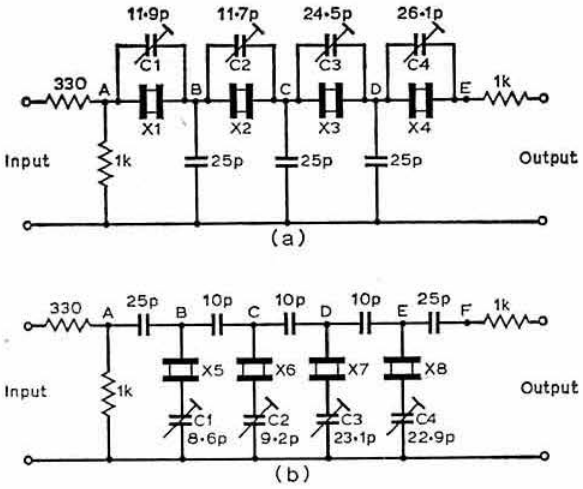


Fig 22. SSB filters. (a) Lower sideband. (b) Upper sideband

Tuning

The filters are tested using the test set of Fig 12[2]. During tuning each crystal must be isolated from its neighbours, and upper and lower sideband filters each need a slightly different procedure to be followed.

In Fig 22(a) the first crystal is isolated by linking points B and E. The parallel resonant frequency (ie frequency of minimum output) of XI is then moved closer to the passband by increasing the capacitance of C1. To tune the second section, point A is linked to B, point C to E, and C2 is trimmed to tune X2 to the same frequency as X1. The same procedure is applied to the remaining sections to complete the tuning.

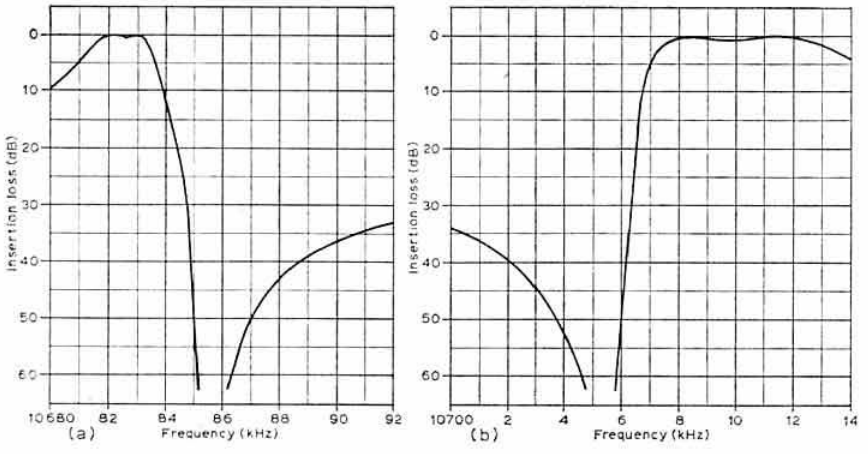


Fig 23. SSB filter frequency response. (a) Lower sideband (b) Upper sideband

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Table 1

Crystal case reference	Fig 22 reference	Series resonant frequency (kHz)	Parallel resonant frequency (kHz)
0074	X1	10,680·7	10,699·9
0074	X2	10,680·9	10,699·6
0075	X3	10,683·3	10,702·5
0075	X4	10,683·3	10,702·1
0076	X5	10,700·6	10,720·0
0076	X6	10,700·3	10,719·9
0077	X7	10,702·8	10,722·8
0077	X8	10,703·0	10,722·7

In the upper sideband filter, Fig 22(b), the peak rejection frequency is determined by the series resonance of the crystals. To tune the first section, A is linked to B, and B to F. In this case *reducing* the capacitance of C1 will move the series resonance of X5 nearer to the passband so it is useful to set all the trimmers to maximum capacitance initially. For the second section, A is linked to C, and C to F, and similarly for the remaining sections.

Performance

Fig 23 shows the frequency response of each filter. The choice of the best maximum rejection frequency will probably require several attempts at tuning. The closer the notch is positioned to the passband the steeper the rate of cut-off; however, a point is reached when the passband becomes restricted and this is illustrated in Fig 23(a). This filter would give a better overall response if the rejection notch were moved slightly higher in frequency.

A transmitter incorporating these filters requires a lowpass filter to limit the audio bandwidth before it is applied to the modulator. Without this additional filter the bandwidth of the transmitted signal will be unnecessarily high.

Conclusion

These additional designs have been reported to show that the cost of filters need no longer be a barrier to home construction of ssb transmitters, even if new crystals have to be purchased at commercial prices.

References

[1] "Some experiments with high frequency ladder crystal filters", J. A. Hardcastle, G3JIR.
Part 1, *Radio Communication* December 1976.
[2] Part 2, January 1977.
[3] Part 3, February 1977.
[4] Private communication, 17 January 1977.
[5] "Technical Topics", *Radio Communication* June 1977. □

Calculation of distances from QTH Locator codes or latitude and longitude using scientific calculators

by J. H. BOWEN, CEng, MIERE, G8DET;* R. C. HARVEY, TEng (CEI), MITE, G4BBR; and A. J. HARRIES

A NUMBER of methods have been described for calculating the distance between two stations whose positions are defined by QTH Locator codes. Some methods make use of computers while others use programmable calculators, both being very efficient, especially when a large number of calculations are required as in tallying up the score for a contest. The authors feel, however, that there is also a need for a method of calculating these distances using relatively cheap scientific calculators, in fact one machine currently available at under £10 does the job admirably.

The described process is in two main parts, the first being the conversion of the QTH Locator code into degrees longitude east and degrees latitude north. Locations to the west of Greenwich are expressed as negative degrees east. The conversion is easily accomplished with the help of Table 1 which assumes the QTH is in the centre of the QTH Locator code tertiary "square".

1. G4BBR QTH, QTH Locator code YL10e.
   Longitude 1 (−4) + (1·90) = −2·10°E
   Latitude 1 (51) + (0·90) = 51·90°N
2. G8DET QTH, QTH Locator code AL23b
   Longitude 2 (0) + (0·57) = 0·57°E
   Latitude 2 (51) + (0·73) = 51·73°N

Due to the fact that the QTH Locator code system does not define a unique location, stations have been worked on 144MHz with the same QTH Locator codes separated by 26° of latitude, ie 2,889km. Reference to a map will show if the correct latitude (or longitude) has been chosen. A maximum error of ±7km is possible between two European stations due to the relatively large area covered by the QTH Locator code tertiary "square". The error may be halved if the actual latitude and longitude, expressed in decimal degrees, is used for the home QTH. For dx record purposes the latitude and longitude for both stations should really be used together with a multiplier of 111·12.

The second stage involves the calculation of the distance between the defined QTHs, and the standard formula for this is given at the foot of this page.†

A number of calculators have been tried on the above formula and all those listed below will work out the distance without having to resort to pen and paper during the calculation:

Hewlett Packard Scientific range;

*62 St Clere's Way, Danbury, Chelmsford, Essex.

† Distance = $\cos^{-1}$ [Sin(Lat 1) × Sin (Lat 2) + Cos (Lat 1) × Cos (Lat 2) × Cos (Long 1−Long 2)] × 111km
where Long 1 and Lat 1 is the location of the home QTH and Long 2 and Lat 2 is the location of the distant QTH.

TABLE 1

Latitude and longitude shown for Europe, extend as required

QTH Locator code conversion to longitude degrees east

Table 1 (a)

1st letter	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
	–12	–10	–8	–6	–4	–2	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50

Number										
	01	02	03	04	05	06	07	08	09	10
	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30
	31	32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50
	51	52	53	54	55	56	57	58	59	60
	61	62	63	64	65	66	67	68	69	70
	71	72	73	74	75	76	77	78	79	80

Table 1 (b)

Last letter											
f, g, h	·03	·23	·43	·63	·83	1·03	1·23	1·43	1·63	1·83	f, g, h
a, e, j	·10	·30	·50	·70	·90	1·10	1·30	1·50	1·70	1·90	a, e, j
b, c, d	·17	·37	·57	·77	·97	1·17	1·37	1·57	1·77	1·97	b, c, d

Longitude degrees east = Table 1(a) + Table 1(b)

QTH Locator code conversion to latitude degrees north

Table 1(c)

2nd letter	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67

Number								
	01 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80

Table 1(d)

Last letter									
d, e, f	·90	·77	·65	·52	·40	·27	·15	·02	d, e, f
c, g, j	·94	·81	·69	·56	·44	·31	·19	·06	c, g, j
a, b, h	·98	·85	·73	·60	·48	·35	·23	·10	a, b, h

Latitude degrees north = Table 1(c) + Table 1(d)

TABLE 2

Using 'RPN' calculator	Using 'ALGEBRAIC' calculator (Using a store)	Using 'ALGEBRAIC' calculator (Using brackets)
LONG 1 [ENTER↑]	LONG1 [–]	LONG1 [–]
LONG2 [–]	LONG 2 [=]	LONG2 [=]
[COS]	[COS] [X]	[COS] [X]
LAT1 [COS] [X]	LAT1 [COS] [X]	LAT1 [COS] [X]
LAT2 [COS] [X]	LAT2 [COS] [=]	LAT2 [COS] [=]
LAT1 [SIN]	[STO] [C]	[+] [(]
LAT2 [SIN] [X]	LAT1 [SIN] [X]	LAT1 [SIN] [X]
[+]	LAT2 [SIN]	LAT2 [SIN]
[ARC] [COS]	[=] [+] [RCL] [=]	[)] [=]
111 [X]	[ARC] [COS] [X]	[COS⁻¹] [X]
	111 [=]	111 [=]

Display = answer in kilometres

If additional stores are available these may be used for latitude, longitude and constant as required.

Texas Instruments SR50A and SR51A;
Rockwell 44RD and 51R;
Commodore CBM SR7919, 1800, 4148, 4190 and 5190;
Prinztronic Scientific 5001.
Time precluded further models being evaluated; if in doubt try the calculation using the authors' example. The calculated distance is 184km.

Table 2 shows the key stroke operations for some of these types of calculator including Reverse Polish Notation (RPN) and the algebraic (sometimes called logical) range. Some variations may be required but these should be minor ones. The calculator should be used in the Degree Mode. No key should be pressed until the calculator has completed an operation and produced a display. Westerly longitudes should be entered as:

LONG [+/–] or LONG [CHS]

Cos⁻¹ may be obtained by pressing keys marked
a [COS⁻¹], b [ARCOS] or c [ARC] and then [COS].

A second function [F] may need to be pressed prior to using a Trig function eg [F] [SIN]

□

technical topics

Pat Hawker, G3VA

ONE often finds that many people, including quite a few amateurs, are positively curious, if not actually disbelieving, when some of us claim to *prefer* cw to phone operating. The appeal of cw is something that very few writers have ever really explained. Personally I suspect that some fairly complex psychological factors are involved, as in so many other apparently straightforward questions of personal choice. But one exception was the classic "Morse, keys, keying and codes" by John Piggott, G2PT (*RSGB Bulletin*, May 1956) written before quite a few of the present generation of cw addicts were even born. He noted: "The aesthetic pleasure undoubtedly enjoyed by many cw men is seldom discussed ... the attractions of skilful morse operating are very real. This is *not* to advocate 'down with telephony' but rather to proclaim 'long live cw!' ".

Geoffrey Vore, W9QBJ, in *QST* in 1974 wrote: "The greatest reason for cw remains its complete satisfaction as an operating medium; solid contacts with moderate to low power, simplified equipment (and expense) and a minimum of ulcer-producing tensions make cw operation sheer pleasure." Again that emphasis on the *pleasure* of cw operating.

With the Oracle and Ceefax teletext systems now providing telegraphic transmissions to the home at an *average* of 50,000wpm and actually sent in bursts at rates of several million wpm, it might seem that manual cw at around 20wpm must surely be due for retirement soon. But I have yet to hear the most enthusiastic teletext addict claim to find reading words on a tv screen a particularly pleasurable operation in itself!

Thoughts on morse keys

The pleasure in cw is clearly dependent upon satisfactory man/machine interfaces, ie the morse key and the actual sounds coming from the headphones. Each form of morse key seems to attract its own advocates: the straight "pump-handle"; the "sideswiper"; the "bug" (auto-dots); the "elbug" (auto dots and dashes); the "squeeze" mode; and "touch" keying.

It is not always appreciated that there can be wide differences in the "feel" between different designs of the same form of key; recently for instance I was fascinated to find how an old brass straight key could be improved beyond recognition by simply lengthening the arm by about 1in.

There also seems to have been a marked revival of interest in the sideswiper form of purely manual key since John Myers, W9LA, wrote in *QST* a couple of years ago of its individuality and the ease with which a short length of hack-saw blade could be made into a key that "gives real character to one's fist". The sideswiper is a sideways moving key with a contact to each side (as in the bug) but with no automatic formation of either dots or dashes. One simply makes each alternate symbol on the opposite side of the key to the previous symbol. We were interested to see recently in *Spalding Radio News* (No 19, Spring/Summer 1977) details of a sideswiper key built by Dennis Hoult, G4OO, in 1938 and which, despite intervening use of various other types of keys and keyers, he claims "is the easiest and most comfortable of the lot ... with a little practice one can become quite proficient and easily vary speed of sending without turning a knob or altering the position of weights! With materials available today—plastic forms, epoxy-resin adhesives etc they should be even easier to build than in 1938". Fig 1 shows how a short length of blade is clamped at one end to the base and at the other to the paddle.

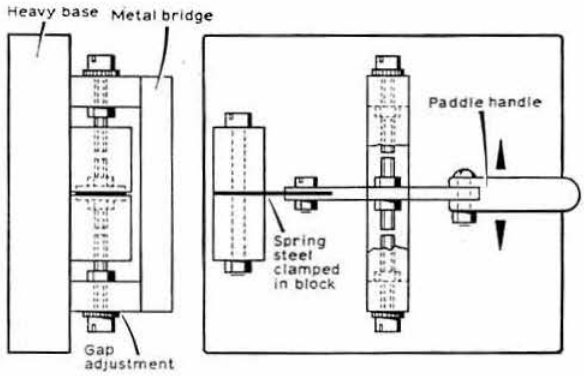


Fig 1. "Sideswiper" morse key built by G4OO in 1938 but still giving good service. With modern plastics and epoxy resins he believes that a neater key could be built today at very low cost

APEK—ambidextrous paddle

A novel idea for a home-made paddle for portable or mobile operation of electronic keyers is described by Vidi la Grange, ZS6AL, in *Radio ZS* (May 1977). The idea is to convert a standard three-contact jack plug into a keying paddle which plugs into the keyer in those situations where a separate heavy fixed-station dual-lever paddle is inconvenient. The paddle can be turned round in the socket to change the respective positions of the dot and dash contacts; the paddle is also suitable for use in the squeeze mode: APEK in fact stands for "*a*mbidextrous *p*addle for *e*lectronic *k*eyers".

ZS6AL describes construction as follows:

"Obtain a standard three-connector jack plug and remove shell; cut off ground connection close to jack body. Drill and countersink two opposing holes in plug shell about 8mm from unthreaded end. The holes should take two 2·3mm by 4mm countersunk machine screws. Take two small solder lugs and connect about 60mm of thin flexible hook-up wire to each. Fit one lug to each screw on inside of shell and secure with a nut. Find suitable flat washer which fits over threaded part of jack body and having outside diameter slightly bigger than shell. Prepare two strips of spring brass about 0·5mm thick, 5mm wide and 40mm long. De-burr edges and bend as shown in Fig 2. Solder strips to rim of flat washer in opposing positions (simplify this by temporarily assembling plug). Mark off on underside of each strip the positions of screw heads fitted to shell. Disassemble plug, clean and tin positions marked on strips. Form small blob of solder at these points and file them lightly to give flat contact surface.

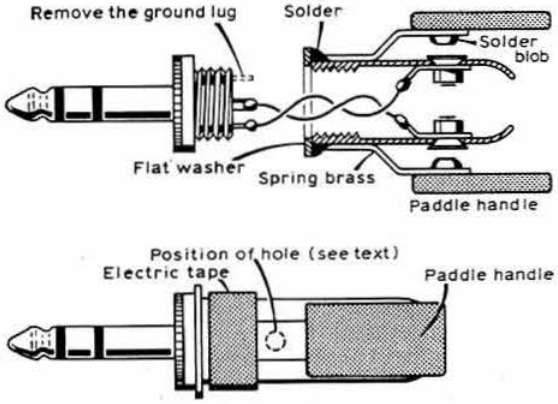


Fig 2. Details of ZS6AL's ambidextrous paddle for electronic keyers built using a standard three-connector jack plug for use when the fixed station dual-lever paddle is inconvenient

"Solder the two hook-up wires to inner and outer lugs of jack. Leave wires long enough to survive twisting when putting jack together. Shape two pieces of old printed-circuit-board to taste or as shown to form paddle handles. Fix them to brass strips with small amount of epoxy. Finally one or two wraps of electric tape cut to correct width should be wound on to jack shell to provide necessary damping of otherwise too-springy brass strips.

"Contact spacing and spring tension can be adjusted by means of long-nosed pliers. If spring tension is too high, a small hole drilled through spring at position indicated should do the trick. Then find out by experiment which side activates dots or dashes and mark it for convenience."

Automatic keyer

Although digital electronic memories are increasingly being used as the basis of automatic keyers, it should not be forgotten that the ordinary tape recorder can still provide auto-keying by using pre-recorded tapes in conjunction with a dc relay energized by rectifying the audio output of the recorder, although the simplest systems are not really suitable for use with small cassette recorders.

A novel and rather more elaborate system (Fig 3) has been described in *Radio-REF* (No 7, July 1977) by M. Oudart, ON8FM/F0PF. This operates with an af input of only about 0·1V, incorporating a BC109 amplifier after which the signal is rectified in a voltage-doubler arrangement and the dc level used with a Schmidt-trigger (two 2N3415)

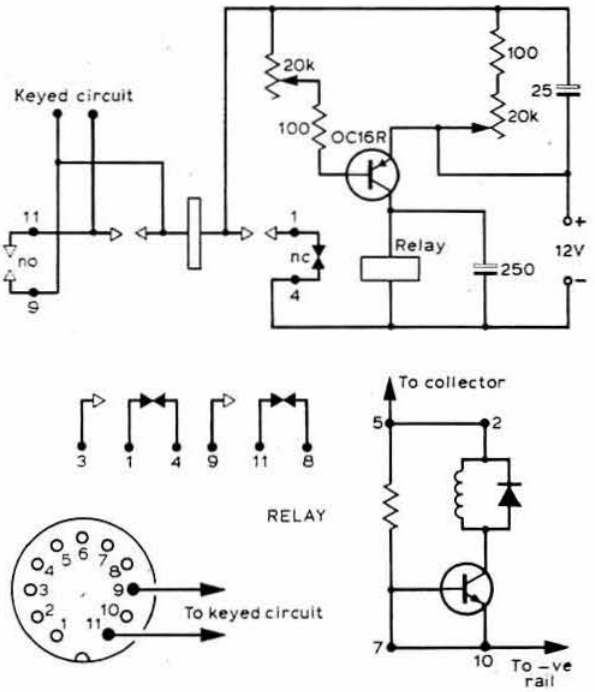


Fig 4. G3PD's version of ZL3FX's electronic dot, manual dash keyer to overcome need for a particularly sensitive relay

which "regenerates" or reshapes the waveform to "all or nothing" levels, fed via a zener diode to a relay-driver stage. The relay contact is in parallel with the normal key or keyer.

ON8FM uses this sytem in conjunction with a small Philips cassette recorder and with break-in so that he can hear any station breaking into the automatic CQ call and revert to manual operation. Since the operator records his own "fist" using, for example, a cw monitor, the problem does not arise that has been noticed on the bands with some of the digital systems: automatic CQ calls with good timing and at high-speed, followed by a stumbling contact where the deficiencies of the actual operator are all too evident!

Eldot keyer

In the March *TT*, we included ZL3FX's design for an electronic dot, manual dash keyer which used a sensitive

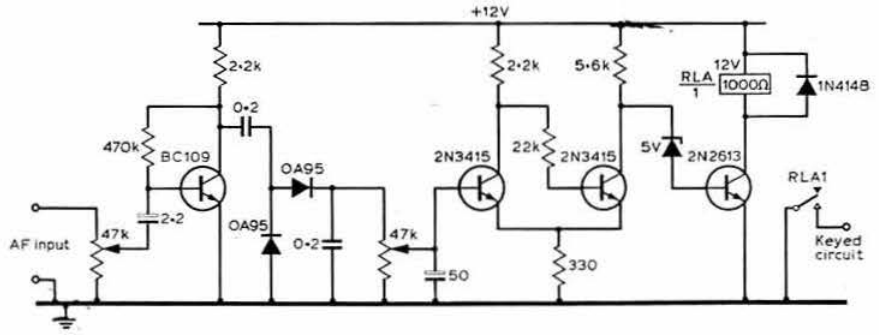


Fig 3. The automatic keyer used by ON8FM in conjunction with a small cassette tape recorder

relay actuated by the collector current of a small audio transistor. He used a home-made relay with some 2,000 turns of 40 gauge wire and the core of an audio output transformer. F. Lees, G3PD, attempted to build one of these keyers but found he could not locate a suitable relay, and tried making one without success. As a result he settled for the circuit arrangement shown in Fig 4 which he finds quite satisfactory, although a little noisy in operation; it also requires a 12V supply and the relay (RS Components transistor relay type 34-925-4 and 11-pin base type 401-712) is a little pricey. Consumption key-on 100mA, key-off 1mA. The OC16R is not critical and almost any suitable power type could be substituted.

It would seem that if a sensitive high-speed relay is available, the original arrangement has advantages, but the G3PD key widens the scope for more readily available relays.

Compact speech-processor for fm

A short item by C. J. Blankendaal, PA0CJB, in *Electron* (July 1977, p360) describes a compact speech processor (Fig 5) which can be used with a dynamic or ceramic microphone in front of most nbfm transmitters to provide suitable shaping and processing of the audio. It is based on an arrangement described in the *Motorola Engineering Bulletin* EB57. The af output of 5 to 15V could be used directly to phase or frequency modulate a transmitter but the output can be reduced by means of R19. Pre-emphasis of 6dB/octave is applied between 300 and 3,000Hz but the active filter then rolls off the audio at −18dB/octave.

Improved active mixer

In several recent items, we have referred to the controversy regarding the optimum approach to mixers of really wide dynamic range. The advantages of the "double-balanced" approach are now generally conceded, but should Schottky (hot-carrier) diodes or power FETs be used? The fet approach has been ably argued by Rafuse, Oxner and Racal (for the 1772 receiver) but there are clearly problems in reproducing their results, as G3RZP brought out in the July *TT*.

In his *Ham Radio* article of October 1976, Ulrich Rohde, DJ2LR, suggested that fet double-balanced mixers offer advantages in test instruments but "their application in shortwave receivers remains debatable", pointing out "these circuits are very sensitive to load termination and the input impedance of most crystal filters changes significantly over frequencies outside the passband". DJ2LR then added: "Because of the difficulty in providing wideband impedance matching in FETs at high impedances, in my opinion medium- to high-level double-balanced (diode) mixers offer an advantage over fet mixers."

A recent note from Professor Rohde draws attention to a new mixer he has developed using neither diodes nor FETs but 2N5109 catv-type bipolar transistors in an active system of extremely high performance (incidentally in the July *TT* the text reference to these devices wrongly gave 2N5019, the diagram correctly gave 2N5109). He writes:

"Since modern catv transistors with very low noise figures have a much better gain-bandwidth product, new types of rf feedback can be applied and linear operation can be achieved for second, third and higher imd products that were not available with either valves or silicon FETs. Even the development of the VMP4 power FETs did not solve the problem because of high input and feedback capacitances.

"Fig 6 shows a new double-balanced mixer using four 2N5109 catv-type bipolar transistors in a feed-back arrangement that was outlined in my *Ham Radio* article. The rf feedback, together with the impedance stabilization stemming from a unique application of the transformer, avoids the drawbacks of fet mixers while giving a higher intercept point at the same drive level and a low noise figure and stable gain.

"The emitter resistors reduce the amount of flicker noise in the system and a 40dBm intercept point is achievable with 13dBm local oscillator drive and there will be very little degradation with +10dBm drive."

DJ2LR enclosed an interesting set of comparative spectra of a double-balanced mixer with four hot-carrier diodes, 7dBm oscillator drive with two carriers of 0dBm applied; a double-balanced mixer using a U350 in accordance with the Siliconix application note; and that achieved with the mixer of Fig 6. Third-order imd products are suppressed by some 65dB, compared with 35dB with the U350 mixer. He points out that "for the same amount of local oscillator drive this means a 30dB improvement with roughly the same component costs and about the same noise figure".

This is thus clearly an active mixer of extremely high performance, although I feel that amateurs must be careful to appreciate that this does not mean that conventional mixers are now obsolete. Everyone would agree that it is a "good thing" to have a receiver that will take all the rf that a large antenna can provide from the mass of 250kW broadcast stations, particularly on the 7MHz band. But equally

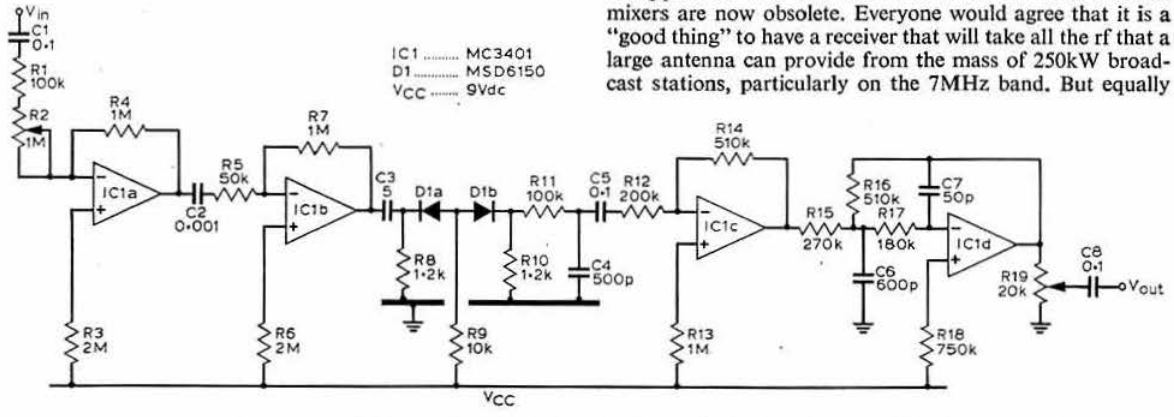


Fig 5. Compact speech-processor for fm based on a design in Motorola Engineering Bulletin EB57 as used by PA0CJB

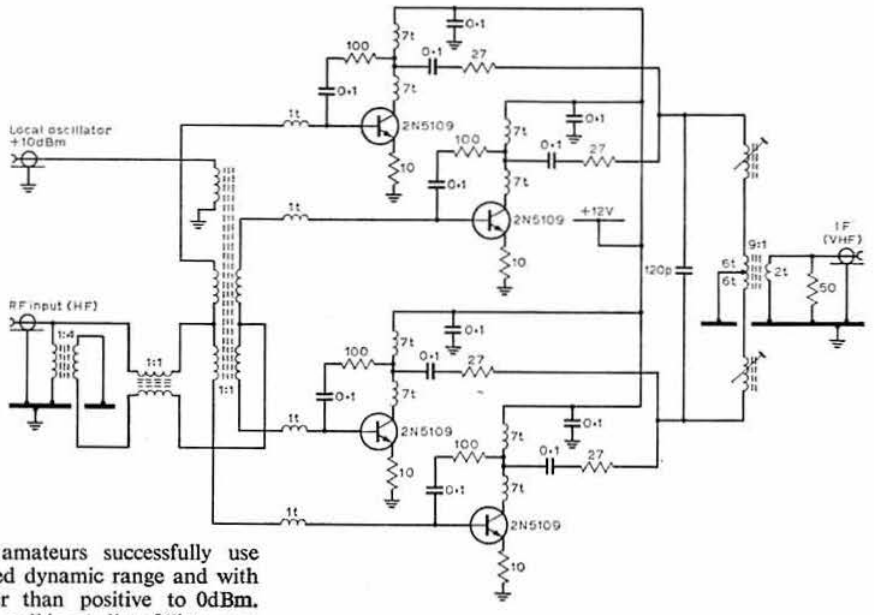


Fig 6. The improved active double-balanced mixer of extremely wide dynamic range as developed by DJ2LR using catv-type bipolar transistors

one must accept that many amateurs successfully use receivers which have only limited dynamic range and with intercept points negative rather than positive to 0dBm. The early FT101 did not show up well in any list of "intercept points"; nor by current standards did the Collins KWM2 or their "S-line" receivers. But many amateurs were (and are) reasonably happy with the results achieved with these equipments. Proneness to imd has not prevented the FT101 from becoming possibly the most widely used of all hf transceivers! It is not every hf receiver that has to cope with the sort of situation on board naval vessels where receivers are using whip antennas just a few feet away from transmitting antennas being used at the same time.

So although dynamic range is a very important and very useful way of sorting out receivers, we need not become obsessed about this aspect of performance. If by good front-end selectivity one can reduce the number of very strong signals reaching the mixer one may (except on 7MHz) find things not too bad, particularly if one can cunningly persuade all the other local amateurs that it is much more fun on vhf!

Predictable "gimmick" capacitors

Jack Hardcastle, G3JIR, in the course of his experiments with crystal filters found that he needed some low-value capacitors which could not be satisfied by standard values. He was anxious not to use pre-set trimmers because of the constant temptation to alter their settings. He felt that the standard form of amateur "gimmick" capacitor, consisting of two pieces of insulated wire twisted together, was neither sufficiently predictable nor sufficiently stable for this application.

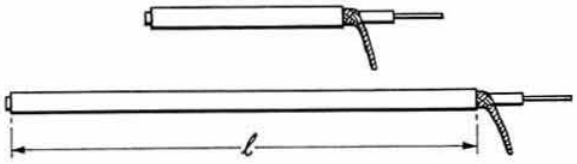


Fig 7. Short lengths of miniature coaxial cable used to form low-value capacitors of predictable value as used in crystal filter experiments by G3JIR

In seeking some alternative form of capacitor, it occurred to G3JIR to look up the characteristics of coaxial cable. The miniature Uniradio 95 (available from RS Components as catalogue number 388-158) has a very convenient capacitance of 100pF/m which represents 1pF/cm. This enables stable capacitors of values up to about 10pF to be made in quite a small space. At some £4.77 for a 50m reel the cost is not insignificant and represents about 0·1p/pF, but it does allow the production of fairly predictable odd-value capacitors. For example, 2·7cm of cable was measured as 3pF, and an 8cm length as 8·9pF; measuring the length over the part of the cable covered by the braiding: see Fig 7.

He points out that if one side of the capacitor is to be earthed such capacitors have the further advantage of providing their own electrostatic screen.

Battery burping

It might be thought that after so many years of battery charging there would be little new to uncover about the process, though actually this seems to be far from true. For example, quite a few years ago Joe Cropper, G3BY, drew attention in *TT* to "dirty dc" charging in which an ac component is retained to cause an "electrolytic shake up" and noted that this technique was particularly useful in keeping torch and cycle batteries going through several charging cycles even though these are usually thought of as expendable primary cells. This idea has been included in several editions of *Amateur Radio Techniques* although one seldom hears of it being used.

But an echo of this idea is now attracting considerable attention across the Atlantic in the charging of both lead-acid and the larger categories of nicad cells. One reason for this interest in battery charging, as I found on a couple of trips to the USA, is that the television companies over there have very rapidly swung over to using lightweight electronic

cameras and U-matic video recorders instead of film cameras for "electronic news gathering" (eng). This rush to electronic journalism soon brought the tv teams into contact with all those problems of /P operation so well known to amateurs. One heard complaints of multi-connector plugs and sockets that were too easily damaged; the difficulties of establishing instant microwave contact with base because of unfamiliar sites and/or interference from competing teams; the need for much maintenance of electro-mechanical equipment; power consumption that showed up the limitations of batteries (often carried in battery belts developed for earlier film operations); leakage of silver cadmium batteries and short life of nickel-cadmium unless charging conditions were carefully observed. . . .

Most of these problems are being rapidly overcome (and it is salutary to see how quickly American development engineers can move when they need to). One of the recent innovations is the use of battery chargers that burp; that is to say, they apply short higher-voltage pulses during the charging process. It is claimed that this tends to shake gas molecules loose from the battery plates, so preventing the molecules from insulating portions of the plates and hence reducing the effective charging current by raising the internal resistance.

By using this burping technique it becomes possible to use larger charging currents and significantly shorten the time taken to recharge a battery. For instance, with some of the sealed cylindrical nicad batteries used in eng it is said to be possible to recharge these fully in 15 to 20min, compared with conventional charging times of up to 16h.

In an "Ideas for Design" note in *Electronic Design* 12, 7 June 1977, John Okolowicz describes a burp charging unit (Fig 8) for conventional 12V lead-acid car batteries. This delivers 20V burps at controllable intervals from once every 2s to once every 2½min, using a 555 timer ic. He states:

"This burp-control circuit can be added to just about any existing 12V charger. The 555 timer is connected in a free-running mode and has independent on and off times. The time between burps is controlled by R10. Capacitors C2 and C3 charge to 20V. When relay K1 activates, a negative charge is dumped into the battery.

"Burping continues after the battery is fully charged. But the time between burps should be adjusted to correspond to the chemical activity in the battery—a short time for high activity when the battery charge is low, and long when near full charge. The duration of the negative pulse is short, so it will not harm the battery. But be careful—with the battery mounted in an automobile, the alternator rectifiers can be damaged if the positive cable to the battery is not removed."

Radioactive meters

A note by ZL1VP in *Break-in* (January/February 1977) draws attention to the radiation (three times maximum dosage level permitted by New Zealand's National Radiation Laboratory) which he detected coming from the luminous dots on a meter taken from a wartime ZC1 transmitter (a type which has been widely used by New Zealand amateurs). Subsequently a number of other ZC1 meters were tested with roughly similar results and a radiation spectrometer analysis detected the element radium. Meters dabbed with luminous paint were at one time readily available on the British surplus market and some must still be in use, though we have no idea how these compare with the ZC1 meters.

ZL1VP points out that the greater risk exists when servicing these luminous meters. He writes:

"Inhaling tiny dust particles of the luminous meter face dots (which physically crumble off the painted brass meter plate) or ingesting similar small particles carried via skin contact to food could be injurious. Should it be necessary to service these meters do so in a stainless steel sink. When completed, scrub your hands and the sink with soapy water.

"As laboratory radiation levels defined are for maximum limits, exposures at lower levels will not free you from all risks; less, the safer, proportionately.

"Lastly, check that box of old meters and clocks. It could be time for a clean out." □

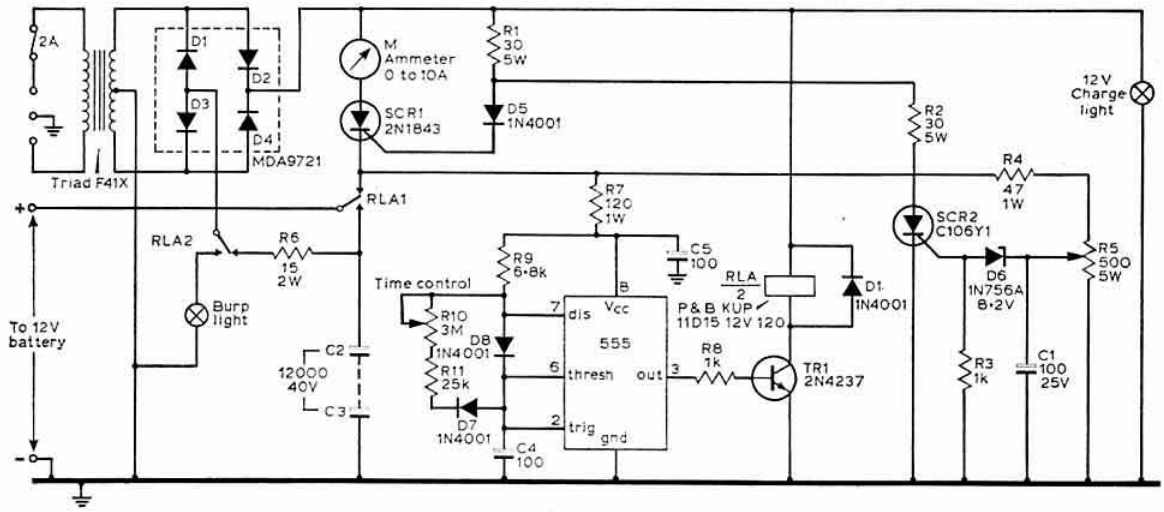


Fig 8. Burp-control circuit added to a 12V battery charger in order to apply 20V pulses to a charging battery at intervals adjustable from about 2s to 2½min, determined by the setting of the time control resistor R10 (*Electronic Design*)

microwaves

Dain Evans, G3RPE*

Microwave round tables

A second round table will be held at 2pm on 8 October in the Department of Electrical & Electronic Engineering, Mappin Street, Sheffield.

Another in the series of round tables will be held at the IBA Engineering Headquarters, Crawley Court near Winchester on 13 November.

1·3GHz news

One of the facts of life a columnist has to live with is that the day after writing of the lack of news, eg about activity on 1·3GHz, then literally the next day the letters begin to arrive. For example, G4BYV reports that on 22 June PA0VV (CM72d) in Delft worked GW8CFQ, and he wonders if this contact is in any way a "first". GM8BJF also worked the Delft station from St Abbs Head (YP) and was also heard S9 by SM6HYG, whose transmitter unfortunately was not working at that time. On 10 July G3OSS in London worked DK1ZD (EN) at S5/7, SK6AB and SM6FHZ, all with 15W rf and a single quad-loop Yagi. His receiver used a BFR91 preamplifier to a Microwave Modules converter. The distances covered are of course in the region of 1,000km.

In a later letter, G4BYV summarized other recent contacts. Both G3LTF and G3JXN worked SM6FHZ, and the latter also worked SK6AB. G8LEF (Huddersfield) recently had a contact with SM6ESG, and a newcomer to the band, G3WSN (Chelmsford), worked ON6AT/A (BL) despite the latter using only 500mW. G8GML (Cambs) has also worked the DK1ZD station.

G3LQR (Suffolk) has worked the following stations: SM6FHZ, DK1GJ (FO), DK1UC (FN), DC8BB (EL) and ON6AT/A. G4BYV (Norfolk) has worked DK1UC and DJ8XO both S9, DC8BB, DK1ZD and ON6AT/A. Apparently the beacon DB0IZ (EN) is off the air while it is being modified. G4BYV's current score on this band is 106 stations in 26 different locator squares.

G3SBV (Streatham Common) reports that he and his junior operator G8LXZ are now operational on 1,296MHz using the 5W ssb generated from the G3LTF/G3WDG mixer described in the January 1976 issue of *Radio Communication*. The antenna being used is again a single quad-loop Yagi. A 2C39 pa is being constructed. G3RQZ, who is a local, has also been encouraged to come on. G3SBV raises again the topic of an activity evening on the band. Directly on 1,296MHz?

GM4DIJ and GM8BJF are considering the possibility of establishing a 1,296MHz beacon in the Edinburgh area. This would be sited at the university's electrical engineering department and would have a clear take-off to the west, through north to the south-east.

2·3, 3·4 and 5·7GHz news

GM3FYB will be on the Isle of Man over the weekend 10/11 September with equipment for 2·3, 3·4 and 5·7GHz. He is most interested in trying to arrange schedules for these bands.

G4BEL (Cambs) reports that on 21 May he worked PA0VV (Delft) on 2·3GHz, when signals were S9 + 20dB. The Dutch station was using just 2W fm but G4BEL was using his full rig: 20W ssb into a dish 5ft in diameter fed by a log-periodic feed. His receiver is the W2CQH interdigital design (*QST* January 1974) with two "Birkett Specials" as rf preamplifiers. So far G4BEL has worked only two other stations on this band, G3LQR and G4BYV. This is hardly the fault of inadequate equipment on his part.

There are a number of new callsigns appearing at these intermediate frequencies. For example, GM3JFG and GM3PLL now have wide-band equipment for 3·4GHz, and G8ARH can now generate 2W at 5·7GHz. Apparently G3BNL had a contact on the latter band from his new home in Harrow with G8ADC on Dunstable Downs, a by-no-means easy path. Perhaps now would be an especially appropriate time to try and produce an accurate record of those who are active at these intermediate frequencies.

The GB3ALD 10GHz beacon

On 14 July the new 10GHz beacon GB3ALD came into service. This is sited on the nearest of the Channel Islands, Alderney, which is approximately 90km south of Portland Bill. The beacon uses a Gunn oscillator which feeds a sectorial horn antenna of 15dB gain. The main beam covers the south coast from at least Start Point to Beachy Head, although it surely will be heard in other directions, eg in France, which at its nearest point is only about 15km away according to my map.

The beacon has already been heard by G3VPF at Ringstead Bay. G4CNV has also heard it from his kitchen at Preston near Weymouth. The signals display the deep fading characteristic of this type of over-water path. On the evening of 31 July some of the fades were associated with the passing of ships, which surely indicated that super-refraction was one of the propagation modes operating at that time. The same morning it was heard by both G3JVL and G8DIC from the latter's home on Hayling Island. Even from the bedroom window the antenna height was less than 10m asl! Later that evening G3JHM heard the beacon from a site 10km north of Chichester, over what must be a path length of 170km—and this must be some sort of record.

Clearly this and the other 10GHz beacons are proving invaluable in indicating one thing that badly needs to be demonstrated—that openings at this frequency may be far more common than we tend to believe. In this, the detailed observations supplied by G8BCO and G8ARO for the London beacon GB3LBH on the morning of 1 July are a most valuable record of one particular event, and something I would like to see more of in the future, if possible.

Commercial Gunn oscillators

The standards amateurs demand in terms of reliability of tuning and frequency stability from their Gunn oscillators is really very high indeed. After all, an i.f. bandwidth of 100kHz at 10GHz represents just one part in 100,000 which is pretty good going for a free-running oscillator. Understandably, much effort has been put into the design of such oscillators by amateurs, with much success in some cases.

Apart from the Gunnplexer units which were designed

(continued on page 698)

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

4-2-70

Graham Knight, GM8FFX*

Convention—British style

The Winning Post Hotel at Twickenham is the familiar setting for the 1978 VHF Convention which will be held there on Saturday 25 February. Plans are already being made to involve the audience in the talks and seminars which will be held in the school adjacent to the hotel during the day. The emphasis in the evening will be on informality—no speeches or dinner jackets—but bring a partner as VHF Committee member G3DAH has already suggested the first RSGB disco.

Convention—American style

It is interesting to know that British vhf equipment is selling well in America and that two British companies had stands at the recent Dayton, Ohio, convention. Ian Barton, G3TYE, of Polar Electronic Developments and Richard Porter, G3VXK, of Microwave Modules were amazed at the attendance which exceeded 25,000 visitors. Both companies not only sell their full British range in America but also make special converters and transverters specifically for the American 50MHz band. There is a large swing back to vhf ssb in the USA and it is good to see British designed and manufactured equipment being exported in quantity to America.

First G-DL crossband 70/432MHz

On 11 July Rolf Niefind, DK2ZF, in QTH locator FN04j heard G3ZEZ at Clacton-on-Sea on 70MHz cw at RST539. Rolf replied on 432MHz and this is believed to be the first crossband 70MHz to 432MHz contact between England and Germany. Next day Rolf worked even further to G3RJR at Birmingham, a distance of 859km. Both GB3SU, the Derbyshire beacon on 70·695MHz, and GB3SX in Sussex on 70·685MHz have been good signals in Germany on several occasions and DK2ZF is interested in further crossband contacts. Rolf, who uses a Jaybeam four-element antenna and a Microwave Modules converter for reception on 70MHz can reply on either 28·750MHz, 144·120MHz or 432·200MHz. For skeds contact DK2ZF at 2407 Bad Shwartau, Lerchenstr 10.

Channel Islands firsts

Syd Smith, GJ8EZA, worked UC2AAB at a distance of 2,074km via sporadic-E on 8 July at 1135gmt. This is believed to be the first-ever contact between Jersey and White Russia. Syd has overcome the problem of living in a valley in a most unusual way. His antennas are mounted on a 50ft tower at the top of a 200ft hill near the home location. At the top is a remotely-controlled 40W linear and a pre-amplifier fed from 250ft below by an FT221R.

GJ8EZA is also active on 432MHz television and recently made the first fast-scan television QSO between Jersey and France by working F1CFD. The equipment is an FT620 prime mover and a Modular Electronics 432MHz transverter with a 54MHz video converter between the camera and the transverter input. Using this equipment two-way fast-scan contacts have also been made with GJ8AAZ and GJ8GDX. Pictures have been received from F1ANH and F5YX/M.

On Guernsey the outstanding signal from GU3HFN in the August 70MHz contest was due to the four-over-four antenna which was mounted on an 80ft mast. The Guernsey club is now hoping for some northern GM contacts to get into the "Real DX" section of 4-2-70.

New transistors

Following the success of the SD306 transistor two new devices of interest to vhf enthusiasts are announced by Signetics. The SD307 is suitable as a mixer with 15dB conversion gain at 600MHz, and the rf transistor SD308 has a gain of 20dB at 1GHz with a 4·5dB noise figure.

First "Supreme" of 1977 goes to G3FIJ

G5UM, the vhf awards manager, reports that it was distinctly unusual to be asked to issue three 432MHz Senior Awards in one week. They went to Colin Morton, G3DY, of Peterborough (No 34), Angus McKenzie, G3OSS, of North London (No 35), and Frank Howe, G3FIJ, of Colchester (No 36). As G3FIJ already held two Seniors, No 39 for 144MHz and No 25 for 70MHz, securing his third Senior automatically qualified Frank for Gold Leaf Supreme Award No 17.

Details have not been published for some time of the present FMD certificates which are issued free to qualifying members by G5UM. Standard and Senior awards are obtainable for each band but with different qualifications. These are:

Standards Awards
70MHz—3 countries and 30 counties
144MHz—9 countries and 40 counties
432MHz—3 countries and 20 counties
Senior Awards
70MHz—6 countries and 60 counties
144MHz—15 countries and 60 counties
432MHz—9 countries and 40 counties

A special Gold Leaf Supreme Award is available to members holding three Seniors or two Seniors and a 1,296MHz award, so far 17 amateurs have achieved Gold status.

Further details of the above RSGB awards and many other international awards are contained in *Amateur Radio Awards* obtainable from RSGB HQ.

Events for your diary

This year's Scottish Convention is being held at the Adam Smith Centre in Kirkcaldy on 10 September. G3RPE, G3OUF, G6JP and G3DAH are among the vhf personalities who will be attending this event. Further details from GM3YOR.

A large attendance is guaranteed for the popular North West Convention at Lancaster University on 17/18 September. Pat Gowen, G3IOR, the acknowledged Oscar expert, will be giving two lectures on satellite communication—one for Oscar beginners and another for advanced Oscar users. Full details of the event are in the July *Radio Communication*.

* PO Box 49, Aberdeen AB9 8JA.

The University of Aston, Birmingham, is the venue on 19 November for a slow-scan television exhibition and convention being organized by The British Amateur Television Club. The event lasts from 10am to 5.30pm. Further details from G8DLX, QTHR.

Sporadic-E reports

May, June and July have all been good months for those amateurs working sporadic-E dx. As these reports are of scientific interest to many people it is again proposed to deal with them in detail.

Tim Hordley, GW8BXQ, (XL26g) caught an early opening at 0950gmt on 25 May when he worked IT9JLG in locator GY74j at a distance of over 2,000km. On 14 June, Jack Hum, G5UM, was listening on 70·26MHz for any mobiles on their way home when he found the frequency was useless due to S9 signals from eastern Europe navigation transmitters and Polish radio stations. Changing quickly to 144·050MHz cw brought a contact with LZ1FO and an incomplete QSO with LZ2DAX. Jack says it was particularly noticeable how fast the 144MHz cw operators realized there was an *Es* opening.

On 25 June Andy Brown, G4EZT, and Graham Brant, G8KBW, were in the middle of a radio tour around the West Country and had stopped to operate from a 600ft asl site near Barnstaple in Devon. After working some stations 300 miles away on fm they suddenly heard two Spanish stations on 145·500MHz. They quickly changed over to their Trio TS7010 on ssb to work in quick succession HG90C, OE3GHA, HG5KDQ, OE3XUA, HG5AIR, HG4YF, SP9AFI/9, OE5UKL, OE6KUG/P, HG1KVP/P and finally YU1NOU in locator JEO9h at a distance of 1,900km. They noted that the opening lasted from 1400 till 1615gmt. On the same day Dave Price, GW4CQT, worked many Austrian and Hungarian stations but found it frustrating that the opening was confined to a small area, albeit 2,000km away.

On 8 July Paul Widger, G8AGU, in Devon, worked UC2AAB near Minsk in locator NN18c at a QRB of 2,079km. On the same day GM6XI/M in Kintyre (XP53a), GM8BKE in Glasgow and GM4DGK/P at the Cairn o' Mount (YQO8g) all worked strings of Italian, Hungarian and Yugoslavian stations on ssb around lunchtime.

On 12 July Ron Marriot, G3LTN, at Banbury, Oxfordshire, worked YO2IS, HG8KP and HG5KDP at S9 signal strengths. This opening was quite short, lasting only from 1404 to 1427 gmt.

Anyone who has worked sporadic-E dx this season is asked to please send reports to GM8FFX indicating beam heading, locator, signal strengths etc; all the reports will be collated and sent to the RSGB Propagation Studies Committee and to the various other interested bodies detailed in last month's report.

Data transmission

There are now quite a number of amateurs in the London area who are taking advantage of the new licence conditions by sending data on the 144MHz band. In view of the increasing numbers of data operators the VHF Committee may suggest 144·550MHz as a data calling frequency. This would leave 144·500MHz and 144·600MHz as calling frequencies for sstv and rtty respectively. Details of QSOs and equipment used by data operators would be appreciated for inclusion in *4-2-70*, as would comments on frequencies.

Moonbounce

David Price, GW4CQT, at Cwmbran, is following in G3LTF's footsteps by becoming interested in 432MHz moonbounce. He has just completed the special antenna; a very large array of 12 16-element quads, all made in his workshop. It is mounted at a height of 30ft, the full steering gear is being tested, and all the phasing harnesses are finished.

Tropo conditions

The Glenrothes group expedition by GM3YOR and GM3OLK got off to a good start when they tested the equipment from near Peterhead. From the rare square of ZR they worked stations all over Britain on the three vhf bands. However, by the time the expedition got to the Shetlands the good conditions had faded considerably. G4DZU and G4CMV were good signals on 144MHz, as was G8GXP who unfortunately did not hear GM3OLK/P calling from ZT square. Contacts were also made from Shetland on 432MHz but not over the distances worked a few days earlier. John Aitken, GM8NFG, at Deerness, Orkney Islands, recently acquired an FT221R and has been a good signal in the London area with his 10W of ssb. It will be most interesting to see how John fares in the next aurora. On 13 July DL7QY in Berlin had a good cw contact with EI6AS in WN59g.

Conditions on 432MHz were very good in the first two weeks of July, with GM3UU in Aberdeen working Norwegian stations with an indoor dipole. LA6HL and LA3EQ have joined LA3WU on 432MHz ssb and all three have been working many British stations. G8AGU in Devon has been working his usual pile of dx including many German stations, DM2CPA and 1,145km to OZ5GF.

Meteor scatter on 144MHz

Clause Neie, DL7QY, worked GW4CQT on 16 July in a QSO which took one hour to exchange 26/R27 reports. Fourteen bursts and seven pings were received during the contact via sporadic meteorids. Dave Price, GW4CQT, has been spending a lot of time concentrating on sporadic meteor contacts and has been rewarded by contacts with YO2IS, DM3ZBA and SM7AED.

The grapevine

Interesting to see items from *4-2-70* being reprinted in a number of publications varying from *Wireless World* to the *Belfast Telegraph* and on tv teletext . . . G3NMY and G8MWV in Norfolk have a nightly sked on 144·420MHz with both stations beaming to GM hoping for breakers . . . No reports yet of reception of the Lannion beacon on 50·1MHz . . . QTH locator hunter G3POI wonders if anyone would like to make a boat trip to St Kilda (VR) or to Rona(XT) . . . VHF manager G3OUF has been to the USA to get first-hand information on their repeater scene and to study Ed Tilton's sun research project . . . Both GB3TW and GB3NEE were off the air recently while workmen painted the IBA mast—apparently the painters would not work if any of the high power transmitters were operating.

Late news

The first auroral opening since May was noticed by G3IPV at 0520gmt on 29 July when Swedish stations were heard working to Norway on cw. SK6JF/OY arrived ok in the Faroes and has been worked on 144MHz. GM3GNR/P at

REAL DX 1977

70MHz	G4CVI—GM3ZBE	650km
144MHz	G3ZEM—UO5BF	2,400km
432 MHz	G8AGU—OZ5GF	1,145km

Orkney and GM8MJV/P at Lowther were both in big demand during the 144MHz QRP Contest. Best dx for the GM3OLK/YOR Shetland expedition was DC1XC who was worked on 144MHz and even on 432MHz. YU4BYZ in locator IE17f was the first ms station heard via the Perseids at Aberdeen. GB3LER, the Lerwick beacon, came into service on 30 August.

Finally, thanks for all the letters and reports. Please send details of your 4-2-70 activities to PO Box 49, Aberdeen. □

RAE Courses 1977-8

(See also the list on page 627 of the August issue)

Aldridge, Walsall. Tynings Lane Evening Institute, Aldridge, Walsall. Tuesdays commencing 20 September. Enrolment 15-16 September.

Bangor, Co Down. Technical College, Bangor. Mondays and Thursdays, commencing 20 September. Enrolment from 7 September. Details from GI3WSS, QTHR; tel Holywood 4277.

Belfast. Cregagh Technical College. Commencing during September. Details from college principal.

Birmingham. RAE Mondays and Wednesdays commencing 19 September. Morse Thursdays commencing 22 September. Enrolment during week commencing 12 September. Details from G3KPT, QTHR.

Boreham Wood. Boreham Wood College of Further Education, Elstree Way, Boreham Wood, Herts. Tuesdays and Thursdays, 7-9pm, commencing 20 September. Enrolment 4-8pm, 7-8 September.

Brentwood. Brentwood Adult Education Centre, Brentwood, Essex. Thursdays, 7.30-9.30pm. Enrolment at Bishops Hill Centre Rayleigh Road, Hutton, 7-8.30pm, 13 September. Details from centre, tel 0277 216722.

Bridgnorth. Bridgnorth College of Further Education, Stourbridge Road, Bridgnorth. Wednesdays, 7-8.45pm, commencing 14 September. Enrolment 6.30-8.30pm, 7-8 September. Fees £10 (£5 for students under 18).

Chippenham. Chippenham Technical College, Cocklebury Road, Chippenham. Enrolment 2-4pm, 6-8pm, 1-2 September. Details from head of engineering department or course tutor at college.

Crawley. Adult Evening Centre, Sarah Robinson School, Ifield, Crawley. Mondays, 7-9pm, commencing 26 September. Enrolment 7-9pm, 14 September. Details from course tutor, tel Crawley 22540.

Dudley. Dudley Technical College, Dudley. Tuesdays, 6.30-8.30pm, commencing 13 September. Details from head of electrical engineering and science department, tel Dudley 53585.

Harrow. Hatch End High School, Harrow. Wednesdays, 7-10pm, commencing 28 September. Enrolment 10am-3pm, 17 September at Nower Hill High School. Details from G8ELB, tel 01-864 4411 Ext 39.

Knottingley. Knottingley High School, Knottingley. Tuesdays, 7pm. Enrolment 19 September. Details from G3HCW, QTHR.

Leeds. Airedale and Wharfedale College of Further Education, Calverley Lane, Horsforth, Leeds LS18 4RQ. RAE Tuesdays, 7-9pm, commencing 13 September. Morse Mondays, 7-9pm. Enrolment 5-6 September, 6.30-8.30pm. The college also hopes to hold an advanced amateur radio course designed for newly-licensed amateurs, covering choice of equipment, its adjustment and detailed operating procedure. Details from R. Greenhalgh, G8LEX, head of engineering, tel Leeds 581723.

London (Chingford). Friday Hill House, Simmons Lane, Chingford. Mondays, 7.30pm, commencing 19 September. Enrolment on first night. Fee: £8. Details from G8EAY. tel 01-500 6034.

London (Holloway). Grafton Radio Society Holloway Institute, Whittington School, Highgate Hill, N19. Mondays, 7-10pm. commencing 19 September. Enrolment: ILEA areas, 8-9 September; outer London 12-14 September. Details from G3ZKE, QTHR, tel 01-485 7065.

London (Paddington). Amberley Street Evening Institute, Paddington. Thursdays commencing 29 September. Enrolment 8 and 12 September. Details from G8ELB, tel 01-864 4411 ext 39.

Loughborough. Loughborough Technical College, Radmoor, Loughborough. Tuesdays, 6-7pm morse, 7-9pm theory and practical, commencing 20 September. Enrolment 6-8pm, 12-14 September. Fee: £8.05. Details from head of department of electrical engineering, tel 0509 215831.

Newcastle-upon-Tyne. Gosforth High School, Gosforth, Newcastle-upon-Tyne. Theory, Tuesdays, 7-9pm; morse, Thursdays, 7-9pm, commencing in September. Details from G3FPE, QTHR, tel Newcastle-upon-Tyne 668439.

Newtownabbey. Technical College, Newtownabbey. Commencing September. Details from the principal.

Newport. Newport ARS, Brynglas House, Brynglas Hill, Newport. Mondays, 6-8pm, commencing 19 September. Fee: £7. Details from GW3YTJ, 2 Durham Road, Newport.

St Austell. Mid-Cornwall College of Further Education, Palace Road, St Austell. Tuesdays 7-9pm, commencing 27 September. Enrolment 5-7.30pm, 21-22 September. Details from G4DND, QTHR, tel St Columb 479.

Sheffield. King Edward VII Lower School, Darwin Lane, Sheffield 10. Wednesdays 7-9pm, commencing 28 September. Details from G3JON, QTHR.

Southend-on-Sea. College of Technology, London Road, Southend-on-Sea. Enrolment 5-7 September. Details from G3KMT, QTHR, tel Southend-on-Sea 353931 ext 043.

Swindon. The College, Regent Circus, Swindon. Mondays 7-9pm, commencing 12 September. Enrolment 1, 2, 5 September. Details from G3NPM, tel Swindon 29141.

Wellington. Telford ARC. Details from G8MXS.

Wigan. Wigan Adult Education Centre, Parsons Walk, Wigan. Mondays commencing 19 September. Enrolment 12, 15, 19 September. Fee: £13. Details from G3RCA, QTHR.

MICROWAVES

(Continued from p 695)

especially for amateur use by Microwave Associates, Gunn oscillator/transceiver units are available from various manufacturers in the UK, including AEI, MESL, Mullard and Plessey. It would be most useful to learn of experiences with these devices so that the information can be passed on.

Pre-amplifiers for 1·3, 2·3, 3·4 and 5·6GHz

In the 1/77 issue of *DUBUS-INFO*, DL7QY gives details (including pcb layout) of pre-amplifiers for these bands based on relatively inexpensive NEC stripline transistors, details of which are:

	1·3GHz		2·3GHz		3·4GHz		5·6GHz	
	gain dB	NF dB	gain dB	NF dB	gain dB	NF dB	gain dB	NF dB
NE73435	12	3·8	7	4·8	—	—	—	—
NE02135	13	2·0	11	2·8	6	3·8	—	—
NE57835	14	1·7	12	2·5	7	3·5	5	5·5
NE22235	16	1·5	14	2·2	9	3·2	7	4·3

G4BBR reports that these devices are available in small quantities from Auriema Ltd, 442 Bath Road, Slough SL1 6BB. Prices range from about £3 to £13.

This remarkable issue of *DUBUS* also includes 3·4 and 5·6GHz converter designs, and a 100W linear amplifier by W6IOM which uses a pair of 2C39s.

Waveguide components

If only in self-defence, may I be permitted to point out that waveguide 16 and 20 components, for 10 and 24GHz respectively, are available from: Don Hayter, "High Peak", Telegraph Lane, Fourmarks, Alton, Hants. A sae will produce a list. □

A new look for the Radio Amateurs' Examination

by R. J. HUGHES, G3GVV, Chairman of Advisory Committee for Radio Amateurs' Examination of the City & Guilds of London Institute

The purpose of the RAE is to provide a basis from which a potential radio amateur may commence "self-training, intercommunication and technical investigations", without causing interference to other services.

Starting with the May 1979 examination, there will be changes both in the syllabus, and in the form of the exam.

The major syllabus change is the elimination of valves and the substitution of transistors. In recent years both valves and semiconductors have been included but the former are becoming obsolete—by removing them from the syllabus instructional time is saved, and it is considered that a person with a knowledge of semiconductors is capable of investigating the use and application of valves without causing avoidable interference. There is a reduction in the syllabus content relating to basic electricity and magnetism. Additions to the syllabus include specific reference to single sideband and frequency modulation.

The examination will consist of two separate papers. The first, lasting one hour, will deal with licensing conditions and transmitter interference; the second, lasting 1¾ hours, will deal with operating practices and procedures, and with theory; there will be a 15min break between the two papers. A candidate must take both papers at his first entry; if he fails one paper, he need only retake that paper.

Both papers will consist of multiple-choice questions (Paper 1 with 35 questions, Paper 2 with 60 questions). A multiple-choice question consists of a sentence in which a question is either asked or implied, followed by four possible answers, only one of which is correct. The candidate is required to select the correct answer. Here is an example:

Poor frequency stability of an amateur transmitter can result in:
(a) The generation of parasitic oscillations.
(b) Operation outside the amateur bands.
(c) A reduction in power output.
(d) Difficult adjustment of the power amplifier stage

The main reasons why multiple choice questions have been introduced are:
(i) a much wider coverage of the syllabus can be given;
(ii) there is no choice of questions, so that all candidates are attempting the same questions;
(iii) there can be no variation in marking standards by different examiners, as all marking is carried out by an electronic mark-scanner;
(iv) Because candidates are not required to express their answers in their own words, their performance is determined primarily by their technical knowledge and understanding.

Acknowledgements are made to City & Guilds of London Institute for their assistance in the compilation of this article.

Copies of the syllabus pamphlet, price 40p, are available from the Sales Section, City & Guilds of London Institute, 46 Britannia Street, London WC1X 9RG. □

oscar news

USSR amateur system RS

Circular 1273 from the International Frequency Registration Board, an organisation of the ITU, provides advance details of a planned satellite network to be established by the USSR. A summary of the information is given below:

General information. The USSR Administration wishes to inform member countries of the ITU that the USSR is working on the establishment of an amateur satellite service system. This system "RS" will be based on 3-4 satellites on a circular near-polar orbit. The amateur satellite stations are designed for multiple access with retransmission and frequency translation without demodulation on a real time scale.

Date of bringing into use: 1977–78.

Number of satellites: 3–4.

Orbital information:
Inclination, 82°. Altitude of apogee and perigee, 950km (circular orbit). Period, 102 min.

Uplink characteristics:
145·8–145·9MHz (100kHz bandwidth). Quarter-wave receiving antenna, circularly polarized. User uplink power, 10–15W to 10–12dB antenna. Transponder receiver noise temperature, 3000°K.

Downlink characteristics:
29·3–29·4MHz (100kHz bandwidth). Half-wave transmitting antenna, circularly polarized. Transponder power, 1·5W peak to 0dB gain antenna.

Maximum communications distance: 6,000km (3,700 statute miles.)

From the advance publication orbital information it seems likely that the "RS-Oscars" will be launched piggyback with the meteor meteorological satellites from the Plesetsk launch site.

This new series of Soviet amateur radio satellites is welcomed in the spirit of international friendship and co-operation.

It will be noted that the output of repeaters using IARU channels R8 and R9 fall within the uplink passband of the Soviet satellites. This could cause problems, particularly in West Germany where there are a number of repeaters using these channels.

Preliminary information indicates that probable "windows" for the launch of the first Soviet satellite are 1 and 17 October. □

the month on the air

John Allaway, G3FKM*

THE writer has received a copy of a letter from the Nigerian Ministry of Communications (Radio Services Branch) which quite clearly states that amateur licences are not being renewed until the state of emergency in Nigeria is lifted. This seems to indicate that only activity from 5N2NAS is officially approved and that other users of 5N2 calls are doing so without permission. Thus, an administration which could quite possibly support the amateur radio service in 1979 is being given the worst possible impression of radio amateurs. A sorry state of affairs indeed.

DX News

The Italian national radio society, ARI, will be celebrating its 50th anniversary during September. During the month the special station IK50ARI will operate from Florence and will be active on all bands. It will be good for the "DGM" Award (see "Awards").

A group of Italian amateurs operated from San Pitro Is—off Italy in the S Adriatic Sea and said to be administered by the Italian Navy. Their callsign was IJ7EX and the DXCC status of the islands is being investigated.

The expedition to Palmyra Is and Kingman Reef seems to have been a great success. In all, 16,150 contacts were made, over 10,000 from Kingman: 2,900 of these were with Japan, 416 with Europe, 210 with C and S America, and 1,500 with W6! Over 6,000 QSOs took place on 14MHz and the writer would like to join the many who consider this to have been one of the best operations for many years.

WA6KWQ/KW6 is shore based and fairly active. C21EF is said to join in the SEANET activities on 14,320kHz from 1200 quite often.

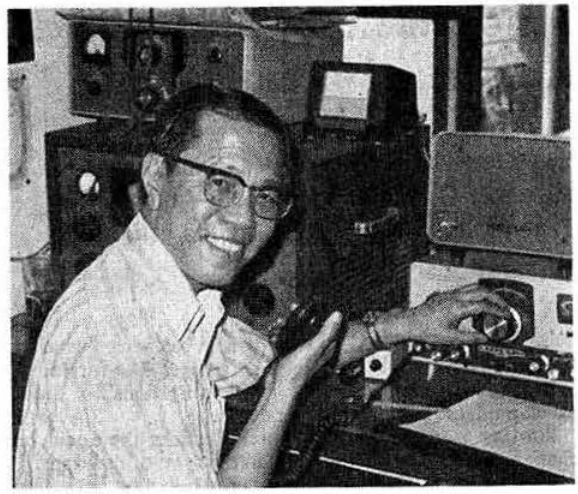
W1JFL reports mail difficulties between himself and A51PN. It seems that he has logs for the period 18 August 1972 to 16 September 1974 only, and that A51PN is not active just now and does not know when he will be back on the air. W1JFL also has logs and QSLs for Don Riebhoff's operations from CT4AT, XU1DX, C31ME and ZB2DM.

S21AB has been reported to be crystal controlled on 14,150, 14,195 and 14,250kHz, and to be heard after 1100.

Phanh, XW8AL, is now living in Paris and is F0DAJ. Other former Laotian amateurs are XW8FN who is now WB31DA, and XW8BS who is W7KRP.

JT0OAQ made 5,500 contacts from Mongolia. He has now returned to the USSR and is UC2LBI. Most QSOs were on 3·5 and 7MHz. UW3HY is said to be going to Franz Josef Land as chief radio operator and a result of this may be an increase in activity of the only station on the island, UK1PAA.

An American amateur connected with the USA Embassy in Douala may be on the air with a TJ call from mid-July.



Tim, BV2A/BV2B, the only amateur on Taiwan

He has an FT101E and vfo and is likely to be active from 2200 to 0200. Those looking for a 9U5 contact may try searching for 9U5CA in the 14,285-14,295kHz area after 2000, especially on Sundays.

G8KLB recently visited Tim, BV2A (see picture). He also holds the callsign BV2B and this is used for ssb contacts. He often operates from 2300 on Saturdays until 0200 on Sundays, and between 1100 and 1400 on Wednesdays, and prefers 14,025, 14,040, 14,218 and 14,250kHz. The Taiwan government recognizes amateur radio, but at present no facilities are provided for taking the required examination. Tim was licensed before the war and operates under limitations—he is confined to the frequencies mentioned.

VU2TN was heard by the writer to say that he hoped to visit VU4 during October or November—this is presumably the Laccadive Is. No further details are available.

Ted Henry, W6UOU, and his wife (who is also licensed) set sail for a round-the-world cruise early in August. Their first stop was to be in the E Caroline Is and then they were expected to go to E Malaysia, and afterwards across the Indian Ocean to the Middle East and Africa.

DX News Sheet says that those who still need a QSL from AC3PT should apply direct to him at The Palace, Gangtok, Sikkim, India.

ZK1BA left the Cook Is early in August, and VR1X was due to leave the Gilberts at the end of the month. The ZK1BA trip to Manihiki has been postponed.

ZS2MI has been active and workable again—at around 1400 on 21MHz, and is also said to be on from 1300 at week-ends on 14,200, 14,300, 28,200 and 28,300kHz. HC8RG has been putting a good signal into Europe after 2200 on 14,180kHz most Wednesdays.

Stations in Canada have been heard using CY prefixes in place of their normal VE. This is believed to be celebrating HM The Queen's Silver Jubilee. Prefixes in the AA series came into normal usage in the USA from the end of July. They will start to be issued in the 4th and 6th call areas where no more 1 x 2 calls are available for extra class licensees. Following this the series AB to AL will be used.

* 10 Knightlow Road, Birmingham B17 8QB.

"DX News Sheet"

Geoff Watts' *DX News Sheet* has been published again since February, but for UK subscribers only. Geoff was ill until 31 January and can no longer cope with all the work involved in sending *DXNS* to over 1,000 overseas readers and in dealing with foreign money exchange. The only copies now going abroad are those sent in exchange for overseas dx bulletins. However, if an overseas amateur or listener wishes to receive *DXNS* it is suggested that he or she finds a friend in the UK willing to forward the sheet each week, and *to whom all payments must be made*. It is not possible for these copies to be sent direct but they will be sent to the UK "agent" each Tuesday for forwarding.

Your scribe has always recommended *DX News Sheet* for all those who are interested in activities on the hf/mf bands. It gives a great deal of information on addresses for QSLs, contests, dxpeditions, and activity by regular stations. A trial subscription (nine issues) costs £1, and other rates will be quoted on enquiry. Geoff's address is 62 Belmore Rd, Norwich NR7 0PU.

The *Prefix, Zone and Country List* is also published by Geoff Watts—this is a complete listing of countries, prefixes, *CQ* and ITU zones, obsolete prefixes, USSR club stations, and other interesting facts. Its 15 pages cost 35p (inland) or $1 or five IRCs for overseas—no foreign cheques can be accepted.

5B4CA (G3ANJ, A4XFC), Gordon Thomas had just called CQ Italy and was wondering which call to write down first hi! Gear, FT200 to a centre-fed long wire via an atu and balanced feeder. QTH Limassol *Photo:* **CARS**

QSL corner

In response to the plea in July "MOTA" for information on the present whereabouts of former VS9 stations, a letter has been received from G3NAC (J. Hern, 45 Long Lane, Willingham, Cambs) concerning his operations from that part of the world. He still has his VS9AAA logs (he made 43,250 QSOs!) as well as those for G3NAC/VS9, VS9HAA, VS9KAA, VS9AAA/VS90, VS9AAA/ZE, VS9HAA/ZE, VS9AAA/4W1 and VS9AAA/VS9M, and will confirm contacts appearing in these if details are given in gmt and with correct date. Incorrect times or dates will not be investigated.

Roger Wheeler, G3MGW, reports that he has lost contact with A4XGQ. He has thousands of cards for him but cannot forward them as he has no current address. Those still needing an A4XGQ card should send theirs to G3MGW, 26 Ladysmith Avenue, Brightlingsea, Essex, together with a sase.

Dalmo G. Pontual, PY6CN (PO Box 1351, Bahia 40.000, Brazil), would like to contact the operator of the S Georgia station VP8IE, active in 1968.

BYLARA

A meeting of yl operators/listeners was held at the 1977 Drayton Manor Rally with a view to forming a British Young Ladies Amateur Radio Association. Suggestions as to the need or purpose of such an organization would therefore be welcomed. The following points are put forward as BYLARA's aims: (1) to further yl operating in the UK; (2) to promote friendship among fellow enthusiasts, (3) to stimulate interest amongst YLs in amateur radio, and (4) to offer help in matters arising from or relating to yl interests. These objectives may be achieved by the following: (a) meetings on the air, (b) meetings in person—at selected rallies, (c) special representation to the RSGB on radio matters, (d) a special yl award, (e) a newsletter, and (f) the production of up-dated lists of yl operators.

Any comments on the above should be forwarded to any of the addresses given in the yl item on page 437 of the June *Radio Communication*, or by joining the yl nets on 3,710kHz at 1100 (Monday) or 1400 (Thursday). Support is needed and interested ladies are invited to assemble in the tea room at Granby Hall at 2pm on Saturday 29 October for a chat and cup of tea.

The SE Asia Convention

This year the convention will be held in Bangkok, and the Radio Amateur Society of Thailand invites overseas amateurs to attend. It will take place from 18 to 20 November, at the Erawan Hotel, Bangkok. There will be an opening luncheon, followed by lectures and an exhibition, and a grand banquet on the 19th. During the convention RAST will arrange tours. Registration costs $25 and covers all meals. For more details contact: SEANET 77 Contest Manager, Ismail Razak, 9M2FK, 281-C, Jalan Pekeliling, Bukit Glugor, Penang, Malaysia. (G3FKM has a small quantity of information sheets.)

Welcome

The following joined the Society during July: EA1TA, F1CCP, F6AJW, F6BQH, F6BVD, F6DPH, I3KMR, OZ2TY, SM6EUZ, VE3AOG, VE3IUI, VK4HK, VK5ZJP, VK6WH, VP9IM, WA6GGH and WB9TDU.

Contests

VK/ZL/Oceania Contest

1000 1 October to 1000 2 October (phone)
1000 8 October to 1000 9 October (cw)

Exchange RS/T plus serial QSO number (from 001). Contacts with VK or ZL count two points, with Oceania one point. Final score is total QSO points multiplied by the sum total of VK/ZL call areas worked on each band. Entries may

be single- or multi-band. Logs should show date, time, station worked, band, number sent and received. Each new call area worked should be underlined and a separate log submitted for each band. A summary sheet should be enclosed and should include name, address and callsign, details of equipment used, and QSO points and multipliers for each band. A signed declaration that all rules have been observed should be included. Listeners may enter and only VK and ZL stations should be logged—date, time, call, station being worked, RS/T of the VK/ZL, serial number being sent, band, and points claimed should be noted. Scoring is otherwise the same. Logs should reach WIA Contest Manager, GPO Box 1002, Perth, 6001, W Australia, no later than 31 January 1978.

The CQ WW DX Contests
0000 29 October to 2400 30 October (phone)
0000 26 November to 2400 27 November (cw)
All bands 1·8 to 28MHz. Exchanges consist of RS/T and *CQ* zone number (UK is in zone 14). One point is gained for contacts with one's own continent and three with others. Only multiplier credit may be claimed for contacts with one's own country. The multiplier is the total number of DXCC and DARC countries, plus zones, worked on each band added together. There are three categories of entrant: (a) single-operator single- or multi-band, (b) multi-operator, single transmitter (all band), and (c) multi-operator, multi-transmitter. In category (c) several transmitters may operate simultaneously, but only one signal may be radiated on each band. Entrants should use separate log sheets for each band and follow the layout of the official form with 40 QSOs per sheet. Log and summary sheets may be obtained from *CQ* by sending a large self-addressed envelope and IRCs to CQ WW DX Contest Committee, 14 Vanderventer Av, Port Washington, LI, NY, 11050, USA. This is also the address to which entries should be sent; they should be postmarked before 1 December for the phone section and before 15 January for the cw.

Results of the **1977 WAB LF Phone** contest have arrived from GM4ELV. In the single operator section scores were as follows: G3DDK (263,070), G4BWP (241,995), G4FQO (240,980), G3WWX (141,810), G3VVE (132,345), G3XFW (68,365), G3YOL (53,560), GW4DKZ (43,170), G4AVA (39,600), G3JZP (37,410), GW4CMW (35,640), G4BLR (21,440), GM4DZX (18,600), G3EJF (12,750), G3JVU (12,250) and G3ILO (3,750). G4AVA/M (2,695) and GW4CMW/M (2,205) entered the mobile section, and G3OUR (106,735) and G3OMT/P (57,165) the multi-operator section. G3ABG scored 2,415 on 1·8MHz and G3OUR (1,125) on the same band as multi-operator. The latter was also the only 7MHz multi-operator entry. Listeners were BRS29330 (176,910), Susan Coombes (166,505), BRS38225 (146,850), BRS35509 (123,670) and Ian Lumb (58,780).

Awards

The Diploma Guglielmo Marconi
Issued by the ARI free of charge to those who have contacted (or listened to) the localities where Marconi worked. Forty QSLs (or 35 plus one from the official commemorative station II4FGM and one from any other G Marconi Memorial station) must be held. The DGM can be endorsed for mode, or mixed. The areas to be contacted are as follows: D4, Lisbon, CT3, CN8, Cadiz, EI, F, FC, London, Flatholm Is, Isle of Wight, GI, GM, HB, HV, Bologna (I4), 15, Rome (I0), Sicily, Sardinia, JA, Buenos Aires, ON, Rio de Janeiro, Stockholm, Gotland (SM1), Leningrad, VE1, VO1, VO2, Sydney, VP9, Massachusets, NY/NJ, Missouri, Illinois, VU, ZB2, YU2, and Tripoli (5A). II4FGM and IP1TTM are special stations. IK50ARI will be active during September and will also count. All contacts must have been made since 1 January 1973, and applicants should send a list of QSLs held (certified by an IARU society awards manager) plus log details and return postage to: ARI, V. Scarlatti 31, Milano, Italy.

The Certificato del Mediterraneo (CDM)
Also issued by ARI. For confirmed contacts (since 1 June 1952) with a fixed station in at least 22 countries on the list plus 50 stations in peninsular Italy. It is issued in mixed or phone classes. The countries list is: EA, EA6, EA9, CN8, F, 7X, FC, IS, IT, OD, SU, SV, SV (Dodecanese), SV (Crete), SY (Mt. Athos), TA, YK, YU, ZA, 9H, ZB2, 5B4, 3A2, 3V8, 4X4 and 5A. Send certified list (as for DGM) plus log details and 10 IRCs to: ARI HF Awards Manager I8KDB, G. Nucciotti, Via Francanzano 31, 80127 Napoli, Italy.

G3FKM has a small supply of leaflets describing ARI awards. Please send sase.

Official Bulletin No 660 from ARRL included the information that the proposal to start DXCC from scratch again in 1980 was rejected at the board meeting in July. From another source news has been received that a special satellite DXCC will be available from 1 October. It will not have endorsements.

The Worked All Britain Award
Please note that from 7 June 1977 the sales of WAB books has been taken over by Mrs J. E. Lacey, Oak Tree Bungalow, Lambourn Woodlands, Newbury, Berks RG15 7TR.

QTH Corner

A4XVL	via G3SYP, 49 Broad Rd, Wickham Market, Woodbridge, Suffolk.
C31NB	via F9AP, A. Pattelat, 29 Rue St Maur, 75011, Paris, France.
CG1CR	VE1ABM, 91 Harbourview Dr, Sydney, NS, B1S 2AB, Canada
FP0CJ	via K8CJQ, 3066 Grand View Dr, Allegan, Mich, 49010, USA.
FP0DE	via WB8NBT 224 Sanford Ct, Zeeland, Mich, 49464, USA.
IJ7EX	I7VCA, PO Box 1, I-70100 Bari, Italy.
KG6RE	via JA2KLT, Y. Maruyama, 204 Gonaka, Shinozuka, Kozaki, Hoigun, Aichi 441-01, Japan.
KA1S	via KA6US, USACC-J, SSA-S, Command Radio Stn, APO, San Francisco, 96331, USA.
WA6KWQ/KW6	Al Gordon, 3222 Hill St, San Diego, Cal, 92106, USA.
TF4F	Box 1058, Reykjavik, Iceland.
VP5WW	via WB4EYX, 1730 Woodmere Drive, Jacksonville, Fla, 32210, USA.
VP2MVP	via WB4CSK, 1839 Dunroamin Lane, Fayetteville, Tenn, 37334, USA.
ex-YJ8AN	ZL1BKE, R. Beets, PO Box 71, Kawerau, New Zealand.
ZM7AT	via WB6DXL, W. Ellison, 16630 Lawnwood, Valinda, Cal, 91744, USA.
ZM7MM	via W6FWX, Dick Alfaro, 1812 Webster St, San Francisco, Cal, 94115, USA.
3V8BZ	now via DL1HH, H. Groh, an Der Bahn 5, 6236 Eschborn, Niederhoechstadt, W. Germany.
ex-5N2AAU	W. Senior, Birkenau, Bundarra Rd, Armidale, NSW 2350, Australia.
5W1BE, 5W1BF	via KS6DV, L. A. Gandy, CB 82, Pago Pago, 96799, American Samoa.

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

Band reports

At the time of writing, conditions on the hf bands had deteriorated slightly and a fairly long series of "low normal" days was forecast. The Zurich observatory reported the mean sunspot count for June as 38·4—in June 1976 this was 12·4; lowest days were only eight but the highest (the 25th, 26th and 27th) reached the seventies. The Russian interference has continued in spite of official complaint and is beginning to cause some to think that action should be taken to "black" Russian amateur activities.

Once again many thanks to those who sent in items for this month's column, and to the following for supplying information for this section: G2HKU, G4RZ, G5JL, G6GH, GM3LYY, G3RCA, G3RZI, G4DSE, G4EAN, G4EHQ and A8961.

7MHz. 0500 *CO, CX, FO8AP, FO8EX, KS6FF/HR3* (QSL WB6DXL), *JA8UI/PZ, WB6EMA/TG, ZL2-ZL4, ZS1HF.* **0600** *CE, W6, VK, ZL, 4M7PF.*

14MHz. 0200 KB3BSF (QSL W3EEK). **0500** KL7IIP. **0600** FO8ET, W6/W7, VR6TC, ZK1DR. **0700** K1DRN/C6A, *FO8EX.* **0800** KH6, KS6DV, KX6BU, ZL, 3V8BZ (QSL to DL1HH), 5W1s AU, BE, BF. **0900** KH6DL (ex-KJ6DL), ZM7AT. **1000** *HM2JN* (QSL JA1HBC), VR4BT, ZM7MM, 3D2RM. **1300** HS1WR. **1400** *SP2EFU/JW,* XT2AE. **1600** 3B8DL. **1700** LZ1CY/D2 (QSL LZ Bureau), TR8LE. **1800** J28AO. **1900** *TU4FOC,* VP8ML (QSL W4MWT). **2000** W4YHK/VQ9, 5Z4WL (QSL DL3WL). **2100** C5AAD (QSL via G2MI), WB5LBJ/DU (QSL to K7LAY), VP5MA (QSL to WB4LFM). **2200** *FM0BZK* (QSL to FY7AS), *FM0DON,* XP1AB, *ZL4NH.* **2300** *HI3MOG* (W3HNK), VP1WS, VS6BE.

21MHz. 0800 *EP, JA, ZS.* **1100** A9XV. **1400** ZS2MI. **1700** A4XFZ, EL2EU, VP2MBB, 5Z4HZ, 9G1JX.

28MHz—Occasional Europeans. *DX News Sheet* notes that G4DYO has now contacted 115 countries on the band during 1977.

Acknowledgements to the authors of the following for items obtained from their publications: *DX News Sheet* (**Geoff Watts**), the *29 DX Club Bulletin* (**VK6RV**), *Long Skip* (**VE1AL/3**), *The West Coast DX Bulletin* (**WA6AUD**). *DX'press* (**PA0TO**), *CQ Magazine* (**W1WY**), the *Ex-G Radio Club Bulletin* (**W3HQO**), and *RSZ Newsletter* (**9J2KL**).

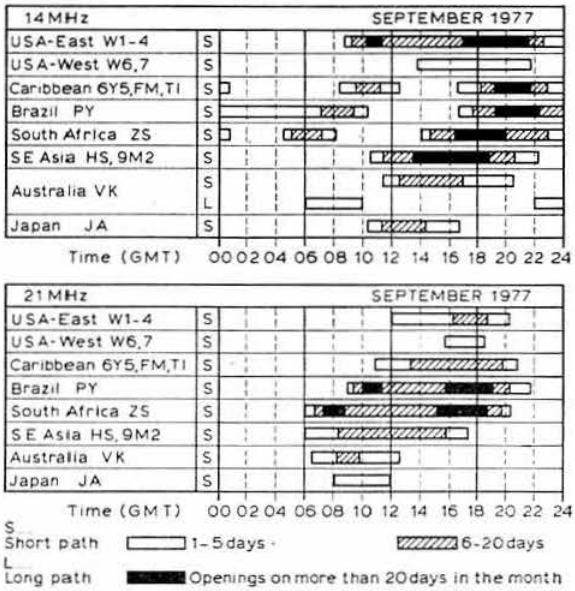
Please send all items for **October** issue **to reach G3FKM** no later than **9 September,** and for **November** by **8 October.**

Propagation predictions

Propagation conditions in both the northern and southern hemispheres are about even during September. At the same time seasonal changes mean that slow improvements will occur in dx conditions on the hf bands, to reach their maximum during October and November. As solar activity is now increasing in the 11-year cycle of sunspot activity, the **28MHz** band will be open to traffic with South America from about 1500 to 1930gmt and with Africa from about 1000 to 1900gmt towards the end of the month. Traffic with Central America, South-east Asia and Australia on **21MHz** will improve slightly. Short skip conditions will tend to cease towards the end of the month.

Longer nights and the coming of autumn mean almost no dx during the latter half of the night on **14MHz.** For this reason **7MHz** will become the main carrier of dx during this period. Contacts on this band and on **3·5MHz** will be possible when the greater part of the path lies in darkness: this is most important for 3·5MHz. Longer nights and the decline of static will improve dx on 7 and 3·5MHz. Local traffic will be interrupted by the dead zone at various times in the latter half of the night.

The provisional sunspot number for July 1977 from the Swiss Federal Observatory was 21·2. Sunspot activity was largely concentrated in the first and last weeks of the month. The predicted smoothed numbers for November, December and January 1978 are 29, 31 and 33 respectively.



HF PROPAGATION STUDY

Predicted HPFs (MHz × 10) for September 1977

GMT →	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	147	130	143	232	268	286	286	291	300	238	190	155	147
Ascension	161	154	144	130	251	284	291	301	310	323	280	182	161
Bahrain	139	124	147	221	260	272	272	272	280	234	181	143	139
Bangkok	120	112	153	204	235	246	248	246	210	190	169	139	120
Barbados	150	128	126	119	152	233	253	253	251	257	251	213	150
Bermuda	144	117	117	114	117	205	234	238	233	234	235	208	144
Bogota	147	125	121	116	144	174	251	247	246	248	247	214	147
Buenos Aires	153	143	138	134	150	257	276	276	276	293	277	204	153
Cape Town	154	144	130	206	270	290	298	305	322	314	247	178	154
Colombo	130	121	154	218	255	265	266	263	261	227	187	144	130
Cyprus	130	117	126	196	235	255	252	252	260	247	188	140	130
Dakar	149	139	131	149	235	275	282	289	289	310	274	182	149
Denver	136	115	106	103	112	111	155	188	205	215	202	173	136
Fairbanks	133	121	116	130	150	150	158	161	171	171	169	140	133
Falklands	157	144	139	139	145	256	277	281	286	304	276	197	157
Gibraltar	94	87	83	105	148	174	176	173	174	176	158	112	94
Hongkong	114	111	148	194	221	232	235	197	178	164	152	136	114
Honolulu	133	116	110	115	163	141	133	126	154	195	178	145	133
Iceland	91	79	79	89	130	147	157	157	153	154	140	105	91
Jamaica	147	122	119	114	143	164	234	238	234	237	234	206	147
Lagos	162	154	136	186	263	289	296	305	322	328	257	178	162
Las Palmas	141	128	121	131	202	243	248	244	247	258	233	166	141
Lima	154	133	130	122	155	168	262	256	257	263	257	213	154
Los Angeles	136	115	106	103	119	111	114	177	204	208	195	167	136
Malta	108	98	98	147	183	208	208	205	210	208	172	120	108
Mauritius	152	134	140	235	277	290	295	301	309	284	218	159	152
Mexico	140	114	102	106	145	130	185	219	219	224	213	186	140
Moscow	98	93	93	155	180	194	202	200	200	194	149	119	98
Nairobi	154	138	139	225	272	291	293	301	314	296	224	163	154
New Delhi	122	116	155	210	243	252	255	251	232	185	155	140	122
New York	141	119	114	111	111	173	205	221	223	225	216	190	141
Osaka	114	111	126	180	200	211	201	171	145	140	136	136	114
Perth	131	121	154	218	253	263	235	204	188	166	150	144	131
Rio de Janeiro	158	144	140	136	163	268	277	280	277	290	277	202	158
Salisbury	158	144	136	219	275	295	298	307	324	308	234	169	158
Seychelles	154	133	141	235	267	280	282	293	307	280	211	152	154
Singapore	122	116	155	210	243	252	255	251	251	232	176	136	122
Suva (s)	124	115	114	158	187	195	202	192	152	177	144	135	124
Suva (l)	152	159	139	180	187	163	153	150	121	161	244	185	152
Sydney (s)	114	111	148	194	221	232	200	187	177	147	148	136	114
Sydney (l)	152	133	130	122	159	135	125	120	117	120	187	209	152
Teheran	133	121	154	218	255	265	266	263	271	237	180	144	133
Vancouver	134	119	111	111	129	125	126	153	161	176	185	155	134
Wellington (s)	114	111	122	178	195	194	192	173	159	143	143	126	114
Wellington (l)	149	147	139	143	143	124	110	110	111	168	194	192	149

For information on the use of this table, see page 284, *Radio Communication* April 1976. Please send reports to Mr J. Spurling, G4AQI, 15 Tibbs Hill Road, Abbots Langley, Watford, Herts WD5 0EE.

Nominations for election to the 1978 RSGB Council

The Articles of Association require that not later than 10 September in each year the Council will send to each member entitled to vote a list of those Council members who retire by rotation or for any other reason on the succeeding 31 December. The list must indicate those members who are willing to accept nomination for re-election and the list must also indicate whether the vacancies are to be filled by election of an ordinary member or on a zonal basis.

The following members retire at the end of this year:

Ordinary members
Dr E. J. Allaway, G3FKM, (by rotation) who will accept nomination for re-election.
Mr D. M. Pratt, G3KEP, (by rotation) who will accept nomination for re-election.

Zone E member
Mr D. M. Thomas, GW3RWX, who does not wish to be nominated at this time.

Not later than 10 October next any 10 corporate members may nominate any qualified member to fill one of the above vacancies, by delivering in one closed envelope to the secretary of RSGB, their respective nominations in writing together with the written consent of such member to accept office if elected. Each such nominator shall be entitled to nominate only one member for election.

In the same envelope, nominees should include brief biographical details of themselves for publication in *Radio Communication* at the time the election is held.

obituaries

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

Mr J. C. Ayling, G3PNA
John Ayling died on 22 May aged 62. He was a keen vhf and /P operator, and an active member of the Reigate ATS since 1959. He was awarded the Norman Keith Adams prize in 1963 for his article on hydraulic masts for portable use.

Mr R. G. Day, G3ZWX
Gordon Day died on 20 June at the age of 58. He was a keen supporter of Wakefield & DRS and a stalwart committee member.

Mr H. Ford, G3OMG
Henry Ford died on 10 June aged 64. He was a founder member of the South Birmingham RS, its chairman for many years, and the first member to be given a life membership. He was active on 20, 80 and 160m.

Mr E. P. Inman, G2DRA
Ted Inman died on 15 July at the age of 68. He had held a licence since 1932 and remained active until just before his death. He was a member of the VHF Century Club.

Mr W. R. Lawrence, G3PDS
William Lawrence died on 12 April. He was a founder member of of the South Birmingham RS and its treasurer for many years. He was also a member of the Midland ARS. He was well known on top band.

Mr C. B. Pretty, G3BND
Bernard Pretty died on 29 July. He was licensed in the early post-war period and at one time was a keen constructor. His recent interest was vhf fm.

Mr J. Partington, G5PX
Jack Partington died on 9 July aged 80 years. He was well known in the Lancashire and Cheshire area for his activity on 160m, and among o/t operators and SWLs.

Mr W. H. Segrott, G8SI
Bill Segrott died on 17 July. He was active over many years and had a wide circle of friends in the amateur radio field.

Mr R. Silverthorne, GW2BG
Reg Silverthorne died on 24 July. He had been licensed since the days of the 1,000 and 400m bands, and operated on all bands until just before his death. He was particularly well known on 3·5MHz. In public life he was twice Mayor of Abergavenny.

Mr F. Walklett, G8AVW
Fred Walklett died on 16 April aged 55. He was well known in the Lancashire area and further afield although active only on vhf.

Mr W. Wardrop, G3MOW
"Wally" Wardrop died at the end of last year and has been greatly missed by the wide circle of friends he gathered around him on hf bands.

We have also been advised of the deaths of:
Mr A. A. Bain, GW5KK, on 9 July;
Mr R. C. Harris, G2BAB, on 8 July.

your opinion

QSL BUREAU
The Editor
Radio Communication
Sir—What a collection of selfish, parsimonious misanthropists there are in the world, and in our Society in particular.

G8WS has already been soundly dealt with except on one point which I would like to mention later, and now we have "times are hard" G3KTL.

The November 1976 Balance Sheet shows a total expenditure of £120,520. The only item which specifically mentions cost of QSL Bureau also includes Beacons and Intruder Watch. The sum against these items for 1975-6 is £1,868. If we count *all* this sum as QSL Bureau it is 1·5 per cent of expenditure. As a part of the £8 annual subscription 1·5 per cent is—wait for it—12p. To forestall possible (incorrect) objection, if it is taken as a percentage of subscription income, £87,956, the percentage is two per cent, or 16p per annum.

So we all contribute about 1p per month to finance a first-class QSL Bureau and, since reading G3KTL's letter fiercely objecting to paying this sum on the grounds of hardship, I cry myself to sleep every night. So touched am I by his desperate poverty that I am prepared to raise my subscription to £8.12 to relieve him of his distress and give myself a quiet night's sleep—and I have been, from the Government's viewpoint, unemployed for the past year.

He says QSLs are now largely a "fun thing". So when we, before the war, received a card for a contact or report, we got no "fun" out of it? QSLs have *always* been a "fun thing" and G2MI and his many helpers, the sub-managers, have been spreading "fun" for many years and I, for one, am very grateful.

Now to G8WS. I never fail to hear him on 20m long path any morning he is on. Often I hear him when, after I have called a station, I find it has gone back to G8WS. Hitherto I have philosophically shrugged my shoulders and envied his luck. I find I have been mistaken. His ability to get any station available gives him no joy. He *knows* he can work them easily (his words). Therefore he says he has no need of QSLs and does not see why those who do should not pay extra for what he has not had to pay for in the past and has no desire to pay for in future.

I, on the other hand, the inevitable loser in any radiation contest with G8WS or any other beam station, have, at the age of 62, never yet lost my sense of wonder at being able to talk over long distances.

My "garden" is L-shaped with leg of 12ft. A Mosley V3Jr stands on the ground no more than 4ft from the nearest brickwork. No

radials are really possible—none at all on the south side of the vertical. Yet my Great Circle map on the wall behind me has pin-identified contacts in all parts of the world with those "fun" QSLs to prove it. The majority long path. I never cease to be astonished.

My praise and warm regards go to W6UA, whose exposition of the true "ham spirit" cannot be bettered. Others have put on record for all time (I assume the Society fulfils its statutary obligation to the national libraries) that they strongly deplore the possibility that a minute fraction of their subscription might benefit other members and not them.

By the same post as this letter I sent a QSL air mail to a listener in Tokyo in reply to a report I did not need received via G2MI. The reason? The printed wording on his very plain card was original and amused me. It gave me added pleasure to provide him with a pleasant surprise.

No doubt some would find such behaviour quite incomprehensible, but Charley Wein will understand and so, it seems, will the Mayor of Haringey. As Charley says, "Its what amateur radio is all about".

B. R. Meredith, G2CYV

ORIGIN OF FM

The Editor
Radio Communication

Sir—*World at their fingertips*, chapter 23, p166: "In June 1935 the Society published what was probably the first technical description in the United Kingdom of Frequency Modulation".

I have one of Cassell's "Work" handbooks titled *Wireless Telegraphy and Telephony* in which a previous owner's signature appears dated 1925. Chapter 11, p139: "Present methods of attaining the desired object" (ie modulation) "require that a wireless transmitter capable of radiating electro-magnetic waves of constant wavelength and amplitude be employed at the sending station, and that either the wavelength or amplitude (or both) of the emitted waves be varied at audible frequency by the current changes through a suitably connected microphone".

This appears to refer to fm of some kind, and it seems improbable that some technical information on how to achieve fm had not been published before 1925 at the latest, and quite possibly in the UK.

Can any RSGB members throw more light on this question.

And for the sake or stirring it in W-land, perhaps Armstrong was not the "inventor" of fm.

Hugh H. Oak-Rhind, G2AUD

REVERSE TVI

The Editor
Radio Communication

Sir—As a follow-up to the letter from G3KRC about tv licences ("Your opinion", February), may I draw readers' attention to paragraph three of the normal television broadcast receiving licence?

It reads: "The apparatus shall be so maintained and used that it does not cause undue interference with any other wireless telegraphy".

Could this be of help to fellow amateurs who have problems with tv time-base radiation.

R. Brothwell, G4EAN

Special event stations

10 September, National Scout Camp
The Sutton & Cheam RS will be operating an exhibition station at "Walton Firs" National Scout Camp, Cobham, Surrey, from 10 am to 5pm. Callsigns G3DCZ/A, G4ADM/A and G4BOX/A will cover 80, 20/15 and 2m. Over 1,500 Cub Scouts will be at the camp, and contacts with all stations, particularly those with Scouting connections, will be welcome.

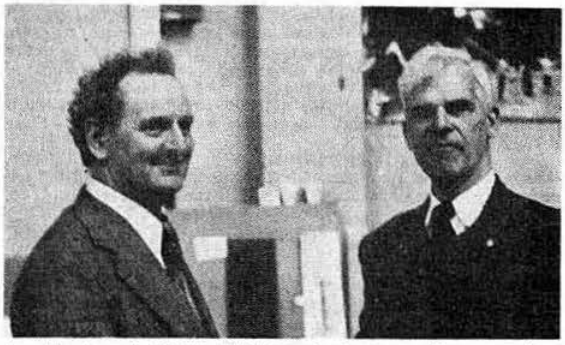
17/18 September, Southlands Arts Festival
The Civil Aviation Authority RS will operate a station at the Southlands Arts Festival, The Green, West Drayton, Middlesex, using G4CAA/P. Talk-in on 2m and 70cm, and a demonstration of fast-scan tv.

18 September, Chichester & D ARC
The Chichester & D ARC will be active from the QTH of the late Gerry Marcuse and will especially welcome contacts with old-timers. Callsigns G2NM on 80m and G3ISO on 2m. Details from G4ETU, tel 0243 88069.

25 September, Bulmers Railway Centre
The British Rail ARS will be operational on the last of the open days at the steam depot, Whitecross Road, Hereford, using the callsign G3SCW/A.

THEY MET AT THE PALACE

Peter Balestrini, G3BPT, RSGB Emergency Communication Manager (left) in conversation with Max Halphen, F8TH, manager of ANRA REFPC, au service de la protection civile, on the Raynet stand at the Alexandra Palace Exhibition



Les Hawkyard, G5HD, VHF Contests Committee secretary (left) talking to Lyall Herdman, G6HD, Contest Committee secretary a decade ago, at the Alexandra Palace Exhibition

NATIONAL FIELD DAY 1977 RESULTS

"Amazing", "Fantastic", "Wonderful", "Best yet", are typical of the many comments received this year about propagation conditions and the record scores achieved by entrants in both the Open and Restricted sections. Although certain parts of the UK suffered from the weather, the really excellent conditions on all the hf bands seem to have provided compensation for the torrential rainfall and flooding reported by many groups.

While a few entrants still regret the demise of the two-station low-power event, the majority have clearly indicated that they like the present rules and prefer the use of licensed power. There were one or two adverse comments about the decision to allow the use of the GE prefix as it was felt this gave an unfair advantage to the less common GE2, GE5, GE6 and GE8 entrants and to the Bromsgrove group who sponsored a special certificate for working their club stations and other GEs. The use of the GE prefix was open to all groups, but only 42 of the 93 total entrants used it in the contest. Judging by the overall results in both sections, it seems doubtful if the use of the GE prefix provided any real advantage.

Open section

The 1976 battle for top honours between the Glenrothes & DARC and the Channel Contest Group was again joined in NFD 1977. Last year, Glenrothes took first place with Channel as runners-up, but this time, the position is reversed with Channel, GE4DAA/P, leading the field with a record number of QSOs and points. They used a Drake 4C combination with a separate SB-301 receiver, a three-band cubical quad at 60ft and separate dipoles at the same height. Analysis of their logs shows that their operators, G3FXB and G3MXJ, achieved the record average of 40 plus contacts per hour for the duration of the contest and at peak times they exceeded 55 per hour. Their 970 contacts and 3,356 points win them the NFD Shield.

Glenrothes, GM3YOR, operated by GM3OLK, GM3YOR, GM3ZSP and GM4ALK, made 806 contacts (average 33·5 per hour). As there are a greater number of entrants in the Open section than in the Restricted, they receive the Gravesend Trophy, and being the highest GM entrant, they also receive the Scottish NFD Trophy together with the certificate for 21MHz. Glenrothes used an FT101B transceiver, a TH-3 triband Yagi and separate dipoles for the three lf bands.

The 1976 winners of the Restricted section, the Racal AR Group, G3RAC/P, with 660 contacts, changed sections this year and are placed third. They also used an FT101B transceiver with a quad, lazy-H and dipoles.

Restricted section

The excellent band conditions also helped the leaders in the Restricted section to achieve record scores. The Swansea ARS, GW5ZL/P, third in 1976, are this year's winners of the Bristol Trophy. Using a modified FT101B for 1·8MHz and an FTDX500 for the other bands, with a 264ft multiband doublet (feed method unspecified), team, GW3GLY, GW3INW, GW3OAY and GW3NJW, made a total of 688 contacts.

In second place are Croydon/SRCC, GE6LX/P, who also changed sections this year. Their operators, G3BFP, G3IAS, G3JLB and G6LX, worked 586 stations. Croydon used a 138ft wire, fed off-centre with open line, and an FT101B transceiver.

The Northern Contest Group, GE3VMW/P, took third place from 588 contacts. They used a FT101E transceiver and a 208ft aerial centre fed with open wire feeders 30ft high.

As will be seen from the breakdown of QSOs per band, the leaders made good use of 28MHz. Their results will confound those who consider that a high-gain beam is a pre-requisite for successful 28MHz operation.

Many entrants in the Restricted section have asked that the report includes greater information about the aerials that were used. This presents a problem, as many groups have not disclosed the feed method used, and in some cases the exact length of the wire. By checking the inspection reports and by a certain amount of detective work, it seems that 11 groups used centre-fed wires in the 260-270ft range, either as horizontal aerials or as inverted-Vs. The next popular aerial was the trap dipole based on the 3·5-28MHz W3DZZ design and fed as a Tee for 1·8MHz. Of the nine groups that used this design, three were mounted as inverted-Vs, the others being horizontal. The G5RV was also very popular, either as a 102ft or a double-sized 202ft version.

The remaining entrants used end-fed wires that varied in length between 70 and 300ft, centre-fed 132-138ft multi-band wires open-wire fed, 138ft off-centre fed wires, trap verticals, loops, 35ft base-fed verticals and other odd-ball "secret weapons" that clearly did not work as well as expected by their designers. What is a single-element echelon?

NFD Trophy

Channel Contest Group — 3,356 points

Gravesend Trophy and Scottish NFD Trophy

Glenrothes & District ARC — 2,803 points

Bristol Trophy

Swansea ARS — 2,570 points

Frank Hoosen (G3YF) Memorial Trophy

Telford & District ARS — 1,953 points

Leading scores on individual bands

1·8MHz	Gloucester ARS	430 points
3·5MHz	Shefford & D RS	720 points
7MHz	Edgware & D RS—"A"	1,070 points
14MHz	Telford & D ARS	1,953 points
21MHz	Glenrothes & D ARC	568 points
28MHz	Swansea ARS	682 points

Overseas station giving most points to entrants

Leonard Snowdon (9HICH) — 900 points

Scottish NFD Trophy

As noted earlier, the winners are the Glenrothes ARC, with the Kingsway Technical College, Dundee, GM4AAF/P, as runners-up.

1·8MHz

In a year when conditions on the higher frequencies were so good, the attention paid to top band might be expected to be less than usual. However, the Gloucester ARS, G3MA/P, spent 6½ hours on the band and made 84 contacts, 56 of them being with the 65 groups claiming points on 1·8MHz. They used a mixer vfo-ba-2E26 pa transmitter and a Marconi-tuned trap dipole. Operators were G3MA, G3XMM, G4CSC, G4FMN and G5BM.

Groups less dedicated to the medium frequencies spent two hours on the band making 250-300 points. At that rate of scoring the band is good value and it is surprising that several groups omitted its use entirely.

3·5MHz

The greatly improved hf band conditions this year are reflected in the lower scores on 3·5MHz. As will be seen from the overall tabulation, many of the leading groups, especially in the Open section, were able to almost dispense with operation on this band.

The band leader this year is Shefford & DRS, GE3FJE/P, which operated exclusively on this band, making 301 contacts. Operators were G2DPQ, G3DOT and G4BWP. In second place are Bury Radio Society, G3BRS/P, who made 270 contacts.

Favourite aerials were dipoles among the Open section entrants and longer wires fed with open-wire line among the Restricted section. As usual there was a good supply of European portable stations workable during most of the contest period from the majority of UK areas. There was a sprinkling of east coast USA in the early hours of the morning and a few of the sharper-eared were rewarded with some six-point ZL contacts around 0530.

7MHz

Some very high scores were achieved on the band and contacts with VK, ZL, JA, W and VE were included in over half the logs. Many of the leading stations obtained extra points by working the

OPEN SECTION

Posn	Group	Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total	Number of contacts
1	Channel Contest Gp	GE4DAA/P	184	61	413	1,819	293	586	3,356	970
2	Glenrothes & D ARC—"A"	GM3YOR/P	258	132	543	1,008	568	294	2,803	806
3	Racal AR Gp	G3RAC/P	332	199	469	726	309	444	2,479	660
4	Guildford & D RS—"A"	GE6GS/P	266	218	426	619	262	410	2,201	622
5	Cornish RAC	GE4CRC/P	208	121	119	820	364	558	2,190	587
6	Bromsgrove & D ARC	GE3VGG/P	266	146	127	1,044	279	320	2,182	608
7	Medway RC Gp	G3ZYV/P	162	205	450	828	173	324	2,142	602
8	Torbay ARS—"A"	GE3NJA/P	248	149	250	882	433	176	2,138	612
9	Bracknell ARC	G4BRA/P	374	457	509	524	119	104	2,087	604
10	Leyland Hundred ARG	GE3GGS/P	336	134	422	488	262	434	2,076	529
11	Bristol Contest Gp	GE6YB/P	186	330	437	695	120	300	2,068	594
12	Addiscombe ARC	GE4ALE/P	234	343	439	663	224	118	2,021	608
13	Maidstone YMCA ARS	GE3TRF/P	352	218	439	827	59	100	1,995	596
14	Reading ARC	GE3ULT/P	290	339	423	542	155	206	1,955	550
15	Telford & D ARS	GE3ZME/P	0	0	0	1,953	0	0	1,953	640
16	Hereford ARS	GE3YDD/P	0	0	0	1,861	0	0	1,861	583
17	Norfolk ARC	GE4ARN/P	236	341	336	581	171	116	1,781	570
18	Mansfield RS	G3GQC/P	0	265	293	1,137	54	28	1,777	579
19	Kingsway Tech Coll, Dundee	GM4AAF/P	196	329	205	433	337	240	1,740	482
20	Verulam ARC	G3VER/P	162	332	672	330	76	146	1,718	530
21	Oxford University RS	G3OUR/P	282	112	612	469	87	104	1,666	478
22	NW Kent Contest Gp	GE3XRX/P	270	285	232	681	149	42	1,659	466
23	Horsham ARC	GE3TNO/P	226	260	473	533	121	24	1,637	508
24	Hull & D ARS	GE3AMW/P	0	454	420	694	49	0	1,617	559
25	Greenock & D ARC	GM3ZRC/P	76	161	149	608	232	370	1,596	426
26	Leicester RS	G3LRS/P	234	402	284	436	115	54	1,525	443
27	"The Hamsters"	GM3SSB/P	0	147	325	462	159	424	1,517	401
28	Chelmsford ARS	G3WSN/P	162	177	382	476	156	140	1,493	439
29	Crystal Palace & D RC	G3VCP/P	342	211	210	404	172	152	1,491	410
30	Bangor & D ARS	GI3XRQ/P	244	118	199	440	185	298	1,484	418
31	Catterick Garrison ARC	G3CIO/P	288	293	280	138	184	202	1,385	370
32	Grimsby ARS	G3CNX/P	340	222	217	223	220	0	1,222	350
33	Scarborough ARS	GE4BP/P	222	167	113	378	193	136	1,209	327
34	Colchester RA	G4CRA/P	316	443	289	69	23	12	1,152	331
35	Ilford RSGB Gp	GE3XRT/P	260	342	235	311	0	0	1,148	357
36	Ayrshire ARG	GM3WIL/P	162	78	313	319	143	96	1,111	313
37	Edgware & D RS—"A"	G3ASR/P	0	0	1,070	0	0	0	1,070	339
38	Edgware & D RS—"B"	G3GC/P	274	267	0	220	223	18	1,002	277
39	Dundee RSGB Gp	GM3NHQ/P	0	13	424	352	194	0	983	298
	Farnborough & D RS—"A"	G3RRA/P	0	0	983	0	0	0	983	308
41	Southdown ARS	G3WQK/P	0	318	196	313	14	56	897	290
42	Bury RS	G3BRS/P	218	647	0	0	0	0	865	309
43	Worthing & D ARC	GE3WOR/P	0	120	247	331	53	0	751	249
44	Easington & Hartlepool ARC	GE4APN/P	0	148	354	112	74	50	738	259
45	Shefford & D RS	GE3FJE/P	0	720	0	0	0	0	720	301
46	West Kent ARS	GE3WKS/P	0	70	297	256	41	8	672	214
47	Maidenhead & D ARC	G3WKX/P	0	597	0	0	0	0	597	229
48	Thornton Cleveleys ARS	G4ATH/P	0	44	19	289	113	22	487	155
49	Clifton Battery Wireless Club	G3JKY/P	0	402	0	0	0	0	402	155

African, Middle East and Bermuda portables, which were readily available during the night.

The band leader was the single-band entry from the Edgware & DRS "A" station, G3ASR/P, who made 339 contacts, a substantial increase over the 1976 band leaders' total. The operators were G3VW, G3GC and G3SJE and they used a T4XB/R4C combination working into a V-beam 46ft high.

Runners-up on the band were the Farnborough & D "A" station, G3RRA/P, who were also a single-band entry. They used an FT-101B transceiver and a Delta-loop aerial to make 308 contacts; operators were G3RRA, G3SVL, G3SZG, G3TMQ and G3VAA. In third place is the multi-band entry from the Verulam group, G3VER/P. All three band leaders entered the Open section of the contest to avoid the limitations of a single simple aerial at a lower height.

14MHz

Conditions can only be described as superb, with the band open for dx for most of the contest period.

Some excellent short skip into Europe, particularly at the start and on the Sunday morning, combined with a 10-h opening to the whole of North America throughout the night gave the single-band entrants a Field Day to remember, and must have provided the operators of the multi-band stations with the unusual dilemma of when exactly to QSY If! A short but unusual opening to VK/ZL around 0330-0430 was also noted, and a few JAs appeared in some logs.

The band leader and winner of the Frank Hoosen (G3YF) Memorial Trophy is the single-band entry of the Telford & DARS, GE3ZME/P, with an all-time record 14MHz score of 1,953 points from 640 contacts. The equipment used was a Yaesu FT101E with a TA32 antenna at only 30ft. The operators were G8AX, G3UKV and G4AUY.

Second place is taken by another single-band entry, that of the Hereford ARS, GE3YDD/P; operators G3HVX, G3WRA and G4CNY employed an FT101B and a two-element quad.

21MHz

With 14MHz open for virtually the whole period of the contest and with double points available from 28MHz, entrants had to decide how much time to spend on 21MHz. Many groups gave it short shift, or used it as a fill-in between sessions on the other bands. These may have been wrong tactics, as those who used the band found that conditions were generally good with world-wide dx and European portables workable at a rapid pace for long periods during the daylight and evening hours.

As part of their effort to make a high overall score in the Open section, Glenrothes "A" used the band to good purpose and made 178 contacts. In second place, the Torbay "A" station, GE3NJA/P, made 128 contacts. Both Glenrothes and Torbay used TH3 tri-band Yagi beam antennas and transceivers.

There was a close contest for third place on the band between the Cornish group, GE4CRC/P, in the Open section with a tri-band beam, and Swansea, GW5ZL/P, the Restricted section winners, with a centre-fed long-wire. Both stations had similar claimed scores, but in checking Cornwall gained the edge by virtue of a more accurate log.

28MHz

USA, Canada, Bermuda and Brazil were worked on this band for the first time in many years during NFD. This sentence will possibly surprise those clubs who in their comments dismissed the band as being disappointing.

These results were achieved by groups operating in both sections, Croydon and Bracknell in the Restricted section, and Swansea

RESTRICTED SECTION

Posn	Group	Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total	Number of contacts
1	Swansea ARS	GW5ZL/P	270	113	290	857	358	682	2,570	688
2	Surrey RCC (Croydon RSGB Gp)	GE6LX/P	268	279	496	648	178	414	2,283	586
3	Northern Contest Gp	GE3VMW/P	236	362	474	494	268	158	1,992	588
4	Stockport RS	G6UQ/P	278	398	388	637	179	60	1,940	565
5	Oxford & D ARS	GE2DU/P	278	223	442	607	296	58	1,904	553
6	Sunderland RSGB Gp	G3RDI/P	262	359	499	475	163	102	1,860	552
7	Reigate ATS	G5LK/P	320	348	456	314	117	230	1,785	488
8	Worcester & D ARC	G3GJL/P	346	168	314	373	251	258	1,710	467
9	G4KF Contest Gp	G4KF/P	258	234	511	419	41	100	1,563	442
10	Cannock Chase ARS & Blake School RC	GE3UBG/P	306	294	399	361	134	48	1,542	415
11	Crawley ARC	G3TIR/P	360	111	365	464	110	120	1,530	421
12	Sutton & Cheam RS	GE2DMR/P	332	290	232	382	253	34	1,523	454
13	Harlow & D ARS	GE6UT/P	250	601	476	124	68	0	1,519	544
14	Hinkley Point (Bridgwater)	GE4EBU/P	298	255	192	416	286	60	1,507	436
15	Havering & D ARC	G3TTB/P	304	265	404	328	97	5	1,403	432
16	Verulam ARC (St Albans)	G3JKS/P	270	425	220	389	12	84	1,400	415
17	Torbay ARS—"B"	G3GDW/P	100	208	176	533	303	40	1,360	408
18	Garendon School RC	G3MKX/P	0	326	481	195	305	42	1,349	388
19	Gloucester ARS	G3MA/P	430	266	375	36	230	0	1,337	376
20	Liverpool & D ARS	G3AHD/P	326	167	358	453	0	0	1,304	370
21	Guildford & D RS—"B"	G5OD/P	0	401	581	142	54	116	1,294	404
22	Vange ARS	GE3IOI/P	74	256	362	377	152	54	1,275	404
23	Government Communications ARC	G3SSO/P	208	255	299	352	159	0	1,273	364
24	White Rose RS	GE3XEP/P	378	216	201	302	169	0	1,266	362
25	Stourbridge & D ARS	GE6OI/P	0	283	104	605	32	234	1,258	382
26	Blackpool & Fylde ARS / Stroud & D ARS	GE8GG/P / GE3EKD/P	0 / 354	86 / 291	352 / 306	497 / 263	189 / 0	120 / 30	1,244 / 1,244	359 / 337
28	Glenrothes & D ARC—"B"	GM4BRM/P	246	201	237	389	70	78	1,221	349
29	Radio Club of Worksop	G4CRE/P	174	211	384	244	56	48	1,117	333
30	South East Kent (YMCA) ARC	GE3YMD/P	0	224	434	384	68	0	1,110	357
31	Breckland Group	GE3GIH/P	6	349	545	165	0	0	1,065	343
32	Newbury & D ARS	G3WOI/P	196	388	220	106	64	70	1,044	315
33	Thames Valley ARTS	G3TVS/P	314	216	348	96	51	0	1,025	283
34	Chingford RSGB Gp	GE8JM/P	0	190	377	371	80	0	1,018	356
35	Perth & D AR Group	GM4EAF/P	0	0	249	635	97	36	1,017	307
36	Caterham Radio Gp	G4APL/P	0	121	199	544	87	58	1,009	336
37	Gt. Yarmouth & D RC	G3YRC/P	214	160	350	265	8	0	997	316
38	Eccles & D RS	GE3GXI/P	0	84	226	422	86	0	818	274
39	First Contest Group	GE4FCG/P	56	196	116	417	0	0	785	235
40	Ainsdale RC	GE4EID/P	76	177	53	160	122	66	654	180
41	Preston ARS	G3KUE/P	244	109	42	208	26	0	629	190
42	Echelford ARS	GE3UES/P	0	0	0	0	303	0	303	102
43	Farnborough & D RS—"B"	G4FRS/P	256	4	3	0	0	0	263	89
44	DEC (UK) Electronics & ARS	G4ESN/P	0	32	12	0	0	0	44	13

and Channel in the Open were but a few who managed to contact stations across the Atlantic.

Also, there was good European traffic on the Sunday, together with UA9 and 5Z4. Some idea of activity can be seen in that Swansea, GW5ZL/P, made 116 contacts and Channel, GE4DAA/P, 103, which with the multiplier resulted in the best NFD results for years. Next year could see a lot more activity on the band.

Check logs

A considerable number of logs were received from fixed and portable stations in the UK and overseas. The HF Contests Committee is very grateful for these, as they do help with the checking. The overseas station contributing most points to entrants was Leonard Snowdon, 9H1CH, who gave 900 points using all bands 7-28MHz. Next was ZE1NFD/P who contributed over 300 points, with EI5WW /P and ZS6NFD/P sharing third place with 192 points. No logs had been received from the A6/P or VP9/P groups at the time this report was being prepared.

Check logs were also received from G3KRC, G3NYY/P, G3RPB/P, GE3USE, G6NK, G3VQO, EP2VW, OK1CIJ, OK1MAA, OK1DKW, OK2BBJ, OK2PAW, OK2YAX, OK3BT, OK3CAU, OK3IF, OK3YCA; all of which proved of great value in checking and the operators concerned are thanked by the committee.

Inspections

Representatives of the HF Contests Committee visited 39 groups in the Open, and 25 groups in the Restricted sections. In all but two of these inspections, the committee is satisfied that entrants were operating within the rules and spirit of the contest. There were two entries where the equipment in use at the time of the inspection did not tally with that shown on the cover sheets for the entries. For future NFDs, the committee is considering the possibility of deducting up to 50 per cent of the checked scores from any group for discrepancies of this kind.

The committee thanks all those who acted for them in making the inspections.

A selection of comments from competitors

"Restricted section excellent substitute for old NFD"—*White Rose.*
"Very fair rules"—*Liverpool.*
"No changes, please, in the rules"—*Hinkley Point.*
"Rules ok"—*Croydon*, and others.
"Busiest NFD since 1949"—*Scarborough*, and many others.
"DX contest tactics necessary"—*Channel.*
"A fine contest with fantastic conditions"—*Southdown.*
"Still think the old contest was better"—*Garendon School.*
"A muddy good time was had by all"—*Sutton.*
"Would have been better if we were a sub-aqua club"—*Garendon School.*
"Can the HF Contests Committee bring back the sun?"—*Edgware.*
"Thanks for the 10° drop in temperature—but you overdid it!"—*Maidstone.*
"We don't really know how to describe our aerial"—*Hinkley Point.*
"Part way through the contest our FT401 was pulled off the table as a car moved off the site complete with the power cable"—*Crawley.*
"We only allowed for 400 contacts in our logs and ran out at 0530"—*Maidstone.*
"You were a bit mean with your log sheets"—*Croydon, Guildford, Cannock, Sunderland*, and others.
"You obviously didn't expect us to do well as you only sent a few log sheets"—*G4KF Contest Group.*

How the leaders used the bands

	Number of QSOs					
	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz
GE4DAA/P	36	20	133	582	96	103
GM3YOR/P	56	44	169	309	178	50
G3RAC/P	64	71	139	229	82	75
GW5ZL/P	52	40	84	279	115	118
GE6LX/P	51	88	141	192	51	63
GE3VMW/P	46	139	137	157	81	28

"Use of GE prefix caused problems"—*Farnborough.*
"Too many stations tried to work us a second and third time"—*Cannock.*
"Could not start erecting station until after last race and then a mast nearly got trampled on by horses"—*Thames Valley* (from Kempton Park Race Course).

Comments from the HF Contests Committee

A total of 93 logs were received within the due period. This compares with 103 for the 1976 contest but, in addition to those who submitted entries, there were another 14 groups who started NFD but had to give up part way through because of equipment troubles, bad weather or lack of operators. Several groups were flooded and were forced to take shelter in nearby buildings, another group disqualified themselves for breaches of the rules. All these sent in check logs which were most useful for checking purposes. If these 15 non-entrants are added to the 93 contestants, the total taking part in NFD compares very favourably with last year.

The committee regrets that the standard of log keeping was not as accurate as in the past and most entrants have lost points or have had their logs rescored. The main errors noted by the checking sub-committee relate to wrong callsigns, wrong reports and serial numbers, and bad arithmetic. In spite of the misgivings of some entrants, the GE callsign did not appear to cause problems with log keeping.

A number of groups seem to have trouble in deciding how many points to claim for a particular class of contact. The rules are quite clear, so the difficulty must be lack of geographic knowledge. NO—A6, A9, EP and ZS are not in the Commonwealth—not even for NFD! The USSR call areas 1 to 6 are in Europe and count two points, not three as was claimed by over 25 per cent of the entrants. Most European countries use /P to signify a portable station, and a suffixed number, such as YU3XXX/1, indicates that the station is operating from a /A location, in this case in the YU1 call area. Such contacts are with fixed stations and count as two points not four as was claimed by many entrants.

The problem of duplicate contacts seems to have bugged most groups and there are numerous comments and complaints about the difficulty of persuading calling stations that a QSO had already taken place. Without exception every log contained duplicates, and while many of these were correctly marked there were still a substantial number that had slipped through. Unmarked duplicates have been penalized at four times the claimed score for the contact.

As mentioned in the report for the Restricted section, there are a number of entries where the details of the aerial used as shown on the cover sheet are vague, or even ambiguous. The committee appreciates that some groups may wish to protect their own interests by not disclosing feed methods, multi-banding techniques etc, but it is necessary that the committee has these details so that they can confirm that the entry is within the rules for the Restricted section. If required the committee will respect the wishes of any group who asks that exact aerial details are not published in the NFD report.

In conclusion

The checking this year was carried out by five members of the HF Contests Committee under the overall co-ordination of BRS20249, who also provided the various tabulations. The report was compiled by G6LX, with band summaries by G3IAS, G3MXJ, G4FAM, G6LX and BRS20249. The preliminary paper-work, log sheets, cover sheets and organizing the site inspections was done by G3KKQ.

The adjudicators scrutinized 38,449 contacts and were able to cross-check a substantial proportion of these. Checking and report writing took a total of over 250 man-hours; but this is not the end of the task, as now the committee has to analyse the many comments from entrants, particularly those that relate to the rules and the conduct of the contest. As was mentioned in last year's report, discussions are in progress with other IARU Region 1 national societies with a view to finding common ground for the harmonization of NFD rules. A considerable amount of work has already been done and it is expected that the matter will be discussed at the 1978 IARU Region 1 Conference.

And so to NFD 1978. As the first weekend in June is the preferred date, and there is no clash with either the Continental Whitsun or our own Spring Bank Holiday, it will be held over the weekend 3-4 June. Let us hope that conditions will be as good, if not better, than for 1977, so that it will be a bumper weekend with even higher record scores. We hope to see you all in NFD 1978.

A last word—to those responsible for posting those precious logs to the adjudicators—please make sure the postage stamps are of the correct value. The under-paid postage dues were quite high. Next year the logs will be returned to the sender.

contest news

Coventry and Rugby DF Qualifying Event results

Twenty teams assembled in Bucknell Woods for this contest. Good signals were heard from Station "A" but some competitors had difficulty in hearing station "B" due to QRM. At 1330 competitors were allowed to leave; some went northwards, some went southwards and others remained in Bucknell Woods under the mistaken impression that one transmitter was hidden close to the start.

Station "A" was in a southerly direction, five miles from the start, and hidden in thick undergrowth in Wicken Woods. Station "B" was in a northerly direction, 11 miles from the start, near Charwelton, and was hidden in a disused underground water tank near the tunnel entrance on the old Central Railway Line.

Peter Woollett was the first competitor to locate a transmitter, signing in at Station "A" at 1417, closely followed by Bill North. Station "B", despite its hiding place, was found by half a dozen competitors before 1445, and just after 1515 Bill North arrived to locate his second transmitter.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	W. North	Mid-Thames	1417½	1515½
2	G. Whenham	Coventry	1528½	1438
3	A. Simmons	Mid-Thames	1530	1443
4	T. Gage	Mid-Thames	1531	1436½
5	P. Tyler	Mid-Thames	1531½	1442
6	J. R. Vickers	Stratford	1532	1444
7	C. Plummer	Medway	1535	1437½
8	P. Lisle	Mid-Thames	1537	1437
9	M. Hawkins	Chelmsford	1430	1553
10	I. Butson	Chelmsford	1428	1554
11	E. Mollart	Mid-Thames	1429½	1555
12	D. Holland	South Manchester	1433	1556
13	P. Woollett	Dartford Heath	1417	1557
14	B. R. Poole	Mid-Thames	1515	1559
15	J. Drakeley	Slade	1602	1516
16	C. Wells	Mid-Thames	1540	1603
17	P. J. Yeates	Salisbury	1418½	—
18	A. Butcher	Chelmsford	1429	—
19	B. Bristow	Mid-Thames	1430½	—
20	J. McBurney	South Manchester	1534	—

A. Simmons and G. Whenham qualify for the Final.

Salisbury DF Qualifying Event results

Eighteen teams assembled at the start just off the A345 near the SW end of Boscombe Down's main runway.

Station "A", operated by G2FIX, was hidden in thick gorse and undergrowth in the densest part of Stockton Woods 13 miles W of the start. Some 300ft of wire thrown over parts which seemed quite impregnable made things a little tricky.

Station "B", operated by G4AJD and also hidden in undergrowth, was at Millersford Plantation 13 miles S of the start. With 130ft of aerial and 130ft of counterpoise running under the main grid system, a strong signal was provided at all times, but with rather odd bearings.

The contest was organized by G2FIX, supported by members of the Salisbury R&ES and ably supervised by Sir Evan Nepean, G5YN.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	G. Whenham	Coventry	1450½	1558
2	B. J. Mahoney	Rugby	1502	1601
3	P. T. Tyler	Mid-Thames	1500	1611
4	D. E. Newman	Slade	1617	1438
5	W. J. North	Mid-Thames	1450	1623
	B. Bristow	Mid-Thames	1623	1459
7	I. R. Butson	Chelmsford	1625	1451
8	C. D. Plummer	Medway	1501	1625
9	A. W. Butcher	Chelmsford	1500½	1625
10	T. C. Gage	Mid-Thames	1501½	1630
11	P. Yeates	Salisbury	—	1457
12	B. R. Poole	Mid-Thames	1502½	—
13	J. R. Vickers	Stratford On Avon	1545	—
14	C. Wells	Mid-Thames	1545½	—
15	P. Woollett	Dartford Heath	—	1559

Three competitors did not find either station.
B. J. Mahoney and D. E. Newman qualify for the Final.

Summer 1·8MHz Contest results

A total of 51 logs was received for this contest and in general the contest was well received, although several operators commented on the lack of activity during the last hour and suggested that the contest could well have finished at 2359gmt, although one operator did suggest that the finish be extended to 0500gmt. Several comments were received on the lack of activity from GW and Merseyside, and a check of logs received shows there was little or no activity from the following English counties: CBE, DHM, IOW, LCN, MSY, SLP, WKS and YSS.

GM3ZSP operated from East Lomond Hill in Fife with an inverted-V with the apex at 150ft, while G3SJJ operated from Ollerton with an inverted-V, apex at 150ft, and 3/2λ dipole at 220ft.

Most of the checked logs contained some inaccuracies and in fact only one of the top 10 logs contained no errors, after re-scoring and checking only very minor alterations had to be made to the positions of the leaders.

G3KDB

SINGLE-OPERATOR

Posn	Callsign	Score
1	GM3ZSP/A	555
2	G3XUD/A	544
3	G3XVF/A	541
4	G4EOK	534
5	G3YMC	531
6	G3RWL	530
7	G3NYY	500
8	GI3JEX	499
9	G4FAM	497
10	G4BXT	494
11	G4CBQ	493
12	G3NKS	484
13	G3SJE	482
14	G3WUX/A	477
15	G3YLG	462
16	G3KOR	454
17	G3ZJK	444
18	G3TLF	441
19	G3GC	427
20	G3ZSU	426
21	G4ALG	425
22	G3OVL	420
23	G3DCZ	417
24	G3HGE	410
25	G4ERW	408
26	G3OZM	386
27	G5MY	373
28	G4CMY	351
29	G4DUS	343
30	G3ZDV/A	314
31	G4ELZ	306
32	GM4GK	293
33	G2FNK	260
34	G3JEI	252
35	G4CZB	251
36	G3ILO	75
37	G3ULY	68

MULTI-OPERATOR

Posn	Callsign	Score
1	G3SJJ/A	598
2	G3VUM	403

OVERSEAS ENTRY

Posn	Callsign	Score
1	HB9AFI/P	243
2	PA0QRP	240
3	DK6PB	226
4	DJ6OZ	145
5	DJ5GW	114
5	F8EX	114
7	DL1YA	60

DISQUALIFICATIONS

G3WQK/A — See rule 5B ii

G4CWH, G4CSC, G3IG W — All late entries

CHECK LOGS RECEIVED FROM

G6ZT GW8PG

June Microwave Contest results

Entries for this once-popular contest have reached an all-time low, with only four stations bothering to compete for placings. Activity generally was also down despite conditions being reported as above average and the 10 GHz Cumulative running concurrently. The VHF Contests Committee will have to look closely at this contest to see whether it should continue in its present form, be modified to attract more entries or be phased out entirely.

Congratulations to the band winners who will receive certificates.

G3VPK

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
			3,456MHz			
1	G8AGN/P	162	2	ZN52/61	G8HAJ/P	86
2	GW8ADP/P	77	1	YL25	G3BNL/P	77
			5,760MHz			
1	GW8ADP/P	77	1	YL25	G3BNL/P	77
			10GHz			
1	G3KSU/P	650	10	ZK34	G3VPF/P	89
2	GW4BRS/P	624	8	YL25	G8ARO/P	116
3	G8AGN/P	90	2	ZN52/61	G8MAJ/P	86
4	GW8ADP/P	43	1	YL25	G3WDG	43

UHF 432MHz-2·3GHz Contest rules

1600-1600gmt, 1-2 October 1977

All entries and checklogs to: VHF Contests Committee, c/o Mr L. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants SO1 4FB.

The following general rules, published in the January 1977 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7b, 8, 9a, 10a, 11-22.

This contest is timed to coincide with an IARU Region 1 event. Contestants wishing to enter the IARU contest should complete a Multiband Summary Sheet and the following multipliers should be used on that sheet only: 432MHz, × 1; 1,296MHz, × 5; 2,304MHz, × 10.

The VHF Contests Committee Trophy will be awarded to the leading station on 1,296MHz.

432MHz Cumulative Contest rules

2000-2230gmt, 8, 16, 24 October-1, 9, 17, 25 November

All entries and checklogs to: VHF Contests Committee, c/o R. J. Taylor, G4BEL, 12 The Rampart, Haddenham, Cambs CB6 3ST.

The following general rules, published in the January 1977 issue of *Radio Communication* will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8, 9a, 10b, 11-22.

1977 BARTG Contest results

If a summary of the contest were to be made in the minimum of words, these would be: "The best yet!". This was the result of a number of factors, the main one being a period of improved conditions prior to and during the contest, and these conditions produced contacts by both long and short path routes at the same time of day.

As a result of the increased interest in the rtty mode, the number of entries was 40 per cent up on last year, and the number of contacts by the leading stations increased by about 50 per cent. In the single-operator section there were 107 entries of which 13 were UK stations headed by G3YYD in fifth place. Of the 15 stations in the multiple-operator section, three were G stations, headed by G3ZRS in sixth position. In the swl section, T. Musson, BRS27262, was in sixth place.

9th BARTG VHF RTTY Contest rules

When. 1800-2300gmt 10 September 1977 and 0700-1200gmt 18 September 1977.

Who. Licensed amateur radio stations within Zones 14 and 15 who are permitted to use rtty as a mode of communication. Portable operation is allowed but must be from one location for the whole duration of the contest. Contest logs from SWLs will also be very welcome.

Bands. 144 and 432MHz. Cross-band contacts will not be valid.

Stations may not be contacted more than once on any one band during the entire period of the contest, but an additional contact may be attempted with the same station if the other band is used. Contacts by means of satellite or repeater will not count for points.

Messages will consist of: Time of start of contact. Time in gmt and to consist of a full four-figure group. The use of the expression "Same" or "Same as yours" will not be permitted.

RST report. Normal three-figure system.

Message number. This will consist of a three-figure number starting at 001 for the first contact made, and numbers will continue in a consecutive manner irrespective of the band used. Numbers will continue in sequence throughout the total period of the contest. QTH locator (normal five-symbol locator) or QTH given either as a town or as a bearing and distance in kilometres from a town, and the town must be capable of identification on a normal tourist map.

Points. All two-way rtty contacts will score in accordance with the distance chart shown below.

0-50km scores 1 point	250-300km scores 11 points
50-100km scores 3 points	300-350km scores 13 points
100-150km scores 5 points	350-400km scores 15 points
150-200km scores 7 points	400-450km scores 17 points
200-250km scores 9 points	and pro rata.

Scoring. If both bands are used the two scores will be added — each band scoring at the same rate, ie there is no multiplier for the 432MHz band.

Note. Proof of contact may be requested in cases where the station worked does not appear on any other contest logs received.

The final results will be tabulated into two categories, (1) Western Europe and (2) UK stations only.

Additional notes

(a) In order to achieve maximum compatability and to implement the IARU recommendations, a speed of 45·5 bauds should be used.

(b) To avoid confusion and congestion around the recognized rtty calling frequencies, and to make more effective use of the bands, the use of vfo operation by participating stations is encouraged if possible.

Logs. Use one log per band. Logs to contain the following: date, time of start of contact, RST report sent, message number, time received, callsign of station worked, his RST and message number (which may be combined; for example, 599001), QTH locator or QTH received, estimated distance and points claimed. It will be helpful to include your own QTH locator or QTH at the top of each log sheet.

Awards: Certificates will be awarded to the top scorers and runners-up in each country. The Judge's decision will be final and no correspondence can be entered into in respect of incorrect entries or logs received after the closing date for entries.

All logs must be received by 15 October 1977 to qualify, and should be sent to: D. F. Beattie, G3OZF, "Mayerin", Churchway, Stone, Aylesbury, Bucks, England.

club news

RSGB affiliated societies and clubs, and RSGB groups, are invited to submit items for inclusion in "Club News" to their regional representatives (not direct to the editor).

Items of news and dates of forthcoming events should reach RRs by 25 September for the November issue.

REGION 1—RR W. M. Furness, G3SMM, 16 Coniston Avenue, Sale, Cheshire M33 3GT.

Ainsdale (AARC)—8, 22 Sept; 6, 20 Oct; 3 Nov. Ainsdale Scout Headquarters. For details contact G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. YMCA, Blackburn. Sec E. A. Lomax, G4DGR, West End PO, Accrington, Lancs.

Blackpool (B&DARS)—First Monday in the month. Phone G5ND (Blackpool 64508) for details of venue.

Bolton (B&DARS)—Main meeting first Wednesday in each month informal meeting third Wednesday in each month, 8pm. Bolton Recreation Club, Kensington Place, Bolton. Hon sec G4FSN (ex G8LXD).

Bury (BRS)—Main meeting on the second Tuesday of the month. RAE classes and morse instruction every Tuesday as well as informal meetings of club members. 13 Sept ("Railways in Switzerland" by G8FDG), 11 Oct (Constructional competition and film night), 9 Nov (Giant surplus equipment sale—if you have any surplus giants, bring them along!). Alternate Tuesdays—Noggin and Natter, with G3BRS on the air (cw and phone). 8pm. Mosses Youth and Community Centre, Cecil Street, Bury. Sec E. R. Thirkell, G4FQE, Rochdale 32730.

Carlisle (C&DARS)—Mondays, 7.30pm. Currock House, Lediard Avenue, Currock, Carlisle. A very full programme of lectures and demonstrations has been arranged for the coming months. Full details from G8DVD.

Chester (C&DARS)—Tuesdays, 8pm, except for first Tuesday in the month. YMCA Chester. Further details from the ASR. G3PYU.

Douglas (IoM ARS)—Mondays fortnightly, Keppel Hotel, Creg-ny-Baa, near Onchan. Sec GD4FWQ (ex GD8LFA), Douglas 22295. IoM amateurs ask that UK and other amateurs who request direct QSLs from GD should send IRCs, as UK postage stamps are not accepted by the Manx Post Office.

Eccles (E&DARC)—Tuesdays, 8.30pm. White Swan, Worsley Road, Swinton. Sec G4AEQ.

Lancaster University (UoLARS)—Wednesdays, 8pm. Furness College. Visitors are welcome, as are skeds on hf and 2m—club callsigns are G8DOU and G3ZBY. There are RAE and morse test classes. Enquiries to John Morris, G4ANB, Dept of Physics.

Leyland (LHARG)—Second Monday in each month, 7.30pm. "Rose & Crown", Ulnes Walton, Leyland. Details from G3XII.

Liverpool (L&DARS)—Tuesdays, 8pm. Conservative Association Rooms, Church Road, Wavertree. Sec G4EST.

Liverpool (North Liverpool RC)—Tuesdays, 8.30pm. Informal meetings. "Nags Head", Thornton, Crosby, Liverpool 23. Visitors welcome. Sec R. Porter, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD.

Liverpool University (UoLARS)—Meeting at lunchtime and on Mondays, 5pm. Club shack, Reilly Building. The club is active on all bands 80/2m—callsigns G3OUL/G8JUL. Details from hon sec, c/o Students' Union or c/o GW4FJK.

Manchester (M&DARS)—Wednesdays 7.30pm. 203 Droylesden Road, Newton Heath, Manchester 10. Sec G8IYX.

Manchester (South Manchester RC)—2 Sept (Mini df), 9 Sept ("DX on top band" by R. P. Smith, G3SVW), 16 Sept (Home-brew test gear—various members), 18 Sept (DF national final run by SMRC), 23 Sept ("DF techniques and review of df national final" by D. C. Holland, G3WFT), 7 Oct ("RTTY", speaker to be announced), 14 Oct ("More reminiscences" by D. Barber, G2AKR), 21 Oct ("Radio noises" by P. Jones, G2JT), 28 Oct (Discussion evening—the future of amateur radio and other topics), 9 Nov (Annual dinner). 8pm. Sale Moor Community Centre, Nooris Road, Sale. Informal meetings Monday evenings at "Greeba", Shady Lane, Baguley. Full particulars from sec G3VIW, tel 061-973 3355.

Manchester University (MUARS—G3VUM). Interested parties should contact G4AOS, QTHR.

RSGB Region 1 Regional Meeting

3pm Sunday 16 October 1977

Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington, Cheshire

The meeting is open to all RSGB members resident in Region 1.

Admission is free. Light refreshments will be available.

The venue is off the A50 close to the junction of the M6/M56 to the south-east of Warrington. Ample parking facilities.

Talk-in on 2m. Further details from G3SMM, QTHR

University of Manchester (UoM—IoS&TARS)—G3CXX is active on all hf bands and G8FOT on 2m and perhaps 23cm. Items for club/magazine/newsletter, or letters from intending members gratefully received by sec, c/o UMIST.

North Western Repeater Group—Informal meetings on the third Thursday in each month, 8pm. "Globe Club", Willows Lane, Accrington, Lancs. Details from sec G4FZN.

Preston (PARS)—Thursdays fortnightly commencing 8 Sept. 8pm. "Windsor Castle" (private room), St Pauls Square, Preston. Sec G8KTM.

Salford (Dial House RS)—Wednesdays, 5.30-9.30pm. Dial House, 21 Chapel Street, Salford, Lancs. Net channel 145·25MHz fm—the club station G3WDH monitors this frequency every club night for any other station. Details from sec G8JCM, c/o M38 at above address.

Stockport (SRS)—Second and fourth Wednesdays in each month, 8pm. Blossoms Hotel, Buxton Road, Stockport. Sec G3FYE. 14 Sept (Mini-lecture "Dials and scales" by G3NUQ), 28 Sept ("Computers" by Peter Whalley), 12 Oct (Multimeter project by G8CZW). New members and visitors always welcome.

Thornton Cleveleys (TCARS)—First and third Wednesdays in each month, 8pm, morse practice from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to "Gardner's Arms"), Thornton. Details from sec A. Bullock, G8MKO, 26 Lancaster Avenue, Thornton Cleveleys, Blackpool.

UK FM Group (Western)—19 Sept (AGM 8pm for 8.30 at Wirral Mercury Motor Inn, Backford Cross, Chester.) 6 Oct (Informal meeting), 3 Nov (Informal meeting). 8.30 p.m. Legh Arms, Knutsford. For details of group apply G3LEQ, tel Knutsford 4040.

Warrington (W&DARS)—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Sec R. E. J. Staples, G3MMD, 3 Willow Close, Lymm, Cheshire, tel Lymm 3533.

Wigan (W&DARS)—First and third Wednesdays in each month. Poolstock Cricket Club, Keats Avenue, Poolstock. Sec A. Cunliffe, G4EII, 50 Langholm Road, Garswood, Wigan.

Winsford (Mid-Cheshire ARC)—Wednesdays. Technical Activities Centre, rear of Verdin Building, Verdin Comprehensive School, Grange Lane, Winsford. RAE class 7pm to 8pm. Morse class every third Wednesday. Net nights 160m Mondays, 8pm, 2m (fm) Tuesdays 8pm. Sec G8HAV.

Wirral (WARS)—First and third Wednesdays in each month, 7.45pm. Sports and Recreation Centre, Grange Road West, Claughton, Birkenhead. Sec G3DLF.

Liverpool Luncheon Club—members wishing to attend should contact G3VQT or G2AMV.

1977 North-west Amateur Radio Convention—17/18 Sept, Lancaster University. Full details from J. R. Morris, Dept of Physics, Lancaster University.

UK FM Group (Western)

Annual General Meeting

7.30pm for 8pm, 19 September 1977
Wirral Mercury Motor Inn, Backford Cross, near Chester

Members are asked to try and attend

The chairman of the Society's M & R Committee wishes to thank all ARs, ASRs and club and society representatives in Region 1 who attended the evening gathering following the committee meeting in Manchester on 14 July.

Region 1 area representatives. Add: Central Cheshire—G3LEQ and Cumbria (North)—G3VIJ to the list in the May issue.

REGION 2—RR R. C. Andreang, G4CMT, 6 Beech Avenue, Bilton, Hull, Humberside.

Barnsley (B&DARS)—Fourth Friday in each month. 7.30pm. King George Hotel, Peel Street, Barnsley. Sec G3LRP.
Denby Dale (DD&DARS)—Wednesdays, 7.30pm. Pie Hall, Denby Dale. Visitors always welcome. Sec G3FQH.
Goole (G&DARS)—Fridays, 7.30pm (during school term only). Goole Grammar School. Details from chairman G3VBI.
Halifax (Northern Heights ARS)—7.45pm. Peat Pitts Inn, Ogden, Halifax (four miles north of Halifax town hall). Sec G3MDW.
Hornsea (HARS)—Wednesdays, 8pm. Rear of Victoria Hotel, Hornsea (facing Hornsea Mere). Grateful thanks to all help for our rally and attendance RR2 Rep. Sec G4CHH.
Hull (H&DARS)—Fridays, 7.30pm. Dorchester Hotel, Beverley Road, Hull. Sec G3LZQ.
Hull (HUR&ES)—Friday 1pm, Room 313B, Union Building. All amateurs invited. G8HUC is active on 2m ssb. Enquiries to G4FVP, 210 Whitehall Road, Tyne and Wear, during vacation or to Clive Davies, Union Block, during term.
Leeds (White Rose RR)—Wednesdays, 7.30pm. (Lectures start 8pm). Sec G4DZI.
Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. Sec G4CNG, QTHR, or at "E" block, Lupton Flats, Alma Road, Leeds 6, during term.
Otley (OR&ES)—Tuesdays, 8pm. 14 Back of Court House Street, Otley. Sec G8DFZ.
Scarborough (SARS)—Fridays, 7.30pm. Scarborough Technical College, Corby Road, Scarborough. Sec G3RTN. PRO Charles Whitaker, 1 Ryefield Close, Eastfield, Scarborough.
Sheffield (SU&PRS)—University—Wednesdays in term, 1pm. The "Red Deer", off Main Street. Details G4BXN.
Polytechnic—This club must expand this year if the Students' Union is to continue financial support. Details G4CYA, QTHR, tel Sheffield 303030.
Sheffield (Association of Sheffield ARCs)—Mondays, 7.45pm (note first Monday in month, during term). This group meets to bring together the several smaller clubs in the area and to provide a joint newsletter. 3 Oct (Junk sale), 7.30pm, room 3107, Sheffield Polytechnic. AGM, 8.30pm, room 3106. Details G4CUW, QTHR, tel Sheffield 353927.
Sheffield (ARS)—Third Monday in month, 8pm. Sheaf House Hotel. New club nets with slow morse on 144·18MHz and 28·75MHz, both frequencies, 8pm, 2nd, 4th and 5th Mondays.
Wakefield (W&DARS)—7.30pm, Ines Road School, Wakefield. Sec G3WWF.
York (YARS)—Fridays, 7.30pm (except for the third Friday in the month). United Services Clubroom, 61 Micklegate, York. Visitors always welcome. 10 Sept (Special event station G3HWW on behalf of York Scout Council at Snowball Plantation, Stockton-on-Forest, near York. (Plus JOTA in October.) 21 Oct (Annual dinner), Abbey Park Hotel, York. Sec G3WVO.
Fulford (FARS)—Tuesdays 7.30pm. 31 George Street, York. Rag CNEWS, morse, RAE assistance etc. Sec G5KC.

RR2 thanks all secretaries for their help.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ.

Birmingham (Birmingham University RS)—Every Tuesday during term, 7pm, Students' Union. G3IUB. Sec G4CKK.
Birmingham (Midland ARS)—20 Sept, 18 Oct (AGM). 8pm. Room 110, University of Aston, Gosta Green, Birmingham. G3ZKQ.
Birmingham (Slade RS)—Alternate Fridays, commencing 16 Sept. 8pm. The Committee Room, Church House, Erdington, Birmingham. G4FGF.
Birmingham (South Birmingham RS)—Shack night Fridays, 7.30pm. 7 Sept, 5 Oct ("Video" by G5KS), 2 Nov (AGM). 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. G8KPA.
Bromsgrove (B&DARC)—9 Sept (Surplus sale), 14 Oct (Film show), 15/16 Oct (JOTA). 8pm. Avoncroft Art Centre, Bromsgrove. G8JTK.
Burton-on-Trent (B upon T&DARS)—7 Sept (Df exercise from T-junction at Yoxall—7.30pm), 21 Sept (Df exercise from five lane ends, Needwood—7.30pm). G3ACR.
Cannock Chase (CCARS)—First Thursday in each month (Business meeting), other Thursdays (HF and vhf club stations, natternites, morse classes, talks etc). Visitors welcome. 9pm. Bridgtown Social Club, Walsall Road, Greenock. G4CHI.
Coventry (CARS)—Fridays, 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. G8DMI.
Coventry Technical College (CTCARS)—Mondays and Thursdays, 7pm. Winfray Annexe of the College. G8ISJ.
Coventry (University of Warwick ARS)—Wednesdays during term. Talk-in on S20. 7pm. Cryfield Farm, University of Warwick, Coventry. Vice-president G8MIA.
Hereford (HARS)—First and third Fridays in each month. Civil Defence HQ, Gaol Street, Hereford. G4CNY.
Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. Swan Hotel. Tuesday meetings are natter-nites. Sunday net noon, 21·150MHz. G3RTY.
Lichfield (Chad RC)—Alternate Wednesdays, commencing 14 Sept, 8pm. The Naval Club, Burton Old Road, Lichfield. G4ESK.
Mid-Warwickshire (MWARS)—5 Sept (Surplus sale), 19 Sept ("Home-made printed circuit boards" by G8JWC), 3, 17 Oct, 7 Nov. 8pm. 61 Emscote Road, Warwick. G8CXL.
Redditch (RRC)—Second and fourth Thursdays in each month, 8pm. WRVS Centre. Salop Road, Redditch. G3EVT.
Shrewsbury (Salop ARS)—Thursdays, 7.30pm. New members welcome. The Albert Hotel, Smithfield Road, Shrewsbury. Joint secs Bob Carter, 11 Ash Close, Sutton Farm, Shrewsbury SY2 6HU, and Dave Doody, 56 Ellesmere Road, Shrewsbury SY1 2QP.
Solihull (SARS)—20 Sept (Surplus sale), 18 Oct (AGM). 7.30pm. The Manor House, High Street, Solihull. G4EQF.
Stoke-on-Trent (S-on-TARS)—Thursdays, 7.30pm. 2A Racecourse Road, Oakhill, Stoke-on-Trent. G4CWN.
Stoke-on-Trent (North Staffs ARS)—First and third Mondays in each month—lectures etc. Second, fourth and fifth Mondays in each month—natter nites, Raynet and club station G4BEM. Newcomers welcome. 7.30pm. Harold Clowes Community Centre, off Dawlish Drive, Bentilee, Stoke-on-Trent. G3YBY.
Stourbridge (StARS)—Informals on the first Tuesday in each month, 9pm. "Shrubbery Cottage" public house, Heath Lane, Oldswinford, Stourbridge. 19 Sept ("Radio in prisoner of war camps" by Tom Douglas, G3BA), 17 Oct ("GB3BM repeater" by Haydn Bate, G8AMD). 7.45pm. Longlands School, Brook Street, Stourbridge. G4CLX.
Stratford-upon-Avon (S-on-A&DARC)—Meetings will be resumed in Sept. New members welcome. G4EXR. Tel Stratford 5638.
Sutton Coldfield (SCRS)—Second and fourth Mondays in each month. 7.30pm. Central Youth HQ, Clifton Road, Sutton Coldfield. Sec Mrs Liz Furness, 4 Goodere Drive, Polesworth, Tamworth, Staffs B78 1BZ.
Tamworth (TARS)—Second and fourth Mondays in each month. Indoor Sports Centre, Corporation Street, Tamworth. New members welcome. G4EUF.
Telford (T&DARS)—Wednesdays, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Visitors welcome. G8MXS. Tel Much Wenlock 357.
Willenhall (W&DARS)—Alternate Wednesdays. Morse classes available at the end of each meeting. "The Three Crowns", Stafford Street, Willenhall. G3YHN, XYL.
Wolverhampton (WARS)—12 Sept (Natter-nite), 19 Sept (Discussion on the modification of commercial radiotelephone equipment), 3 Oct (AGM), 10 Oct (Natter-nite), 17 Oct (Members' slides and films), 31 Oct (Natter-nite), 7 Nov ("The Yaesu Musen FRG-7 receiver" by Peter Burden, G3UBX, and John Cook, G8EDG). 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. G8EDG.
Worcester (W&DARC)—5, 17, 26 Sept (AGM), 3 Oct. 8pm. The Old Pheasant, New Street, Worcester. G4DXE.

REGION 4—RR T. Darn, G3FGY, Sandham Lane, Ripley, Derbys.

Derby (DADARS)—Wednesdays, 7.30pm. Morse classes Tuesdays and Fridays when arranged, 119 Green Lane, Derby. 7 Sept (Bring and buy sale), 14 Sept (Surprise night), 21 Sept ("Hi-fi, the

modern curse for interference", causes and cures by G3VGW), 28 Sept (Film or video show), 5 Oct (Junk sale), 12 Oct (Technical topics).
Derby (NHARG)—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (GARC)—First and third Thursdays in each month. 8pm. Alexandra Social Club, Cleethorpes.
Leicester (LRS)—Mondays, 7.30pm. Club House, Gilrose Estate Cottage, off Groby Road, Leicester. The Leicester Club were the winners of the East Midlands Amateur Radio Group Contest which was held in the spring.
Mansfield (MARS)—First Friday in each month, 7.30pm. "The New Inn", Westgate, Mansfield.
Melton Mowbray (MMARS)—7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray.
Nottingham (ARCON)—Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham.
Nottingham (NURC)—Alternate Thursdays during term time. Details from Roger Dixon, G4BVY, c/o Students' Union or QTHR.
Loughborough (ARC)—Loughborough Students G8KSZ, QTHR, would like to hear from anyone interested in joining the club in the new term.
QRP Club—This very active international club is now run from the Nottingham area; they put out a very good newsletter with some very interesting QRP circuits.
Morse at Mablethorpe—A repeat of the morse class of a few years ago will be held, numbers permitting, at the Tenneson Secondary School, Mablethorpe, on Wednesday evenings commencing in September. Further information from G4CTE, QTHR.

REGION 5—RR P. F. Chilcott, G4BBA, 258 Coneygree Road, Peterborough, PE2 8LR.

Bedford (B&DARC)—1 Sept (SSB FD plans), 3/4 Sept (SSB FD), 8 Sept (Junk sale), 15 Sept (The "kiss" principle by G8BNE), 22 Sept ("Get going on rtty" by G4FEV). 8pm. United Services Club, Broadway. Sec G4FEV.
Cambridge (C&DARC)—Fridays, 7.30pm. Corporation Yard, Victoria Road. Sec G4BAO.
Cambridge (CUWS)—Tuesdays during term. Sec G4DZY, Christ's College. See us at society's fair on 4/5 Oct.
Corby (CTCARG)—Mondays, 7.30pm. Corby Technical College. Clubhouse and GB3CI in grounds.
Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South. Sec G3WXS.
March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.
Northampton (NRC)—Thursdays, 8pm. Spencer Dallington Community Centre, Tintern Avenue, off Gladstone Road. Sec G8LHR.
Peterborough (GPARC)—22 Sept ("Use of components" by John Costin, G8BSO), 27 Oct ("Weather on rtty" by G. E. D. Allcock). 7.30pm. Southfields Junior School. Sec G4BBA, tel 65213.
Peterborough (PR&SS)—3rd Friday each month, 7.30pm. Scout Hut, Occupation Road. Sec G3EEL.
Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Sec G8HHO.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA.

Banbury (BARS)—Fridays, 7.30pm. 43 North Bar, Banbury. New members and visitors welcome. Sec S. L. Terry, tel Banbury 4769.
Bracknell (BARC)—Mondays, 8pm. Coopers Hill Centre (adjacent to station). 12 Sept (Inter-club quiz), 26 Sept (Natter-nite), 10 Oct (Cheese and wine), 24 Oct (*tba*), 7 Nov (Film nite). Other Mondays, cw classes. Sec G3YMC.
Burnham Beeches (BBRC)—First Monday in each month, 8pm. Hedgerly Scout HQ. Sec Peter Flynn, tel Farnham Common 2609.
High Wycombe (Chiltern ARC)—Fourth Wednesday in each month, 8pm. 42 Castle Street, High Wycombe. Sec G4FRL.
Maidenhead (M&DARC)—16 Aug (Demonstration—"PCB techniques" by G3ZLQ). Red Cross Hall, The Crescent, Maidenhead. 24 Aug (Informal). 8pm. The Beehive, White Waltham.
Milton Keynes—for next meeting please ring sec G3THC, tel Milton Keynes 316730.
Newbury (N&DARS)—First Monday in each month, 7.30pm. Newbury College of Further Education, Oxford Road, Newbury. Sec G4EEE.
Oxford (O&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Civil Service Sports Club, Marston Road, Oxford. Visitors welcome. Sec G4BHR.
Reading (RARC)—23 Aug (Brewery visit!), 6 Sept (Junk sale). 8pm. White Horse, Emmer Green, Reading. Sec G4CCC.

REGION 7—RR N. A. Smith, G3HFO, 7 The Byeways, Surbiton, Surrey KT5 8HT.

A meeting of affiliated society representatives in Region 7 was held on 30 June. The main subjects discussed were misuse of repeaters, the RSGB International Radio Communication Exhibition at Alexandra Palace in May, and methods of recruiting new members to affiliated societies using information from HQ on new members of the RSGB. Another meeting will be held in September to co-ordinate views on the future of the RSGB in preparation for the Regional Representatives Conference on 24 September.

Addiscombe (AARC)—Tuesdays, 9pm. "Spreadeagle", Portland Road, Woodside. Sec G3SJX.
Ashford, Middlesex (Echelford ARS)—Second Monday and last Thursday in each month. 7.30 for 8pm. St Martin's Court, Kingston Crescent, Ashford, Middlesex. Sec G3TDR, tel Staines 56513.
Bexley Heath (North Kent RS)—Second and fourth Thursdays, 8pm. St Mary's Institute, 2 North Cray Road, Bexley. Sec G4ARQ.
Coulsdon (CATS)—First Thursday in each month, 7.30 for 8pm. 10th Purley Scout Hall, Chipstead Valley Road, Coulsdon. Third Monday in each month, 7.30 for 8pm. 1st Purley Scout Hall Purley Park Road, Purley. Sec G4DLD, tel Burgh Heath 59956.
Cray Valley—First and third Thursdays, 8pm. Eltham United Reform Church Hall, 1 Court Road, Eltham, London SE9. Sec G3YWO.
Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month, 7.30 for 8pm. TS "Terra Nova", 34 The Waldrons, Croydon. Sec G3FWR, tel 01-657 3258.
Crystal Palace (CP&DRS)—Third Saturday in each month, 7.30pm. Emmanuel Church Hall, Barry Road, London SE22. Sec G4AVV, tel 01-653 4340.
Guildford (G&DRS)—Second and fourth Fridays in each month. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.
Kingston (K&DARS)—Second Wednesday in each month, 8.15pm. Berrylands Scouts and Guides HQ, Stirling Walk, Raeburn Avenue, Surbiton. Sec G4APG.
New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 68 Camilla Road, Bermondsey, London SE16.
Reigate (RATS)—First Tuesday in each month, 8pm (Natter nights). Marquis of Granby, Hooley Lane, Redhill. Third Tuesday in each month, 8pm. Constitutional Centre, Warwick Road, Redhill. Sec G3XSZ.
Sutton and Cheam (S&CRS)—14 Sept, 7.30pm. Ray's Social Club, London Road, Cheam (Junk sale). 22 Sept, Sutton College of Liberal Arts, Cheam Road, Sutton (G8SM on the stereocode method of reading morse). 20 Oct, Sutton College of Liberal Arts. 26 Oct, Ray's Social Club. Sec G2DMR.
Thames Ditton (Thames Valley ARTS)—4 Oct (South Midland Communications), 1 Nov, (G3XZV on antennas). 8pm. Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.
Wimbledon (W&DRAS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G3XTC, tel 01-644 3698.

REGION 8—RR D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent.

Brighton (B&DRS)—14 Sept ("Oscilloscopes" by G3XUS), 8 Sept ("Radio interference"—GPO), 12 Oct ("Computers" by G3XJG), 26 October ("Aeronautical radio" by G3OEM). Further details from N. Hewitt, G8JFT, 74 Carlyle Street, Brighton BN2 2XW.
Burgess Hill (Mid-Sussex ARS)—7.45pm. Marle Place, Burgess Hill. Details from G3PEQ.
Canterbury (East Kent RS)—Details of future venue and programme from G8GHH.
Chichester (C&DARC)—First Tuesday and third Thursday in each month. Lancastrian Boys School. Details of future events from G4ETU, tel 0243 88069.
Crawley (CARC)—United Reform Church Hall, Ifield, Crawley. Details of future events from G3MGL.
Dartford (DHDFC)—Second Friday in each month. The Scout House, Broomfield, Dartford. DF hunts 11 and 23 Sept, details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee SE12.

Dover (South-East Kent YMCA ARC)—Details of future events from G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone.
Eastbourne (Southdown ARS)—24/25 Sept (Return visit to Radio Club de Normandie, Rouen, France), 3 Oct (Second annual junk sale). Chaseley Home, South Cliff, Eastbourne. Details from sec G8CVV, pro G3LFZ.
Gravesend (GRSGBG)—Mondays, 7.30pm. The Windmill Tavern, Shrubbery Road, Gravesend.
Hastings (HERC) (ITT(H)S&AC)—Details of future events for both units from G8DNO.
Horsham (HARC)—First Wednesday in each month. Civil Defence HQ, Moons Lane, Brighton Road, Horsham. Details of future events from G3NPF.
Maidstone (MYMCAARS)—First and third Fridays devoted to the beginner, RAE and morse tuition, 7.30pm. Alternate Fridays, a wide range of lectures and use of the club shack. Melrose Close, Loose, Maidstone. Details from Harry Poppy, G8KMX, tel Maidstone 61792.
Medway (MARTS)—Fridays, 7.30pm. Aurora Hotel, Gillingham. Details from P. J. Poole, G4EVY, 5 River Drive, Strood, Rochester, Kent.
Ramsgate (Kent Coast ARC)—Details of meetings from G4DTA.
Tunbridge Wells (West Kent ARS)—Details of future events from G8LMV.
Worthing (W&DARC)—Details of future events from P. J. Robinson, G8MSQ. Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing.
Kent Repeater Group—Details of membership and events from G3XDV, 5 Lambs Walk, Whitstable, Kent.
Sussex Repeater Group—Information available from G8HVV.

REGION 9—RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY.

Camborne (Cornish RAC)—1 Sept ("An introduction to rtty" by G4CVY), 6 Oct ("The 70cm repeater" by G3TDJ), 3 Nov (Sale of surplus equipment). 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net each weekday on 3·715MHz 10am, and on Sundays 3·692MHz at 11am. Visitors to club meetings most welcome. Full details from G3NKE, tel Camborne 712419.
Exeter (EARS)—Second Monday in each month, 7.30pm. Community Centre, St Davids Hill, Exeter. Details from G3HMY.
Newquay (N&DARS)—Alternative Wednesdays, 7.45pm. Treviglas School, Newquay. Details from G8GOR, tel Newquay 4168.
North Devon (NDRC)—Second Wednesday in each month at QTH of G4CG, fourth Wednesday at QTH of G2FKO. Full details from G4CG.
Plymouth (PRC)—First and third Tuesdays in each month. 7.30pm. Virginia House, Bretonside, Plymouth. Visitors most welcome. G4EJO.
Saltash (S&DARC)—First and Third Fridays in each month. 7.30pm. Burraton Toc-H Hall, Saltash. Sec G8LLR, tel Plymouth 771135.
Torbay (TARS)—Fridays, with special meeting on last Saturday of each month. 24 Sept ("Speech processors"). 7.30pm. Rear of 94 Belgrave Road, Torquay. Torbay net, weekdays 3·756-3·764MHz, Mondays to Fridays 1030, Saturdays 0930. Visitors to club meetings always welcome. Full details from G3UIQ, tel Newton Abbot 3025.

REGION 10—RR R. G. Barrett, GW8HEZ, 23 Carshalton Road, Beddau, Pontypridd, Glam.

Barry (BCoERS)—Thursdays, 8pm. Barry Rugby Football Club, Reservoir Road, Barry. Details from sec GW3VBP.
Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, near Blackwood. Details from sec GW3KYA.
Bridgend (Glamorgan VHF/UHF Group)—Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, near Bridgend. Details from sec GW8HEZ.
Cardiff (CRSGBG)—11 Sept (Mobile picnic, Porthkerry Park, Barry, from 12 noon), 12 Sept ("The Time Code Clock" by GW4COJ), 10 Oct (AGM and constructors' contest), 17 Oct (Social evening—cabaret, music and dancing at Roath Conservative Club, Cyril Crescent, Cardiff). 12 Sept and 10 Oct, 7.30pm, Pantmawr Inn, Pantmawr Estate, Cardiff. Details from sec GW3VOW, 9 Millrace Close, Lisvane, Cardiff.
Merthyr (Hoover ARS)—Mondays 7.30pm. Hoover Social Club, Pentrebach, Merthyr. Details from sec GW8HHY, QTHR.
Newport (NARC)—Mondays, 7pm. Adult Education Settlement, Brynglas Road, Newport. 12 Sept ("Linear amps" by GW3NWS), 10 Oct ("Oscilloscopes" by GW3NWS). Details from sec GW8MER.
Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.
Pontypool (PRSGBG)—Tuesdays, 7pm. Education Settlement, Park Hill Road, Pontypool. Details from GW3JBH.
Port Talbot (British Steel Corporation ARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW4ESV.
Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.
Sully (S&DSWC)—Mondays, fortnightly, 7pm. Sully Bowls and Social Club, 58 South Road, Sully. Details from sec GW8JHF.
Swansea (SARC)—Tuesdays fortnightly, 7.30pm. The Commercial Inn, Killay. Details from sec GW4AYJ.

REGION 11—RR P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinile, Caernarvon LL54 5TW.

Rhyl (R&DARC)—It is regretted that this club has been closed until further notice.
Conway Valley (CVARC)—Second Thursday in each month. The Quaries, Llandulas, Colwyn Bay.
Bangor (UCNWARS)—Thursdays, 7.30pm. School of Engineering Science, Dean Street, Bangor. Prospective members please contact the sec.

REGION 12—RR Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.

Aberdeen (ARS)—Fridays, 8pm. Cowdray Club, 5 Fonthill Road, Aberdeen. 9 Sept (Closed), 16 Sept (Talk on the FT221R and TR7200G), 23 Sept (Mini-lecture and extraordinary general meeting), 30 Sept (Latest repeater information), 7 Oct (Junk sale), 14 Oct (Talk on the IC201 and IC211E), 21 Oct (AGM), 28 Oct (Presidential address), 4 Nov (Junk sale). Sec GM4BKV.
Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Kingsway Technical College. Sec Robert Officer, 17 Broomwell Gardens, Monikie, Broughty Ferry, Dundee DD5 3QP.
Inverness (Technical College ARC)—Meetings commence second Wednesday in September, 6.45pm in room C30. Club activity presently at an all time low and it is hoped for a much more enthusiastic winter session. As a project the club recently built an rtty converter which will be in use during the winter period. Sec John Reid, 37 MacEwen Drive, Inverness.
Lerwick (ARC)—Wednesday evenings at Annsbrae House, Lerwick. Sec GM3HTH.
Moray Firth (MFARS)—Wednesdays, 7.30pm. Elgin Technical College. Sec GM8LVG.
Perth (P&DARG)—The club are presently investigating the possibility of operating a repeater in the Perth area. Full details of meetings etc from sec GM4DQJ.

Bob Kerr, GM4FDT, (left) with George Pople, GM4DKL, who operated a demonstration station at a recent Hobbies & Crafts Exhibition in the Community Centre, Lairg, Sutherland.
Photo: A. M. Smith

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent Kirkcaldy, Fife KY1 2LH.

Berwick upon Tweed (Border ARS)—First and third Fridays in each month, 7.30pm. Roxburgh Hotel, Berwick upon Tweed. Details from GM8IIO.

Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencreiff School, Maitland Street, Dunfermline. Details GM3MGX, tel Limekilns 313.

Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Carlton Hill, Edinburgh. Details from GM4BWT, tel 031-668 1119.

Edinburgh (Lothians RS)—Second and fourth Thursdays in each month, 7.30pm. Adult Education Centre, Riddles Court, High Street, Edinburgh. Details from GM4BYF, tel 031-447 3201.

Glenrothes (G&DARC)—First Sunday in each month and every Wednesday, 7.30pm. Old Primary School, Provosts Land, Leslie, Fife. Details from GM3YOR, tel Kirkcaldy 200335.

REGION 14—RR (Post vacant)

Glasgow (WoSARS)—16 Sept ("RSGB"), 30 Sept ("RTTY" by GM3SZP), 28 Oct ("VHF tx" by GM8BBA). 8pm. 22 Robertson Street, Glasgow. Details from GM4FDM.

REGION 15—RR H. J. Campbell, 26 Kilcoole Park, Belfast BT14 8LB.

Ballymena (BRC)—Tuesdays, 8pm. 86 Old Cullybackey Road, Ballymena. RAE and morse classes. Fridays, club night; Sundays, special projects, 3pm. 2 Sept (AGM). Sec GI8LSF.

Bangor (B&DARS)—First Friday in each month, 8pm. Redcliff Road, Bangor. 2 Sept (AGM). Sec GI4AAM, 14 Manse Road, Bangor.

Belfast (QUoBRC)—Tuesdays, 8pm. Queen's University Radio Club, 37 Fitzwilliam Street, Belfast. All welcome.

Belfast (CoBYMCARC)—Club now active at new address, YMCA, Wellington Place, Belfast.

Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. 21 Sept (AGM). Come along and help arrange winter programme. Further details from GI8FOK.

Carrickfergus (CYMCARC)—Last Monday in each month, 8pm. Carrickfergus YMCA. New members very welcome. Sec C. Morrison, GI8KZU, 3 Donegall Square, Carrickfergus, Co Antrim.

Mid-Ulster RSGB Group—First Sunday in each month at QTH of GI4BAC. 4 Sept (AGM). Sec GI3WWY.

North Ulster (NURSGBG)—For details contact GI3UHL, QTHR.

REGION 16—RR R. E. G. Kendall, G8BNE, "Wesley", Ranworth Road, Hemblington Corner, Blofield, Norwich NR13 4PJ.

Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from R. Brocks, 30 Rowan Drive, Heybridge, Maldon.

Colchester (CRA)—Wednesdays, 7.30pm. 114 Ipswich Road, Colchester (above Candor Motors). Details from G3YAI.

Great Yarmouth (GYRS)—Last Thursday in each month, 67 Southdown Road, Great Yarmouth. Details from G3NHU.

Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Details from G3WUX.

Ipswich (IRC)—14, 28 Sept (To be arranged), 12 Oct ("Mellor data" by G. Mellor), 9, 30 Nov ("Aerials" by C. Chambers, G8KET). Ranelagh Road School, Ipswich.

Loughton (L&DRS)—Second and fourth Fridays in each month, 8pm. Loughton Hall, near Debden station. Details from G8DZH.

Lowestoft (L&DARC)—Fridays, 7.30pm. Morse class every Tuesday. YMCA, Park Road, Lowestoft.

Martlesham (MRS)—7 Sept (TX/rx test session—G4FZZ), 5 Oct (Postal mechanization and automation). Details G3ZNU, PO Res Centre, Martlesham.

Norwich (Norfolk ARC)—7 Sept (Visit of RSGB President), 14 Sept (Air traffic control), 21 Sept (CW tuition), 28 Sept (Surplus equipment auction), 5 Oct (CW tuition, committee meeting), 12 Oct (Special general meeting), 19 Oct (CW tuition), 26 Oct ("Crystals and crystal oscillators" by D. Hill).

Norwich (U of East Anglia R&EC)—Details from P. Gowen, G3IOR.

G3NYK (bottom right) operating G4BPO, the 14MHz demonstration station on the air during the Families Open Day at the PO Research Centre, Martlesham

Vange (VARS)—Thursdays, 8pm. Youth Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR L. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants.

Basingstoke (BARC)—First Saturday and third Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Sec G3CBU.

Basingstoke (UKFM Group, Southern)—Chineham House, Basingstoke. Details from PRO G8ECO.

Bournemouth (Wessex ARG)—First and third Fridays in each month, 7.30pm. The Dolphin Hotel (club room), Holdenhurst Road, Bournemouth. Sec G. Cole, G4EMN, tel Bournemouth 20027.

Chippenham (C&DARC)—Tuesdays, 7.30pm. Sheldon School, Hardenhuish Lane, Chippenham. Sec G8BXG.

Fareham (F&DARC)—Wednesdays, 7.30pm. Porchester Community Centre, Room 9. Sec D. Thompson, tel Fareham 2799.

Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Sec G4FEA.

Guernsey (GRES)—Tuesdays and Fridays, 8pm. Details from sec GU8ITE, PO Box 100, Guernsey.

Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Sundays 6.30pm. 21·40MHz. Sec G4CHO.

Jersey (JARS)—Sundays, 10.30am, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec Mary McTaggart, 19 Parade Road, St Helier.

Poole (PRAS)—Last Friday in each month, 7.30pm. Poole Technical College. Sec Graham Tizzard, tel Poole 4641 ext 34.

Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. G3CNO.

Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G3FIX.

Southampton University (SUARC)—Tuesday evenings, also informal meetings every lunchtime in the clubroom, Old Union Building. Sec A. George, G4ESZ.

Two distinguished speakers attended a meeting of the Wessex ARG on 20 May: Ken Alford, G2DX, talked on "The early days of wireless", and Dud Charman, G6CJ, gave his fascinating well-known talk on antennas. Left to right: Roy Scott, G2CZH, club vice-chairman; G2DX; Frank Hicks-Arnold, club president; and G6CJ

Southampton (SRSGBG)—Second Saturday in each month, Lanchester Building, Southampton University; Wednesdays, the clubroom, Kent Road; both at 7.30pm. AR G4COM.
South Dorset (SDRS)—7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Details from G3YWG.
Swindon (SD&ARC)—Alternate Wednesdays, 7.45pm. Clubroom above Coldharbour Public House, Blunsdon, just north of Swindon. Sec G8KWC.
Winchester (WARC)—First and third Fridays in each month, 7.30pm. Antrim House, St Cross Road, Winchester. G4BKE.

REGION 18—RR P. J. Fay, G3AKG, 5 Harland Way, The Glebe, Washington, Tyne and Wear NE38 7RB.

Durham (DUARS)—Alternate Wednesdays during term. Physics Dept, Durham University. All local amateurs are welcome to join. Talk-in by G4DUR on R5 or S20 before all meetings.
Easington (AR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good RAE pass record). ATV can be received on 625 lines. The club is now equipped with an hf transceiver as well as other gear. Sec G4CO1.

RSGB Region 18 (NE England)

REGIONAL LECTURE

Scarborough Lecture Theatre
University of Durham

(By arrangement with the Durham University Radio and Electronics Society)

Commencing 6.30pm (sharp) Saturday 8 October 1977

Speakers:

Mr "Dud" Charman, G6CJ, with his famous "Aerial Circus"
Mr B. O'Brien, G2AMV, Zonal manager

All amateurs and SWLs welcome

Talk-in by G4DUR on R5 and S21. Entrance on South Road (A1050)

Details from G3AKG, QTHR, or at your local club

Great Lumley (AR&ES)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Assistance with RAE and morse if required. All amateurs and SWLs welcome. Sec G8JLQ.
Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall, Grange Road. Sec G3NWU, 73 Eamont Gardens, Hartlepool.
Middlesbrough (POARC)—Sec G8CDP, 48 Grange Road, Hartlepool, Cleveland.
Morpeth (Northumbria RC)—Now meets Thursdays, British Legion premises, Gambois, near Blyth. Sec G4AVO.
Newcastle-upon-Tyne (Tyne and Wear Repeater Group)—First Wednesday in each month. Arts Common Room, University of Newcastle. Open to all amateurs and SWLs. 23 Sept (The group cordially invites all radio amateurs and SWLs to meet the RSGB vhf manager, Mr David Evans, G3OUF, at a question and answer session about the future of vhf amateur radio). 7.30pm. Refreshments provided. Sec G3URE.
South Shields (SS&DRS)—Fridays, 7.30pm. Trinity House, Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue,
Middlesbrough (Teesside Repeater Group)—Last Tuesday each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and SWLs invited but first contact sec Mrs Pauline Bland, G8MBK, 5 Belgrave Drive, Normanby, Middlesbrough, Cleveland.
Tyneside (TRS)—Mondays, 8pm. The Community Centre, Vine Street, Wallsend. Sec Alex Frazer, 35 Percy Street, Tynemouth.

REGION 19—RR D. S. Smith, G4DAX, 151 Hamper Mill Lane, Oxhey, Watford, Herts.

Acton, Brentford & Chiswick (ABCRC)—20 Sept (G3CCD as F0UT in France), 18 Oct (2m antennas). 7.30pm. Chiswick Trades and Social Club, 66 High Road, Chiswick. Sec G3GEH, tel 01-992 3778.
Barking (BR&ES)—Mondays (Constructional), Wednesdays (CCTV techniques), Thursdays (Informal). Morse classes Tuesdays. 7.30pm. Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex. Sec N. Dowsett, 44 St Anne's, Barking.
Cheshunt (CDRC)—New premises—Church Room, Church Lane, Wormley, Herts. Wednesdays, 8pm.
Chingford (Silverton RC)—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Visitors very welcome. Sec G4AJA, tel 01-529 2282.
Ealing (EDARS)—Tuesdays, 8pm. Northfield Community Centre, Northcroft Road, London NW13. Newcomers and old-timers very welcome. Sec M. E. J. Cummings, G8KPN, tel 01-997 5947.
East London RSGB Group—Summer break until September. Do not forget "Small box of tricks competition". Build something into a 2oz tobacco tin. Rules from sec J. Bundock, G4CJQ.
Edgware & District RS—Slow cw under club call G3ASR/A now on 144·175MHz, Mondays 8.30pm, and first and third Thursdays 7.30pm. Reports greatly appreciated. Sec G4BZY, tel 01-952 2495.
Harrow (RSH)—Fridays, 8pm. The Roxeth Community Centre, Scott Crescent, West Harrow, Middx. Sec G4FBK, tel 01-864 1412.
Havering (H&DARC)—Wednesdays, 8pm. British Legion Club, Western Road, Romford.
Holloway (Grafton RS)—7.30pm. Holloway Institute, Archway Annexe, Highgate Hill, London N19. Sec G3ZKE.
Ilford RSGB Group—Thursdays, 8pm. 50 Mortlake Road, Ilford. Details from D. T. Sapworth, G3YMW.
Northolt (British Airways European Division ARS)—First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact G3OUF, tel Amersham 21573 for details. Civil Aviation Sunday net at 1100-1200gmt on 3·68MHz, listen for G3NAF or G3BEA.
Shelbourne (SRC)—Wednesdays 7pm-9pm (Electronics for beginners), Thursdays, 7pm-9pm (Club evenings). Shelbourne Youth Centre, Hornsey Road, London N4.
South Kensington (Baden Powell House Scout ARG)—Third Tuesday in each month, 8pm. Baden Powell House, Queensgate, South Kensington.
Southgate (SRC)—Second Thursday in each month, 8pm. The Green, Winchmore Hill, London N21. Sec G4AEZ, tel 01-366 7166.
St Albans (Verulam ARC)—22 Sept (G3KFE), 27 Oct ("Early experiences of radio communication" by C. Martin). 8pm. Market Hall, St Albans. Second Thursday of month (Informal meetings). Details from sec G4DUS.
Stevenage (S&DARS)—15 Sept ("Amsat" by G3RWL), 6 Oct (Zone C manager—G3MXJ), 20 Oct ("Intruder watch" by G5XB), 3 Nov (Junk sale). 8pm. Canteen, Hawker Sidley Dynamics Ltd,

Gunnels Wood Road, Stevenage, Herts. Talk-in on S20. Sec G8KMV, tel Stevenage 54689.
UK FM Group (London)—Second Tuesday in each month, 7.30pm for 8pm. Grove Park Hotel, Junction Bolton/Spencer Roads, Grove Park, Chiswick.

REGION 20—RR G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol.

Bath (B&DRG)—Tuesdays, 8.30pm. The Crypt, Ascension Church, 35a Claude Avenue, Oldfield Park, Bath. Sec N. S. Cridland, Flat 3, 30 Paragon, Bath. BA1 5LY.
Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. Sec G8KGE.
Bristol (Shirehampton ARC)—Fridays, 7.30pm. Twyford House, Shirehampton. New members most welcome. G4BWB.
Bristol (BRSGBG)—26 Sept (Brains trust), 31 Oct (Geology of the Bristol area), 28 Nov (Regional rep). 7-9.30pm. Small lecture theatre, Queen's Buildings, University Walk, Clifton, Bristol 8. Sec G4FRG.
Cheltenham (CRSGBG)—First Thursday in each month, 8pm. The Old Bakery, Chester Walk, Cheltenham. 1 Sept (The Society President). Sec G3KII.
Gloucester (SARS)—First Thursday in each month. 1 Sept (AGM). Chequers Bridge Centre, Painswick Road, Gloucester. Sec G3MA.
Weston-super-Mare (WsMARS)—Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle. G3PQE.
Yate (Y&DARC)—First Saturday in each month, 8pm. G3RQN QTH. All welcome, including SWLs. Local chat channel S24, 145·6MHz, 2100 Wednesday and Saturday. Further info from G8LGC.
Yeovil (YARS)—Thursdays, 7.30pm. Hut 101, Houndstone Camp (three miles W of Yeovil, off A3088, info at main gate). S20 fm talk-in. Sec G3NOF.

Looking ahead

10 September—Scottish Amateur Radio Convention, Adam Smith Centre, Kirkcaldy.

17-18 September—NW Amateur Radio Convention, University of Lancaster.

25 September—Welsh Amateur Radio Convention Oakdale Community College, Blackwood, Gwent.

15-16 October—Jamboree on the Air.

27-29 October—ARRA Exhibition, Granby Halls, Leicester.

2 December—RSGB AGM, IEE, Savoy Place, London WC2.

1978

2 April—Northern Radio Societies Association Convention and Exhibition, Belle Vue, Manchester. Details from G8BCG or G4BVE, QTHR.

Contests calendar

18 September	DF Final South Manchester
18 September	10GHz Cumulative (Rules in May issue)
1-2 October	UHF (432MHz–2·3GHz)
8-9 October	21/28MHz (Rules in June issue)
15-16 October	7MHz Phone (Rules in June issue)
23 October	70MHz Fixed
October–November	432MHz Cumulative
5-6 November	7MHz CW (Rules in June/July issue)
5-6 November	144MHz CW
12-13 November	2nd 1·8MHz
4 December	144MHz Fixed

Mobile rallies calendar

18 September	Peterborough Mobile Rally, Walton Secondary School, Mountsteven Avenue, Peterborough. Talk-in station G3DQW on 2m. Details from G3EEL, QTHR, tel Peterborough 62881/65423.
25 September	Harlow & D ARS Rally, Netteswell Comprehensive School, Harlow. Details from G3WUX, G8FRG, G3YDI, QTHR.

The RSGB stand at the RNARS rally on 19 June, with Len Newnham, G6NZ, the man behind the stall

Members of the Southampton University Radio Club alongside the 1929 Dennis bus, nicknamed the "Toastrack" and maintained and run by the engineering faculty of the university, at the Longleat Rally on 12 June. Left to right: C. Bryant, G3WIE, and xyl; C. Debney, G3ZYW; R. Taylor, G4FDG; A. Lincoln, G4CIG, and yl; I. Mercer, G3ZER; M. Bayes, G4DZC; A. George, G4ESZ; J. Spicer, G8LJU; J. Old, G4DMY; F. Baldry, G8IOP; A. Ward, G8KGG, and R. Keech, G8MKL

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 alternate issues 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 75p (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. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

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.

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS.

Do not post to RSGB HQ or Advertising Representative.

FOR SALE

DFM, 60MHz, 50mV sensitivity, 100Hz res, 6-digit led, sup leading zeros, prof pcb, case 8 by 2 by 5, £42 ono. Buyer collects. Tel 01-648 5895.

Complete station comprising Yaesu FT200, FP200, mic, type D morse key, home-brew swr meter, lpF dummy load, 25ft mast and various antenna bits and pieces incl makings of TA31. £245. G3UAO, QTHR. Tel 076-31 5245 evenings.

Yaesu FR101D, manual, mint cond, 2m ground plan antenna and two 30ft galvanized steel poles. £320 ono. Buyer collects. Must sell, moving. Whittingham, 351 Woodham Lane, New Haw, Weybridge, Surrey. Tel Byfleet 43124.

FRDX400, ideal swl rx, 10 to 160m, exc cond, very little used, £135. G4EOW, QTHR. Tel Romsey (Hants) 512475.

CR100, clean, ok, must be collected, £15. Xtals: HC6U 33·200, 51·900, £2 each; HC18U, most wire leads, 10·250, 10·300, 10·800, 33·200, 33·375, 33·440, 34·4825, 34·825, 35·000, 35·658, 37·325, 40·000, 43·333, 44·600, 45·000, 74·825, 78·525, 80·506, 81·506, 84·506, 88·304, 88·975, 90·833, £1 each. G3HBG, QTHR.

SSM Europa, £70. MM 70cm to 2m converter, £13. Tripler, £13. Joystick UFA, system J, unused, £34. Pye Cambridge AM10D hi-band, unmod, complete, £20. G4FGJ, QTHR. Tel Oakley 3304.

Save £40. Nearly new Microwave Modules 70cm transverter, MMT432/28, together with Jaybeam MBM48-el Multibeam, £90 the pair. Two new Sylvania 6JB6 pa tubes (Drake NCX etc), £5. Tyler, 94 Alexandra Ave, Luton, Beds. Tel 0582 25519.

FT101, including fan, ext spkr, mic, exc cond, £275. HQ1 Minibeam, Stolle 2010 rotator, £65. 8Y/2m Yagi, brand new, £8. Dual swr bridge, rf field indicator, with traps, terylene guys, shackles, £15. Buyers collect. G4CEU, QTHR. Tel Southend-on-Sea 526431.

Pye PTC331 20W a.m. tx with fm using Burns phase modulator, vxo for most fm channels, £20. Two 2m to 70cm Bay 96 varactor triplers, £10 each. 8MHz Emu vfo, £8. Marconi TF390G sig gen, 10-150MHz, £10. Communication receivers: AR88D, £50; BC342M, £35; both with fm discriminators, spares and handbooks. Microwave Modules 70cm converter, 28-30 i.f., £18. DL6SW 2m converter, 28-30 i.f., £10. HBW 2m converter, 6-8 i.f., £8. Rx atu, 3-xtal calibrator and preselector, £10. G8EZJ, QTHR. Tel Reading 476873.

If you want a JR500S with top band, phone 01-460 7148 and ask for Phil, G8MDA, and have £40 ono in used oncers handy, or write to 97 Nightingale Lane, Bromley, Kent.

TS700G, TR7400A, Datong UC/1, Microwave Modules 500MHz counter, all as new, for sale to best offers. G8DLP, QTHR. Tel 021-556 3324 daytime.

Multimobile G-whip, 10/15/20 plus 80m (slightly damaged) and 160m coils, new price over £30, bargain at £16.50. MK Products factory assembled sstv PCBs, 5FP7 tube, almost finished psu, £38. Codar CR70A gen cov rx, £21. Prices include carr. G4BVH, QTHR. Tel 0273 504634.

Liner 2, fitted preamp, mic, Belcom R115E psu, manual, mobile mount, mint cond, £115, no offers. *Radio Communication Handbook*, 4th ed, £5. 2m 5⅛ whip, hinge type, no base, £3. Smith. Tel Worc 354679.

Latest model IC240 with IC3PA psu, all mobile fittings etc. 6-el quad. All just three months old, still under warranty, hardly ever used, first £200 secures. Buyer collects or deliver at cost. GW3CBA, QTHR. Tel Barry 737793.

Heathkit SB200, £150. Hy-Gain 203BA BN86 balun, £50. G4DJC, QTHR. Tel 0245 69034.

FT277 Mk2, exc order, £290. Heathkit SB300, SB400, completely overhauled and revalved, exc order, £180. Francis and Lewis 40ft lattice tower, as new, £60. Devices Sales Ltd Heatpen recorders with handbooks and paper, £150 each. G5UG, QTHR. Tel 0934 25961.

Datong UC/1 up-converter, £80. Yaesu FR101DD digital rx, fitted extra 5MHz xtal, £380. Reason hope to need tx. Could deliver reasonable distance. Riminton, 17 River Mount, Walton-on-Thames, Surrey. Tel Walton 20898.

FTDX500 tx/rx, 560W, p.e.p. a.m./ssb/cw, spare valves, KW E-Zee match, SWR50A, 50Ω dummy load, instruction manuals, £285. S. Williams, 7 Oddfellows Street, Scholes, Cleckheaton, W Yorks BD19 6NX.

Pye Monoscope tv test card generator, test card G, in 5ft by 19in blower cooled rack, wkg order, £25 ono. Prefer buyer inspect and collect. G4FEV, QTHR. Tel Bedford 64148.

Twenty-six 4m Cathodeon xtals made to Pye specs for Cambridge and Bantam, £1.25 each or £20 lot to clear. 4-el 4m Jaybeam, boxed, used one contest only, £8. Pye F30AM base, £150. Setak. Tel Caterham 47892.

Liner 2 ssb tx rx, with latest PA1 preamp, £120 or exchange for IC202. 90W a.m. tx, modulator and psu, £20. G8KKA, QTHR.

TC10 tx, mk2. TC7 rx, mk2. Magnum 2 linear. 10-el Jaybeam. All exc cond, with circuit diagrams, instructions, etc, deliver 50 miles, £225 or will separate, buyers to collect. *Wanted:* quality hf tx/rx. G8KDW, QTHR. Tel 08277 2348 evenings.

Trio JR500S rx, 80-10, no-mods, exc cond, box, £40. *Wanted:* mobile fm/a.m. rig, Cambridge, Storno or similar with several ch control gear, must be wkg 2m. Les Boddington, 1 Davenport Drive, Castle Vale, Birmingham 35. Tel 021-748 7569.

Liner 2, preamp, R115E power supply, £140. TR2200G, 13ch, nicads, £130. 2m fm pa, 1W in, 18W out, preamp, £25. Lafayette HA600A gen cov rx £35. Microwave Modules 2m converter, 2-4MHz i.f., £13. All ono. G8FSL, QTHR. Tel 01-360 5221.

Pair Pye Pocketphones, nicads, charging pcb, RB2 xtals, tx output 400mW, some spares, £33.50 plus post. 2m 40673 mosfet preamp. £4. 1750 xtal toneburst, £5. All good clean wkg cond. Martin Oakcroft, Kingston Lane, East Preston, Sussex. Tel 0843 20592.

Shack clearance: G3HTA hf amateur bands rx, Electroniques front-end, Q-multiplier etc, £45; HW7 3-band tx/rx, still under guarantee, £50; DX40U with vfo, exc cond, £40; Panda Cub tx, working cw only, £15. G4FEQ, QTHR. Tel Leeds 863361.

FR50B rx, vgc, £65. G8KNO, 55 Greenway Rd, Taunton. Tel Yeovil 25129 evenings.

Icom IC202, very nice rig, little used, as new, £135. G4FAI, QTHR. Tel 01-807 3537.

KW201 amateur bands rx, 1·8-28·8MHz, double conv, ssb, a.m., cw, xtal controlled first mixer, switched usb, lsb, 1kHz readout, 1kHz xtal calibrator, handbook, vgc, £110. Revill, 74 Selworthy Drive, Stafford ST17 OPP. Tel Stafford 63387.

TH3JR Thunderbird 3-el, 3-band beam, good cond, £70. G3NUG, QTHR. Tel Radlett 4435.

KP202, fitted S0, S20, S21, S22, R6, R4, with extra xtal R7, nicad batteries, leather case, helical whip, £100 ono. QM70 transistor 2m transverter, 2W output, 12V supply, £40. G4CLA, QTHR. Tel 061-370 3160.

Datong filter, model FL1, unused, £40. Storno Viscount, 4ch, 145, S20, S22, R7, fitted preamp, £35. G3YJD. Tel Watford 45133.

Grundig TK reel-to-reel tape recorder, with mic and tapes, little used, almost as new, £20 ono. Prefer buyer collect. G3MA, QTHR.

Essex Telecoms 2m colinear, £20. Mosley RD5 amateur bands swl trap dipole, £10. Bantex 2m mobile whip, £5. Heath code practice oscillator and key, £7. Morse records, beginners, advanced and check record, £3 set. G8HPA, QTHR. Tel 078-73 71842.

BC348 6-band rx, £25. Professional nuvistor converter, 145MHz, £12. Ancient 144MHz tx, £10. Each with mains psu and sets spare valves. Many xtals, random frequencies, all 50p. SAE for list. G5UM. Tel Leicester 416473.

KW202, £175. KW Vanguard, £30. B40, £15. Heathkit dummy load, £5. Tel Cheltenham 20409.

Yaesu Musen vfo FV400S, new cond, £40 ono. YD844 desk mic, £10. 18AVT vertical, £35. Graves, G4BCP, Woodpeckers, Hillside Road, Rothbury, Northumberland. Tel 066-92 20846.

FT200, FP200, 80-10m, tx/rx, vgc, £230. HQ1 minibeam, £35. KW E-Zee match, £15. G4DFS, QTHR. Tel Barnsley 790386.

Sommerkamp FRDX500, exc cond, £150 ovno. Buyer must test and collect. Kavanagh, 5 Nada Road, Highcliffe, Christchurch, Dorset. Tel Highcliffe (042 52) 6914.

HW202 fm rig with Heathkit psu and xtals for tx/rx on S0, S20 and rx only on S21, S22 but room for more, mint cond but must sell as hopefully going hf, £85 ono. G8JOH, QTHR.

Storno CQL662 uhf fm 6W tx/rx, control box and access tone, antenna, xtals fitted for RB4 and SU8, up to 12ch available, £75. Tel Ipswich 0473 310442.

Mains transformers, oil filled: 1,185V-0-1,185V, 360mA, £8. 500V-0-500V 250mA, 3 × 6·5V 5A, £4. 230V-0-230V, 2 × 6·3V, 6A, £3.50. Mains psu, stabilized, suitable for Liners or fm equipment, adjustable from 8 to 18V dc, 3·5A, £20. SAE enquiries. Carr extra. G4DFE, QTHR.

Single meter swr bridge SWR10, £4. Pair Eagle FR65 10W 8Ω hi-fi spkr chassis, £8. *Wanted:* FLDX400 tx. SP400 spkr 444 mic. G8KAX, QTHR.

Business forces QRT: FT200B with FP200, as new, less than 10 hours use, £230. TA33JR with AR22R, £49. Liner 2, fitted preamp, £105. G3ZVC module with hf preselector/driver components, £50. G2DAF tx mk2 wkg fb 10-80, £40. Tel Reading 694761 evenings.

FT200, psu, vgc, full 10m coverage, new PAs and driver, £200. ITT Starfone FM10 fitted S20, S22, base station psu/spkr, sleeve and mic, full service manual, £70. G3IKN, QTHR. Tel 0344 26197 after 6pm.

Pair cb walkie-talkies, suitable conversion 28MHz, £12. Z-Match atu, £15. Pair Richmond teak bookshelf spkrs, £6. *Wanted urgently:* Trio TR2200 or similar 2m tx/rx. Electronic keyer for /MM. G4CRH, QTHR. Tel Chipping Norton 2724.

Kimber-Allen 37 note keyboard, gold dp contacts, pcb, unused, £30. Carlsboro Wah-Swell pedal, £12. Valve 2m converter, requires 300V and 6·3V, £3. Two 10H chokes, £1 each. Four 5,000μF 35V electrolytics, 50p each. G8GNI, QTHR. Tel 01-361 9364.

Collins 455kHz xtal filters, 500Hz bandwidth, £10. DX100U with spare valves, manual, £35. BC221 with mains psu, manual, £18. 6146 valves, new, boxed, £3. HRO BS and GC coils, S-meters, most other parts. G3AAK, QTHR. Tel Ringwood 3078.

Bantam, fully wkg on 2, good cond, £40 ono. ZVC ssb with preselect, pa, and psu wkg on 80m and 20m, 100W out, £90 ono. G4FAW, QTHR. Tel Ipswich 58815.

Marine vhf tx/rx, 25kHz channels, ITT type STR20B, 12/24V dc 10W, comp with manual, handset, channel xtals, £140 carr paid. Valves: QV08-100B, £3.50; QZ06-20, £1.25; 5B254M, £2; 1625, £1. Racal Mobical u/l ssb 10·7MHz filters, £20 pair. G3JMJ, QTHR. Tel 073-271 3467.

JVC Nivico TD-694 stereo tape deck, as new, in maker's box, swop mobile rig, hf or vhf or why? 18AVT with radials and UR67, £35. G4DRI, QTHR. Tel 01-440 7137 after 7pm.

Liner 2, fitted with 2m rx preamp and 10m tx preamp for use with QM70 70cm transverter, QM70 28/432 transverter, 10W output, audio speech processor, plugs, cables, manuals as supplied, buyer collects, £140 ono complete. G4FAZ, QTHR. Tel 030-57 71053 evenings.

Yaesu FRG7 gen cov rx, mint cond, sale due to bereavement, £130. G4EJH, QTHR. Tel 0272 843897 evenings.

Complete home/mobile station: Drake TR3, RV3 vfo, ac psu, spkr, DC4 psu, mobile harness, mount, Hustler antenna, resonators for 10/15/20m, mic, owner buying new Drake-Line, £300 ono. Tel 0474 4694.

Drake T4XC, R4C 160 to 10m, WWV 10MHz, 15MHz FL1500, AC4 psu, mint cond, recently realigned, £800 complete. Heathkit SB200 linear, good cond, £180. Buyers collect. G3SVH, QTHR. Tel 0922 414524.

KW200B, first class cond, ac psu, £205. Class D wavemeter, 1·8-8·0MHz, £7.50. Nombrex sig gen £5. Martin 3-speed 2-track tape recorder, £8. G4CMU. Tel Burgh Heath 54497.

Microwave Modules MMT144/28 2m transverter, with leads, as new, £75 ono. G8LYT, QTHR. Tel 061-428 8594.

Skyfon superhet transceivers, 3ch, 1W, 8 transistors, 1 ic, xtalled 11m channel for conversion to 10m, as new, cost £80-£90, cash required. Nigel. Tel 01-508 4444 (Loughton) daytime.

Heathkit HW101, £200. SB102, £135. Depth sounder, £35. Hustler whip, 15, 20, 80, £30. Q-multiplier, £7. HP13, £25. HF dummy load wattmeter £35. AV-3U millivoltmeter, £12. Some Heathkit ssb filters and hf tx/rx xtals. Offers. G4BZU, QTHR. Tel Cheltenham 26530.

Yaesu FRG7 rx, nearly new, £120. Sommerkamp FL200B tx, £115. Owner renewing gear. G4FVR, QTHR. Tel Scarborough (0723) 74539.

PF1 tx/rx, RB4, above average cond, new batteries, charger, and ac psu for rx. Bantex 5λ8 432MHz whip. KW E-Zee match. Ac psu, 6·3V 3A, 300V 70mA. Offers. G3XLL. Tel Mellis 596 evenings or weekends.

Liner 2, £85. Hy-gain 18AVT/WB, £40. Stolle rotator 2010, £30. Bantex 2m whip and mag mount, £10. All as new. Collect and inspect. G and D 2m converter, 28/30 i.f., ac supply, £10. G3OSH, 22 St Peters Close, Horton, Nr Ilminster. Tel Ilminster 3349.

70cm PA 2X4CX250B commercial with filters, £35. Codar AT5 tx. T28 rx switching unit and dc psu, exc cond, £40. AV08 comp with prods and leather case, £50. 2m pa 150W, £20.

Wanted: For collection 2C1 tx/rx. G8BSR. Tel Telford 460096.

Tired of talking to yourself? Try my auto-reset repeater timer, times multiples of basic time period, marked by three "pips". No connections to your rig required—5μA quiescent current. G8KKP, QTHR.

Original manuals for AR88-D, HRO S27, BRT400/402, CR300, All good cond; valves 832, 832a, 866. All items £1 each incl post. G2QY, QTHR. Tel Cheltenham 20105.

Heathkit HD-10E electronic keyer, perfect, with manual, £25. Class D wavemeter with book, mains, £8. Medco lp filter 75Ω, unused, £5. GW3YUC, 30 Wern Isaf, Penywern, Dowlais, Mid Glam.

Give-away prices. I have a large quantity of xtals, microwave components, rtty equipments, Pye tx/rxs 4m, 2m, low, medium and high power, SL600 ICs and many other items to clear. Send sae for large list. Shepheard, GW3XNS, Bryn Tawel, Belmont Road, Bangor.

FT200B, showroom cond, little used, £255 ono. Belcom Liner 2 mk2, vgc, £130. 18AVT/WB plus radials, £40. CT373 test set incl af osc, valve voltmeter and distortion meter, lovely cond, £25. G8JFV, QTHR. Tel 08867 685.

Heathkit HW100 five-band tx/rx, mint cond, with ac power supply, spkr, Shure mic and compressor amplifier. Excellent complete station, £198. G3WY, QTHR. Tel Evesham 45497.

TR10 7200G, mic, power lead, car mount, manual; also PS5 mains power supply/digital clock: 5λ8 whip; all six months old and perfect; 20% off list prices. GW3YVC. Tel Cardiff 755190.

TS500 PS500 80-10M, 180W p.e.p, ssb-a.m. exc cond, £150. G4FBA, QTHR. Tel Pontefract 85941.

Property late G8DYO FT200 FP200, £240. Europa 2 MTV, £60. TR7200G and vfo 30G, £190. Trio mc50, £10. Hansen SWR3, £5. Pye a.m. base station, 6 xtals, £15. Tuning fork strobe, 125Hz. Minibeam 10-15-20, £25. Lattice tower 30ft 4-el Yagis, ali tube, 2in odd lengths, offers? Tel 0502 63022 evenings.

75ft lattice mast, six sections, £150. Pye compact charger SU8, £50. Starphone SU8, RB4 charger, £65. Pye Vanguard (tx only) S0, S20, S22, S32, R3, R6, R7, 144·4. 24V, mains psu, £30. All negotiable (carriage extra). G8AXU, QTHR. Debenham 215.

RAE home study course, £9 ono. Details from G8JBK, QTHR. Tel Colchester 230318.

Heathkit SB303 hf rx fitted with optional cw and a.m. filters plus SB600 matching spkr, £230 ono. G8JBK, QTHR. Tel Colchester 230318.

Trio TX599 JR599 and SP599, £350 or why? Need FT301S or similar 12V low power rig. G8ETR, 43 Freemantle Road, Bagshot, Surrey. Tel Bagshot 74576.

Hallicrafters S27 RX 27-143MHz manual, £38. SR42 tx/rx wkg 2m, £28. 10XY 2m Yagi, £16. PC5 audio amp, £4. *Want* kw E-Z match, TA-31/32 triband beam. G4AFY, QTHR. Tel Kidderminster 63358.

KW2000A, mains psu, manual, good cond, £160 ono. G4EHF, QTHR. Tel Brighton 508136.

Creed 7B + power supplies, £25. Terminal unit AN/UR8/A, £20. Datong frequency agile filter, little used, £40. Yaesu FRG7, as new, £145. Linear 2 × 813 (G2DAF type), £40. GW4ACO, QTHR.

FT250 with ac and dc psus, vgc, £170. Heath SB220 2kW linear, mint, £250. Hy-gain TH3 mk3 with balun, boxed, £50. Magnum 2m transverter 200W, vgc, £70. G3SPJ, QTHR. Tel 01-311 8405.

Fiat Hallscrieber 2.50, portable Hallscrieber tx/rx 5.00, RAK 15/600 kHz 2.00, Decca projection tv offers, S27 rx mains/6V offers, ATE 6A distortion rx 6.00, 7/TR2 reperf 3.00, IB tape tx 1.50, R1475 rx mains/12V 6.00. Collect. SAE list. G3DSK, QTHR.

KW2000B with matching spkr/ac power supply, like new, almost unused, £210. Heath SB610 monitor scope in same cond, £60. G3KAS, 73 Rawcliffe Lane, York. Tel 0904 27123.

Eddystone 880 high stability communications rx 30 × 1MHz bands 0·4-30·6MHz, good cond, £180. R1155 rx converted 240V, £20. 27ft antenna mast, tubular steel base, tilt-over lattice, aluminium pole top section, £20. G8JDE, QTHR. Tel Sambrook 375.

FR50B, £75. PR40, £8 ono. Two mains transformers, 300V at 15mA, 300V at 15mA, 4V at 2A, 4V at 0·2A and 4kV at 2mA, 2V at 2A, 2V at 2A. £1 each. Two tc caps, 0·1μF 7kV, 15p each, Resistors 1% carbon film 2W 7Ω, 30kΩ, 33kΩ, 40kΩ. 2p each. 120Ω ww 1W, ½p each. Enam copper wire 80p/lb. sae for info Sept only. All items + carriage. G4DSE, QTHR.

Racal ssb demodulator unit for use with RA117 rx 100kHz input less outer covers, £20. 1·4MHz lsb filters 2·35MHz bandwidth in sealed unit containing six crystals type 6hu, £3. All plus carriage. G3ZDB, QTHR. Tel Epsom 24814 after 6pm.

FT101 160-10m inc 27MHz cb, cw filter, phone, SP101. Yaesu mobile and desk mics, Osker SWR200. All fb cond. £320 ono. RCA AR851 6L comm rx 15kHz-30MHz less psu and cabinet, boxed, new spare valves included, £100 ono. G3TZL, QTHR. Tel 07017-22384.

Microwave Modules MMC144/28LO converter, bnc sockets, as new, £13.50 plus post. G8AYY, QTHR.

Midy VN trap dipole 80-10m, £30. HQ1 Minibeam with spare elements, £35. Liner 2 with preamp, mobile mount 10-el Yagi, Halo, ac psu, £110. Tech Ass bandpass filter, £13. Buyer collects. GW3YPF, QTHR. Tel 0248-680 630.

Satellit 2000 gen cov rx, with ni-cad and ssb unit, mint cond, £100 ono the lot. Easton. Tel North Shields 70429 after 6.30 pm.

EC10 mk2, mains psu and battery pack, fitted Burns FMD1 fm detector, £125. HRO-M gen cov rx, model RCE, 2-30MHz, psu, unmodified, £25. Poulter, 119 Aragon Road, Morden, Surrey. Tel 01-330 3031 after 6pm.

Liner 2, PA3 preamp, mobile mount, manual, inc delivery UK mainland, £125. 2m 6-el Q6 quad, 10 months old, £14. Complete photographic Cibachrome equipment, inc M301 enlarger, lens etc for prints from slides, as new, £175. G4CHD, QTHR. Tel Cheltenham 53178.

Trio JR500S rx, 80-10m built-in spkr, opposite sideband xtal fitted, exc cond, with manual, £65 ono. G8LYF. Tel Tedburn-St-Mary (near Exeter) 485.

Atlas 210X, European model, plus noise blanker and ac psu, superb performance for only £425 complete. Buyer inspects and collects Cambridge area. G3NAC, QTHR. Tel 0954 60584.

Eddystone EC10 mk1 rx, £35. 18AVT/WB, £37. Buyers collect. Gibson, 1 Tamar Gardens, Walney Island, Barrow-in-Furness, Cumbria.

Creed 7B printer, vgc, 50 baud synchronous motor, £25. Electronic keyboard unit, 64 key, uncoded, £8. G4DUM, QTHR. Tel Crayford 526460.

Marconi Elettra short wave rx, 150kHz-30MHz, provision for mic or tape deck, modified for ssb or a.m., complete with manual, £60. Green & Davis 2m tx, 20W a.m., 12V or 240V, with 70cm adapter, comp with Shure 201 mic, £50. G5SN, QTHR. Tel Southend 554846.

FT101, 80-10m, exc cond with Osker SWR200, £220. Pair 6HF5s with bases, new, £5. Pair QQV6-40s with bases, £8. G3HMB, QTHR. Tel Lowestoft 69321.

FTDX560 with fan, dynamic mic and Datong rf clipper, all vgc. G4BYK, QTHR. Tel 0482 811386.

Eddystone 880 ·5-30·5MHz, 30 bandspread ranges, unique precision receiver, complete manual, £75. 5ft 6in rack on rollers, £3. *Wanted:* for overseas amateur rtty printer 4-row keyboard. ST-6 tu afsk osc. No junk please. G8LT QTHR. Tel 032-732-321.

RA17 exc cond, cabinet, £300 ono. Pocketphone PF2FMB R6, S0, £55 ono. Bantam R6, S20 £30. Handi Cambridge 4M a.m. comp batteries, £25. Wayne-Kerr video oscillator 10kHz-10MHz, £12. Solartron double-beam scope with handbook, £30. *Wanted:* Bird UHF elements UHF/SHF attenuator. G8ANZ, QTHR. Stonehouse 4123.

Telford TC9 tx, mixer vfo, A3 xtal or vfo F3, vfo; TC7 mk2 tx, with G8AEV mk2 2m converter, A3 A1, A3J, F3, buyer collects, £60 ono. G8FOR, QTHR.

Versatower P60 with Mustang antenna and TR44 rotator, £365. Atlas 210 with de-luxe mobile mount and antenna matching transistor, £375. All items few hours use only and in new cond. Carr extra. J. L. Barry, 13 Mill Rise. Bourton, Gillingham, Dorset.

KW2000B and ac psu, exc cond, recently checked by manufacturer, £200. Mosley V-4-6 trap vertical antenna, 10-40m, buyer collects, £28. G3MCA, 1 Mosslea Road, Orpington, Kent. Tel 0689 56497.

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YC355D frequency counter. KW-VFO/4B for KW2000B. Datong clipper. Technical Associates peak-notch filter, bandpass filter, audio compressor. G2FUU, QTHR. Tel Nazeing 2274.

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Yaesu FTV250 2m transverter or 2m Europa transverter for FT101B tx/rx, must have manuals. G2BNZ, QTHR. Tel Bolton 654749.

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New swl requires amateur bands rx for about £50. Service information *urgently* required for Philips GM5655 scope, will copy and return if required. Bob Enright, 23 Gorham Drive, Tonbridge, Kent TN9 2DU. Tel Edenbridge 5231 wkg hours.

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4017	1.10
4018	1.10
4019	.70
4020	.85
4021	1.35
4022	.95
4023	.25
4024	.75
4025	.35
4026	1.95
4027	.50
4028	.95
4030	.35
4033	1.95
4034	2.45
4035	1.25
4040	1.35
4041	.69
4042	.95
4043	1.25
4044	.95
4046	1.50
4049	.80
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4066	1.35
4069	.40
4071	.35
4082	.45

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7400	.15
7401	.15
7402	.20
7403	.20
7404	.15
7405	.25
7406	.35
7407	.55
7408	.25
7409	.15
7410	.10
7411	.25
7412	.30
7413	.45
7414	1.10
7416	.25
7417	.40
7420	.15
7426	.30
7427	.45
7430	.15
7432	.30
7437	.35
7438	.35
7440	.25
7441	1.15
7442	.55
7443	.85
7444	.45
7445	.80
7446	.95
7447	.95
7448	.95
7450	.25
7451	.25
7453	.20
7454	.25
7460	.40
7470	.45
7472	.45

7473	.25
7474	.35
7475	.35
7476	.30
7480	.55
7481	.75
7483	.95
7485	.95
7486	.30
7489	1.35
7490	.55
7491	.95
7492	.95
7493	.40
7494	1.25
7495	.60
7496	.80
74100	1.85
74107	.35
74121	.35
74122	.55
74123	.55
74125	.45
74126	.35
74132	1.35
74141	1.00
74150	1.00
74151	.75
74153	.95
74154	1.05
74156	1.15
74157	.65
74161	.85
74163	.95
74164	.60
74165	1.50
74166	1.35
74175	.80

74176	1.25
74180	.85
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74190	1.75
74191	1.35
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74195	.95
74196	1.25
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74L20	.35
74L30	.45
74L47	1.95
74L51	.45
74L55	.65
74L72	.45
74L73	.40
74L74	.45
74L75	.55
74L93	.55
74L123	.55
74S00	.55
74S02	.55
74S03	.40
74S04	.35
74S05	.35
74S08	.35
74S10	.35
74S11	.35
74S20	.35
74S40	.25
74S50	.25
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74S74	.40
74S112	.90
74S114	1.30

74S133	.45
74S140	.75
74S151	.35
74S153	.35
74S157	.80
74S158	.35
74S194	1.05
74S257(8123)	.25
74LS00	.45
74LS01	.45
74LS02	.45
74LS04	.45
74LS05	.55
74LS08	.45
74LS09	.45
74LS10	.45
74LS11	.45
74LS20	.40
74LS21	.25
74LS22	.25
74LS32	.40
74LS37	.40
74LS40	.55
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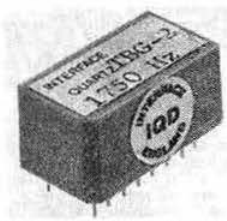

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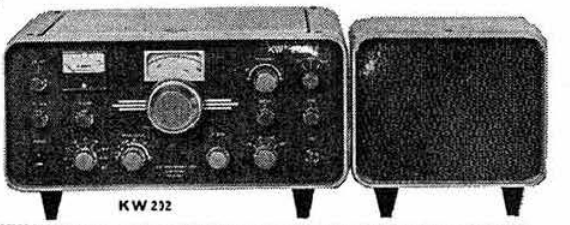

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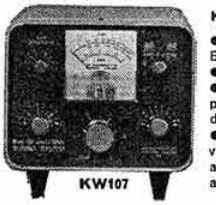

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