March 1976

radio communication

journal of the Radio Society of Great Britain

RSGB PRESIDENTIAL INSTALLATION 1976

Cyril Parsons, GW8NP, installs John Allaway, G3FKM, as 42nd President

Full report on p180

APPLICATION FOR TICKETS
INTERNATIONAL VHF CONVENTION
8-9 MAY 1976

		Cost each	Number required	Total cost
Convention only	Saturday only	75p		
	Sunday only	50p		
	Saturday & Sunday	£1		
Ladies' programme (visit to Windsor Castle)		85p		
Saturday evening dinner & dance		£3.80		
Saturday/Sunday overnight accommodation (single room) including breakfast		£3.50		

I enclose cheque/postal order for £ .....

Name .....

Address .....

.....

.....

Post completed application form and remittance to:
Dept DAE-9, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE.

PROVISIONAL LECTURE PROGRAMME

(Full programme details will be despatched with tickets)

SATURDAY 8 MAY

Stream A

★ *The GB3SN Project*
by the GB3SN group

★ *Moonbounce (eme)*
by Peter Blair, G3LTF

Stream B

★ *Introduction to Oscar*
by Pat Gowen, G3IOR

★ *Oscar 7, Mode B*
by Brian Bower, G3COJ

Stream C

★ *1·3GHz ssb*
by C. W. Suckling, G3WDG, and K. S. Hutchinson, G4ALN

★ *Getting going on 10GHz*
by G. D. Lean, G3WJG, and P. M. Tunbridge, G8DEK

SUNDAY 9 MAY

Stream A

★ *Audio distortion in transmission and reception*
by Angus McKenzie, G3OSS

★ *Open forum*
by VHF Contests Committee and VHF Committee

Stream B

★ *Simple methods of Oscar tracking*
by David Walland

★ *Oscar command station at the University of Surrey*
by Martin Sweeting, G3YJO

★ *Future Oscars*
by a representative of AMSAT (possibly Joe Kasser, G3ZCZ/W3 from AMSAT HQ USA)

★ *Oscar seminar*

Stream C

★ *Microwave Yagis*
by Mike Walters, G3JVL

★ *Microwave dishes*
by Dain Evans, G3RPE

RSGB NEWS BULLETIN SERVICE

The RSGB news bulletin, callsign GB2RS, is broadcast every Sunday morning on hf and vhf, giving almost complete coverage of the British Isles. Its main purpose is to provide an outlet for amateur radio news items and announcements which, by virtue of their topicality or urgency, cannot wait for the next issue of *Radio Communication*.

The bulletin is prepared early on Thursday morning, and news items, marked "GB2RS news" should reach RSGB HQ by first post that day (telephoned items can also be accepted until 10am). No guarantee can be given of inclusion in part or whole of any item submitted and, once broadcast, items are not usually repeated.

SCHEDULE

Time	MHz	Location and coverage (hf) or beam heading (vhf) of station
0930	3·6	G2MI, Bromley, Kent (SE England)
1000	3·6	G8ML, Cheltenham (SW England)
	144·5	GM3UAG, Ellon, Aberdeenshire (NNW)
	144·5	G8GGK, Croydon, Surrey (NE)
1015	3·6	GI3GAL, Belfast (N Ireland)
	144·5	GI3TLT, Bangor, Co Down (N)
1030	3·6	G2CVV, Derby (N Midlands)
	144·5	G4DCH, Burnham-on-Sea (NW)
	144·5	GM3UAG, Ellon, Aberdeenshire (SW)
	144·5	G3PWJ, Brierley Hill (NW)
1045	144·5	G8CDP, Middlesbrough (NW)
	144·5	G8GGK, Croydon, Surrey (SW)
	144·5	G8BHQ, Stockport (NNW)
1100	3·6	G5VO, Bridlington (NE England)
	144·5	G3PWJ, Brierley Hill (SW)
1115	3·6	G3LEQ, Knutsford (NW England)
1130	3·6	GM3EHI, Bellshill, Lanarkshire (S Scotland)
1200	3·6	GM3HGA, Aberdeen (NE Scotland)

radio communication

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CONTENTS

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ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

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Contributions and all correspondence concerning the **content** of *Radio Communication* should be addressed to: The Editor, *Radio Communication*, 35 Doughty Street, London WC1N 2AE. Tel 01-837 8688. **(Circulation** queries should be addressed to: The Subscriptions Department, **RSGB).**

Closing date for contributions unless otherwise notified: 4th of month preceding month of publication.

Advertising, other than Members' Ads, should be sent to the above address marked for the attention of Mr C. C. Lindsay. Tel 01-686 5839.

TS-700G

with the added refinements which YOU requested

Trio proudly presents the new 2 metre FM/AM/SSB/CW transceiver TS700G. It has been custom made to meet the requirements of *all* 2 metre amateurs, particularly of those who travel around and enjoy DX contacts not only from the shack at home but also en route. Trio's new TS700G features all the convenience and outstanding qualities that most 2 metre operators can only imagine: fixed frequency transceive operation on 22 channels in the 144-146MHz range—of course also single channel simplex and two channel duplex transceive modes—and all this without waiting for a vacant repeater frequency and what's more: when the lunatic fringe jam your local repeater, just use the VFO to move down the band and carry on the QSO. If there is too much activity on 2 metre FM—particularly when outstanding propagation conditions exist, and you can only hear multi station rubbish—just switch to SSB or CW and enjoy an interference free contact. With the TS700G, you will be still on the air when the others have to close down.

Outstanding DX performance has also been the predominant feature of the TS700, the predecessor of this deluxe transceiver. Many TS700 owners have amassed QSLs from all over Europe because DX QSO's of hundreds of miles are commonplace with the TS700G—particularly using the SSB mode. In conjunction with a suitably orientated antenna, you can even enjoy transcontinental QSO's via OSCAR satellites.

The world wide success of the TS700 was a stimulant for Trio's engineers to create something even more outstanding. Aided by valuable suggestions from 2 metre operators world wide, Trio developed the TS700G, the 2 metre specialists transceiver which enables you to participate in VHF activity wherever you are; and on FM, AM, SSB or CW—just as you prefer.

And these are the most important features:

Improved FET front end in the receiver section with narrow band tuning characteristics, setting new standards for freedom from cross modulation and overload. Sensitivity is now better than 0.25 microvolts for SSB/CW, (10dB S + N/N ratio) and better than 0.4 microvolts for FM (20dB quieting). This means that stations which were lost in the noise can now be copied loud and clear.

Built in 1750Hz. tuning fork controlled repeater access tone generator (Trio exclusive) together with repeater and reversed repeater offset without retuning mail dial. Together with complete VFO coverage, you can operate on all current or any future repeater systems and monitor repeater input or output channels at the turn of a switch.

Improved calibrator system providing check points at 100KHz. intervals for accurate dial checking. During calibration, the receiver antenna input is disconnected to prevent interference from incoming signals.

Extended meter functions now giving S meter for normal reception, relative output meter in the transmit mode for accurate tuning and centre zero tuning meter for FM reception to get the signal spot on into the discriminator.

TX/RX switching either by means of the PTT microphone supplied or VOX operation using the accessory control unit VOX-3 now available.

The choice of mains (120/240V ac) or battery (12-13.8V dc) operation gives your TS700G complete mobility from fixed station to portable contest use. You have the best station for all uses with the TS700G.

The TS700G features the same reliable, stable, rugged and contest proved circuitry which made its' predecessor, the TS700, the most popular 2 metre all mode rig throughout the world. Just ask the operator who owns one. You will also want to own Trio's new 2 metre specialists' rig—the TS700G.

Sole Importers
Lowe Electronics
Cavendish Road
Matlock Derbyshire
Tel: Matlock 2817/2430

TRIO

LOWE ELECTRONICS

PRICE LIST, MARCH 1976

SEND 25p FOR FULLY ILLUSTRATED LISTS AND CATALOGUE

	net price £	price incl. VAT £	carr. £
TRIO EQUIPMENT			
TS900 transceiver & AC P.S.U.	480.00	**600.00**	2.50
VFO900 external VFO for TS900	64.00	**80.00**	2.50
CW900 CW filter for TS900	29.00	**36.25**	50p
TS520 transceiver 12vdc/240vac	318.00	**397.50**	2.50
SP520 matching loudspeaker	20.00	**25.00**	62p*
VFO520 external VFO	64.00	**80.00**	2.50
TV502 matching 2m transverter	100.00	**125.00**	2.50
CW520 CW filter	24.00	**30.00**	21p
TS700G 2m all mode transceiver	324.00	**405.00**	2.50
VOX-3 matching VOX unit	20.00	**25.00**	66p
TR7200G 10W car transceiver	130.00	**162.50**	2.50
VFO30G remote VFO with repeater shift	64.00	**80.00**	2.50
PS5mains power supply/digital clock clock unit	44.00	**55.00**	2.50
TR2200G 1W 2m handy transceiver	88.00	**110.00**	2.50
VB2200 10W amplifier	36.00	**45.00**	62p*
Ni-cad battery pack	8.15	**8.80**	30p
R599S De-Luxe amateur band receiver	272.00	**340.00**	2.50
S599 matching loudspeaker	20.00	**25.00**	62p
T599S De-Luxe transmitter	272.00	**340.00**	2.50
QR666 general coverage receiver	145.00	**181.25**	2.50
QR6FM F.M. tuner supplied separately	26.00	**32.50**	66p
Extra charge for fitting and alignment	5.00	**6.25**	
QR6MK 500kHz crystal marker	11.24	**14.05**	36p
Extra charge for fitting	2.00	**2.50**	
TR7010 2m SSB transceiver	176.00	**220.00**	2.50
PS5 mains power supply/digital clock	44.00	**55.00**	2.50
HC2 ham clock	12.00	**12.96**	48p*
MC10 hand microphone	8.00	**10.00**	21
MC50 table microphone	18.00	**22.50**	48p*
LF30A low pass filter	12.00	**15.00**	51p
BPF2A 2m band pass filter	20.00	**25.00**	51p
TR3200 70cm handy transceiver	130.00	**162.50**	2.50
Ni-cad battery pack	8.15	**8.80**	30p
UNIDEN EQUIPMENT			
2020 transceiver	380.00	**475.00**	2.50
8010 external VFO	82.00	**102.50**	2.50
8120 matching loudspeaker	24.00	**30.00**	62p*
NIHON DENGYO			
Liner 430 70cm SSB transceiver	228.00	**285.00**	2.50
Liner 2 2m SSB transceiver	145.00	**181.25**	2.50
LA-106 2m linear amplifier	158.00	**197.50**	2.50
R115E regulated PSU for Liner 2 and Liner 430	24.00	**30.00**	2.50
VENUS SLOW SCAN TV			
SS2 Slow Scan station monitor	230.00	**287.50**	2.50
SS2 Slow Scan station monitor kit	155.00	**193.75**	2.50
C-1 camera	255.00	**318.75**	2.50
CRYSTALS			
We stock I.A.R.U. channels for the equipment we sell			
Price per single crystal	2.32	**2.90**	15p
Where 2 crystals, per channel are required	4.20	**5.25**	15p

VALVES

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

	net price £	price incl. VAT £	carr. £
6AH6, 6BZ6, 6CB6A, 6CL6, 6U8A, 6BM8, 12BY7A, 6EW6	66	**82**	21p
6GK6, 6AW8, 6GH8A, 12GN7	1.30	**1.62**	21p
6JS6C, 6KD6 matched pairs, per pair	4.20	**5.25**	51p
6146B/S2001 each	3.20	**4.00**	36p
6LQ6 matched pairs, per pair	5.52	**6.90**	51p
V.H.F. MARINE RECEIVERS			
ASV 1515 less crystals	24.00	**32.00**	48p*
Belcom AMR104M scanner less crystals	67.44	**84.30**	75p*
Seiwa MR-2 pocket monitor less crystals	37.76	**47.20**	51p
Seiwa MS-2 pocket scanner less crystals	42.72	**53.40**	51p
Crystals for the above receivers	2.32	**2.90**	15p
V.H.F. AMATEUR RECEIVERS			
ASV 1515 less crystals	24.00	**32.00**	48p*
NR-56 tunable 2m FM receiver	38.48	**48.10**	48p*
Seiwa MR-2 pocket monitor less crystals	37.76	**47.20**	51p
Seiwa MS-2 pocket scanner less crystals	42.72	**53.40**	51p
Belcom AMR104H scanner less crystals	53.44	**66.80**	75p*
Crystals for the above receivers	2.32	**2.90**	15p
MICROWAVE MODULES EQUIPMENT			
MMC 70/28 4m converter	15.12	**18.90**	Post paid
MMC 144/28 LO 2m converter	15.92	**19.90**	
MMC 432/28 70cm converter	18.08	**22.60**	
MMC 432/144 70cm converter	18.08	**22.60**	
MMC 1296/28 23cm converter	23.92	**29.90**	
MMC 1296/144 23cm converter	23.92	**29.90**	
MMV 432 70cm tripler	17.52	**21.90**	
MMV 1296 23cm tripler	25.04	**31.30**	
MMDO 50 50MHz counter	61.11	**66.00**	
MMD 500P 500MHz prescaler	25.00	**27.00**	
MMT 432/28 70cm transverter	71.20	**89.00**	
CATRONICS PRODUCTS			
DFM 5v 180MHz digital frequency meter	120.37	**130.00**	2.50
500MHz prescaler for above	25.00	**27.00**	24p
FILTERS			
Seiwa 9MHz SSB crystal filter	11.00	**13.75**	15p
Carrier crystals for the above filter, each	1.50	**1.87**	15p
TRIO LF30A low pass filter	12.00	**15.00**	51p
TRIO BPF2A 2m band pass filter	20.00	**25.00**	51p
SHINWA 1110 2m band pass filter	10.80	**13.50**	51p
SHINWA 1110G 2m band pass filter	36.80	**46.00**	51p
SHINWA 1006 2m low pass filter	9.00	**11.25**	51p
SHINWA 28MHz transverter band pass filter	10.80	**13.50**	51p
SHINWA 1005 H.F. low pass filter	8.00	**10.00**	51p

LO, LO, is NAone on 145MHz, or are you all having a CSta asked the PO inspector. Don't BMbarassed by my question, but is it SNtial to have such low deviation determined by MPirical means, or is it all PI in the sky?
BCing you
G3PCY

LOWE ELECTRONICS

	net price £	price incl. VAT £	carr £
STATION ACCESSORIES			
Morse keys	6.00	**7.50**	51p
Katsumi keyers EK108A	32.00	**40.00**	48p*
Low impedance padded headsets	3.68	**4.60**	51p
TRIO MC10 hand microphone	8.00	**10.00**	24p
TRIO MC50 dual impedance table microphone	18.00	**22.50**	48p*
Kuranishi wattmeter/dummy load RW15D	25.00	**27.00**	62p*
Kuranishi wattmeter/dummy load RW120D	55.00	**59.40**	75p*
TRIO ham clock HC-2	12.00	**12.96**	48p*
Microphone plugs as fitted to TRIO and YAESU equipment (4-pin)	48p	**60p**	12p
Matching sockets for the above	48p	**60p**	12p
Maeden speakers	2.00	**2.50**	36p
ANTENNAS			
H.F. Beams			
Hy-Gain TH2Mk3	83.10	**103.87**	2.50
TH3Jnr	85.10	**106.37**	2.50
TH3Mk3	122.10	**152.62**	2.50
TH6DXX (carriage by BRS)	146.50	**183.13**	2.50
H.F. Quad			
Hy-Gain Hyquad 2 element	135.50	**169.37**	2.50
H.F. Verticals			
Hy-Gain 12AVQ	27.10	**33.87**	2.50
14AVQ/WB	39.50	**49.37**	2.50
18AVT/WB	56.10	**70.12**	2.50
RAK Antennas			
A-8XL 80m dipole	9.50	**11.87**	62p*
AL-48DXN 80/40m trap dipole	20.00	**25.00**	75p*
Midy VN 80m to 10m trap diploe	32.00	**40.00**	87p*
Listener III SWL antenna	20.00	**25.00**	62p*
Listener I SWL antenna	7.50	**9.37**	48p*
HD-26A extendable dipole	8.00	**10.00**	33p
H.F. Mobile Antennas			
'G' Whip tribander helical	13.53	**16.91**	1.00
'G' Whip multimobile	16.73	**20.91**	1.00
L.F. coils for the above whips	4.51	**5.63**	45p
Telescopic whips for the above	1.22	**1.52**	45p
Basemount for all 'G' Whips	1.81	**2.26**	45p
V.H.F./U.H.F. Antennas			
'J' Beams			
5Y/2m	4.90	**6.12**	2.50
8Y/2m	6.40	**8.00**	2.50
10Y/2m	12.60	**15.75**	2.50
PBM14/2m	19.20	**24.00**	2.50
5XY/2m	9.40	**11.75**	2.50
8XY/2m	11.70	**14.62**	2.50
10XY/2m	16.15	**20.18**	2.50
Q4/2m	9.60	**12.00**	2.50
Q6/2m	12.80	**16.00**	2.50
D5/2m	9.00	**11.25**	2.50
D8/2m	12.00	**15.00**	2.50
XD/2m	6.60	**8.25**	2.50
UGP/2m	4.75	**5.93**	2.50
MMB48/70cm	13.90	**17.37**	2.50
MBM88/70cm	18.50	**23.12**	2.50
12XY/70cm	19.00	**23.75**	2.50
Phasing Harnesses			
PMH/2C 2m for circular polarisation	3.25	**4.06**	51p
PMH2/70 2 way for 70cm	3.75	**4.68**	51p
PMH4/70 4 way for 70cm	7.80	**9.75**	51p

	net price £	price incl. VAT £	carr. £
V.H.F./U.H.F. Mobile Whips			
'J' Beam 2m 5/8 whip type TAS	7.65	**9.56**	2.50
70cm 5/8 whip type U3	4.75	**5.94**	51p
70cm colinear type U4	7.10	**8.88**	51p
70cm colinear type U5	12.30	**15.37**	51p
ANTENNA SPECIALISTS ASP201 1/4 wave whip	2.50	**3.12**	24p
ANTENNA SPECIALISTS ASP157 1/4 wave gutter mount	7.54	**9.42**	51p
Luso 5/8 2m gutter mount	20.00	**25.00**	2.50
Marine Mobile Whips			
'J' Beam 2m 5/8 whip type TAS	7.65	**9.56**	2.50
ANTENNA SPECIALISTS ASP201 1/4 wave whip	2.50	**3.12**	24p
ANTENNA SPECIALISTS ASP157 1/4 wave gutter mount	7.54	**9.42**	51p
Antenna Accessories			
Coaxial cable 50 ohms UR43 per metre	14p	**15p**	02p
Coaxial cable 50 ohms UR67 per metre	35p	**38p**	04p
Twin feeder 300 ohms per metre	06p	**06p**	02p
Twin feeder 75 ohms per metre	06p	**06p**	02p
Rotator cable 4-core heavy duty per metre	10p	**11p**	03p
Rotator cable 5-core per metre	18p	**19p**	03p
Rotator cable 8-core per metre	31p	**33p**	03p
Rotator cable 12-core heavy duty per metre	22p	**24p**	04p
PL259 plugs	36p	**39p**	12p
Reducers for PL259 plugs	12p	**13p**	12p
SO239 sockets	36p	**39p**	12p
PL259 in-line connectors	60p	**65p**	12p
PL259 angle adaptors	76p	**82p**	12p
SWR metres, single meter	7.80	**8.42**	51p
SWR meters, twin meter	10.00	**10.80**	51p
REACE Antenna Impedance Bridges	22.00	**23.76**	62p
Crystal oscillators for the above, each	5.20	**5.62**	21p
Hy-Gain C1 centre dipole insulator	3.00p	**3.75**	30p
Hy-Gain BN86 Balun	10.49	**13.12**	51p
Diamond BU5 50 ohms Balun	4.40	**5.50**	51p
Diamond BU7 75 ohms Balun	4.40	**5.50**	51p
RAK CX2(A) coaxial switch	10.00	**12.50**	27p
Rotators			
CDE AR40	32.10	**40.12**	2.50
CD44	67.25	**84.07**	2.50
Ham-2	103.00	**128.75**	2.50
Rotator cable 4-core per metre	10p	**11p**	03p
5-core per metre	18p	**19p**	03p
8-core per metre	31p	**33p**	03p
12-core per metre	22p	**24p**	04p

* Indicates carriage by parcel post

Our terms are cash or cheque with order—despatch of stock items is by return. If any item is out of stock, your money is immediately refunded.

PART EXCHANGES WELCOME **EASY TERMS**

PRICES, UNFORTUNATELY ARE SUBJECT TO CHANGE WITHOUT NOTICE

MAIL ORDERS
PLEASE ADDRESS ALL MAIL ORDERS DIRECT TO MATLOCK

LOWE ELECTRONICS

119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE

SMC South Midlands

ESTABLISHED 1958—OVER 17

YAESU MUSEN

MAIN UK DISTRIBUTOR WITH 2-YEAR GUARANTEE

SMC's guarantee, confident in Yaesu quality, is, until further notice, extended to 2 years, covering both labour and free components (excluding valves, semi-conductors and carriage).

SMC EXTENSION OF SERVICE - NORTHERN ENGLAND SUB AGENCIES

In addition to the existing arrangements at Barnsley, the following SMC centres are established.

DAYTIME Mon to Sat. 24A High St. Misterton Nr. Doncaster
Ian G8GPS Phone (for the moment) Peter G3TPX

EVENING Weekends. 100 Normandy Ave, Beverley, N. Humberside.
Tony G8IWA Phone 0482 886392 for appointment.

Peter, with Ian and Tony will be in attendance at most of the Northern Rallies, look for the SMC stand.

NEW FILTERS for the '101 range (3.18MHz). 12KHz and 350KHz low prices (p & p 25p. VAT 25%)
Narrow CW filter 350Hz @ 6dB good shape factor clear the QRM only £16.00 + VAT
Optimise your F.M. bandwidth on the FR101 and fit, with demodulator, to the FT101 for AM/FM. Introductory price only £13.50 + VAT

FT101E

The FT101E, complete HF station

The FT101E a complete mains or 12V DC station contained in a compact 30lb package. 260W P.I.P. of SSB (with in-built R.F. speech processor), 180W, CW and 80W of A.M., 10 to 160m. (inc. 10MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100kHz calibrator, ±5K clarifier (with separate on/off switch), etc., etc. The VFOis stable and linear (readout to 1kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for; tune up, A.M., for CW operation, whose performance with the semi break in keying, with side tone, and the optional 600Hz filter installed is of a high order. Linear and transverter provisions are made with sockets for: relay contacts, ALC output, all internal HT supplies, low level RF heater links and switches, etc., etc.

Consider the rest – Then buy the best

FT221

The FT221, complete 2m station

The FT221. The multimode USB, LSB, A.M., FM, CW (with semi break-in and side tone), 2m transceiver offering the choice of : phase locked VFO or 44 crystal channels, simplex or repeater (600kHz up and down shifts), with unique "double push" auto tone burst, mains or 12V (3A) operation, excellent selectivity, SSB 2·4kHz (1·7: 1 S.F.) or FM 12kHz. Front panel adjustable VOX and mic gain, a calibrator (1MHz ÷ 10), 1kHz readout and linearity, sensitive squelch, clarifier with IRT and IRT with ITT (makes F.S.K. easy), switchable "S" and centre zero tuning meter, noise blanker, serviceable plug in boards all contained in 11¼" (14") × 5" × 11¼", 22lb rigid package.

YAESU MUSEN PRICES (includes FREE Securicor Delivery)

HF TRANSCEIVERS		**HF RECEIVERS**		**VHF TRANSCEIVERS**		**ACCESSORIES**	
FT75B 120W PIP VXO ..	£165.00	FR-101S Single filter ..	£270.00	FT2 AUTO FM autotune ..	£215.00	SP*01B External S peakers ..	£15.00
FP75B AC PSU/speaker ..	£42.00	FR-101D 4 filters 2/4m ..	£350.00	FT-221 Multimode 2m ..	£318.00	SP*01PB Phone Patch ..	£34.75
DC75B 12V DC PSU ..	£42.00	FR-101DS Dig. standard ..	£345.00	FT-224 FM24 channel ..	£135.00	XF30D FM Filter	£18.00
FT-101B 230V AC/12C DC	POA	FR-101DD De luxe digital	£425.00	FT-620B 6m CW/A.M./SSB	£220.00	XF103 CW Filter (FT501) ..	£23.00
FT-101EX Economy "101"	£325.00			FTC212 70MHz FM	£190.00	MMB101 Mobile Mount ..	£11.00
FT-101EE "E" less Clipper	£360.00	**REMOTE VFO's**		Sigmasizer 80R 80ch. ..	£225.00	Fan For FT101 etc	£11.00
FT-101E De Luxe	£395.00	FV50C VFO for FT-75 (B)	£39.00	Sigmasizer 200 200 channel	£180.00	VC75 Vox/Compressor unit	£18.00
FT200B 10–80m	£205.00	FV101B for 101B	£52.00	FP2AC AC PSU 12V out.	£37.00	FF50DX Low Pass Filter ..	£14.00
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FT-501 Digital readout ..	£375.00	**TEST EQUIPMENT (All 8% VAT)**		FTV250B 144MHz	£115.00	YD846 Hand mic	£7.00
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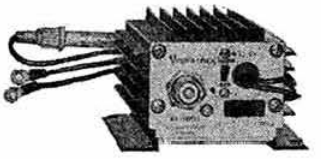

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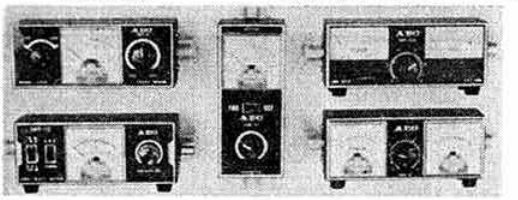

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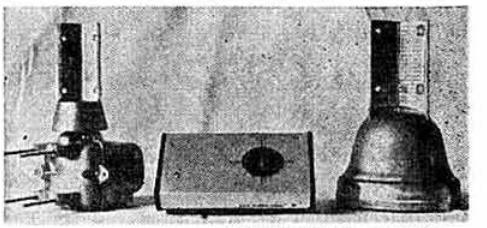

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- ★ *Small* about 1 cubic inch, printed circuit pre-amp. Now incorporated in thousands of transceivers.
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Selected FETs give a noise figure of —3·5dB and a gain of 18dB. Size: 2½" × 1½" × 4". This unit is also available on other frequencies, e.g. 400MHz region for satellite or radio astronomy use, for which it was originally developed. Price: **£11.25**—ex-stock.

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This unit has been produced to satisfy the constant demand for a compact matching unit to meet the critical load requirement of the modern P.A. Receivers are also becoming more sensitive to aerial matching and our Z match can of course be used to match the aerial to your receiver. The units have been tested at 2KW CW output power into a Bird Termaline Wattmeter/Dummy load. The aerial connections can be used with balanced or unbalanced feeders and the connectors are screw terminals for wire aerials AND SO239s for co-ax fed aerials. Price is only **£29.50.**

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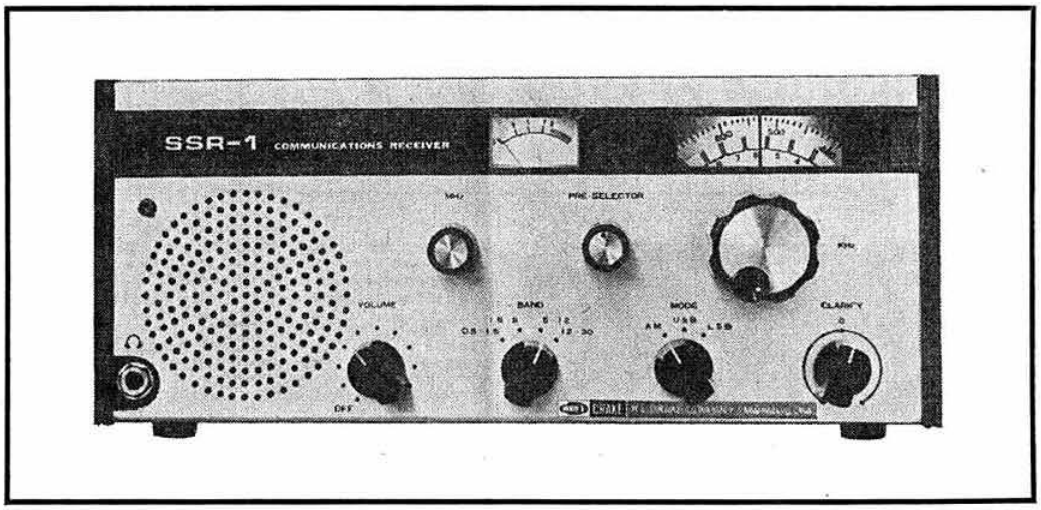

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SPECIFICATIONS

Frequency Coverage: 0·5 to 30MHz in 30 ranges each tunable over 1MHz range with a dial having 10kHz graduations.

Reception Modes: CW, USB, LSB, AM.

Sensitivity: At least 10dB S + N/N under the following conditions:

Mode	Frequency	Input Level*
SSB	0·5-2MHz	1·0uV
	2-30MHz	0·3uV
AM	0·5-2MHz	3·0uV
	2-30MHz	1·0uV

(AM: 1,000Hz at 30% modulation.)

* These voltages are ½ the open circuit signal generator voltage, ie, the voltage read on the meter of a HP Model 606 Generator.

Output: Capable of 200 mw output on SSB at 2MHz with input signal of 0·5uV and 2 Watts output with 5uV input.

Audio Distortion: Less than 5% at 2 Watts.

Calibration Accuracy: Within 5kHz at all frequencies.

Selectivity:

BANDWIDTH	
Mode	—6dB
SSB	3kHz ± 25%
AM	5·5kHz ± 25%

Image Rejection: Greater than 50dB.

IF Rejection: Greater than 50dB at fd below 20MHz. Greater than 40dB at fd above 20MHz.

Antenna: Self contained telescopic whip antenna. External connection to terminal strip. (75 ohm input impedance —unbalanced.)

Audio Output Provisions: Internal 8 ohm speaker and phone jack on front panel that disables speaker when plugged in.

Muting Provisions: External mute jack (RCA type) that provides normal reception with closed circuit and mute with open circuit connections.

Power Supply: 8 type "D" (1·5 v) dry cell batteries. Tapped transformer to provide operation from 117 v — 15% or 240 v ± 10%-20%, 50-60kHz source with automatic switch over to batteries when AC line is disconnected.

Current Consumption Less than 100 ma quiescent at 12 v DC.

Dial Lights: Momentary push button to light when on battery operation. Always on for AC operation.

Clarifier: Tunes minimum of — 2kHz and maximum of — 5 kHz.

Size: Size (33cm) wide, 11in (28cm) ceep, 5¾in (14cm) high.

Weight: 14lb (6·4kg).

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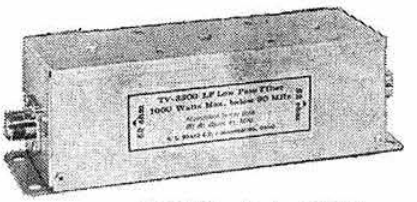
For use from 160 metres through 10 metres. Rating—1 kW DC.

The new Low Pass Filter is more than 80 dB down at 41 MHz and above! This is the third harmonic of 20 metres and the second harmonic of 15 metres.

FEATURES:

Prevents spurious outputs to the antenna that cause TVI from transmitters operating below 30MHz ★ Stops 2nd and 3rd harmonics on 15 and 10 metre amateur bands and 3rd harmonic of 20 metres. ★ Stops 2nd and 3rd harmonics of CB Band ★ Protects all World TV channels ★ Protects TV IF frequencies above 36MHz ★ Has low transmitter loss below 30MHz.



£15.00 p + p 50p

SPECIFICATIONS

Transmitter
Operating Range: 0 to 30MHz.
Design Cutoff Frequency: 33MHz.

Attentuation: Greater than 80dB above 41MHz.
Insertion Loss: Less than ½dB below 29MHz. Less than ½dB at 30MHz.
Power Capacity: 1000 Watts average.
Impedance: 52Ohms input and output.
Connectors: UHF type SO-239 sockets.
Dimensions: 8½" × 2½" × 2½".

PRICE LIST MARCH 1976

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R4C Receiver	£380.00	AC4 AC psu for T4XC	£80.00
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SSR1 Receiver	£225.00		
TR4C Transceiver	£410.00		

IF YOU WANT A NICELY STYLED ATU WITH ANTENNA SWITCH AND TUNING INDICATION... THIS IS IT!

NEW! ANTENNA TUNING UNITS. HF TYPE CL66. VHF TYPE CL99.

CL-66 Specification
Built-in 4 way antenna selection for 3 co-axial lines, and 1 long wire.
Input impedance: 50-15 ohm unbalanced
Output impedance: 10-600 ohm (3·5MHz 200 ohm) unbalanced.
Insertion loss: Less than 0·5dB.
Tuning Indication: By means of L.E.D. (13·5 VDC supply regd.)
Power Handling: 500w.
Price: **£53.75** including carriage/VAT.

CL-99 144MHz ATU
Input impedance: 50-ohms unbalanced.
Output impedance: 20-200 ohms unbalanced.
Insertion Loss: Less than 0·3dB.
Power Handling: 200W.
Price: **£41.25** including carriage/VAT.

WESTERN FOR TEST EQUIPMENT

SEE OCTOBER ADVERT FOR FULLER DETAILS

VALVE VOLTMETER, TE-65
*With new 6" full-view meter
*Compare it to any peak-to-peak V.T.V.M. made by any other manufacturer at any price.
Specification: DC V: 0-1·5-5-15-50-150-500-1500V. (using HV Probe, up to 3kV.). AC V: 0-1·5-5-15-50-150-500-1500v. RMS. 0-1·4-4-14-40-140-400-1400-4000P-P. Resistance: Rx 10-100-1K-10K-100K-1M-10M (0·2Ω-1000M Ω). Decibel: -10dB to +65dB. Power source: 105-125, 220-240v. AC, 50/60 Hz. Tube Complement: 12AU7, 6AL5.

RF SIGNAL GENERATOR, TE,-20D
*Factory calibrated and tested
*Dual output RF terminals
*Separate Variable Audio Output
Specification: Freq. range: 120 kHz-500 MHz (7 bands). Freq-accuracy: ±2%. Audio output: to 8 volt. Internal modulation: 400Hz approx. Tube: 12BH7A, 6AR5. Power source: 105-125v., 220-240v. AC, 50/60 Hz. 12 watts. Employs a Xtal socket and can be used as below: (a) Self-calibration. (b) Marker generator.

TEST EQUIPMENT PRICES
(including P. & P. and VAT)

SE-250B injector	£3.24
SE-350A Tracer	£16.96
SE-360 Tracer/Injector	£19.17
SE-6850 Generator	£46.44
TE-15 G.D.O.	£17.00
TE-20D R.F. Generator	£27.00
TE-22D A.F. Generator	£35.64
TE-40 AC Millivoltmeter	£37.80
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TE-68 Insul. Tester	£48.60
TO-3 Oscilloscope	£91.80

Electronics (UK) Ltd

For the serious FM Repeater Operator— the STANDARD C828!

There's no other choice!

BASE STATION · MOBILE · PORTABLE

We're so fascinated by this little beauty that we think it makes everything else "obsolete" (or expensive!). The Price? . . . **£168.75** + VAT.

- 10 watts(HI), 1 watt(LO) output
- 12 channels SIMPLEX or REPEATER (10 ch. fitted)
- Single crystal control means you only have to buy one CRYSTAL PER CHANNEL
- Fitted S20, S22, R5, R6, and R7.
- LED (BUSY) indicates whether you have accessed the repeater or not
- LED's to indicate EXTERNAL VFO, TRANSMITTER ON, REPEATER OPERATION
- SPEAKER/MICROPHONE gives PRIVATE LISTENING and has switch to over-ride the channel selector enabling a change-over to be made to an external VFC (Type CV 110)
- TONEBURST is built-in. (Automatic on repeater)
- New Leather Carrying Case/Antenna type FCB 01J (available later). Makes the C828 into a 12CH 1/10w. portable unit

THE STANDARD C146A SETS THE STANDARD

★ **Toneburst built-in and can be switched-off.**
★ **Has the finest range of accessories available . . . and**
. . . it's twice the power!
. . . it's half the weight!
. . . and about one third the size (of a competitor).

STANDARD
The Standard C146A is a 5 Channel (2 fitted) 2 watt unit fitted with adjustable toneburst for 1700 and 1750 Hz repeaters. The CSA Base Charger unit enables the C146A to be used as a main station and re-charges Ni-Cad batteries (set of 10 required).

PRICES (Carriage paid inc. VAT)

CV-110, VFO for C828	£56.25
C146A 2m Hand Transceiver, 5 channel	£112.50
SY-200 Synthesizer	£112.50
C430 UHF Transceiver 10W. 10 Ch.	£200.00
C432 UHF Hand Transceiver, 5 channel	£143.75

ACCESSORIES

C-12/230-5AE AC PSU for all models	£31.25
C-12/230-6E AC Charger for C146A and C432	£3.75
Ni-Cad Batteries, set of 10	£10.80
C-205K remote speaker for all models	£11.25
CAD external antenna coupler	£2.50
CSA Base charger unit for C146	£18.75
CAT-08E Rubberflexible antenna	£3.75
CMP-08 External Microphone for C146 and C432	£11.87
CPM-02 Telephone handset for all models	£32.50
C-12/230-3 AC PSU	£93.75
Crystals, per pair	£5.62

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BUY A C146A AND 2PRS OF CRYSTALS AND WE WILL INCLUDE A FREE SET OF 10 NI-CAD BATTERIES

BACK IN STOCK AGAIN

THE OSKER SWR200 POWER METER

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DC GROUNDED
BASE STATION
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ASP201
¼W Unity Gain
108-512MHz

ASP201	**£2.80**
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ASP393	**£15.20**
ASP677	**£12.87**
ASPE667	**£16.10**
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With the exceptions of the ASP629 and ASP749UK, all the other antennas require a single hole of 0·375" for mounting.

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Please add 75p. for p & p for each antenna and accessory.
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Please send SAE for further details.

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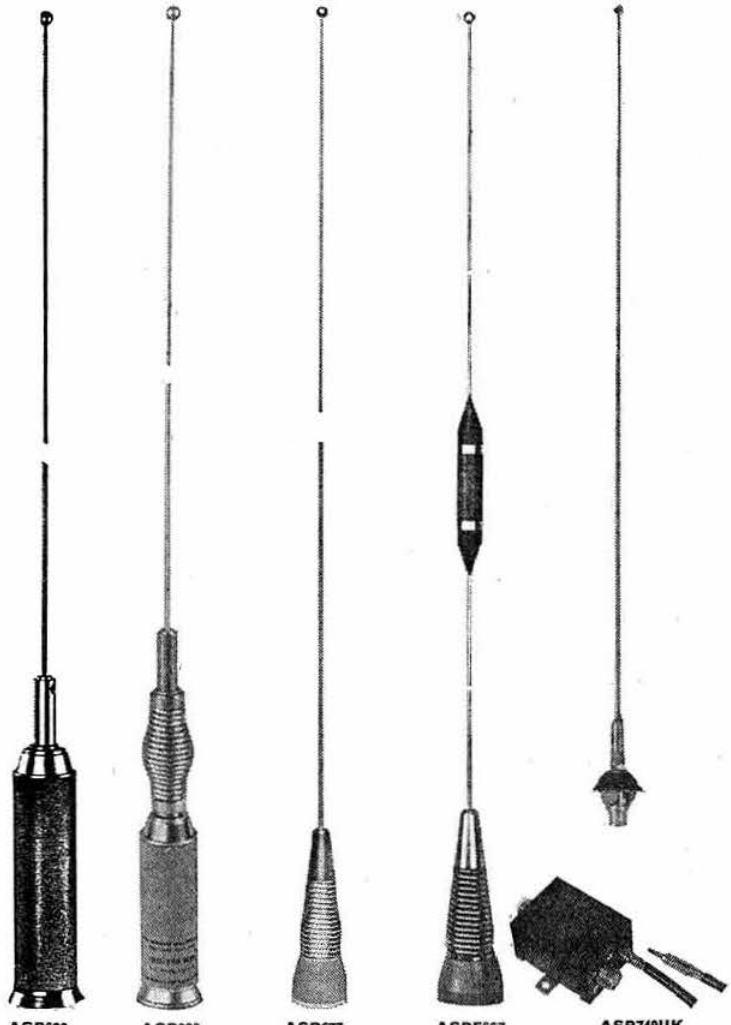

ASP629
¼W 3dB Gain
130-174MHz,
DC Grounded

ASP393

ASP677
⅝W 3dB Gain
140-174MHz

ASPE667
5dB Gain
Collinear
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Complete with 17' of RG58U and PL259 plug

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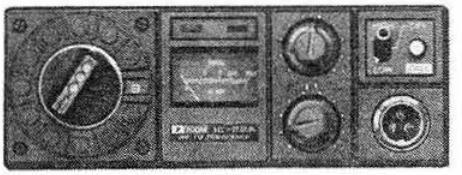
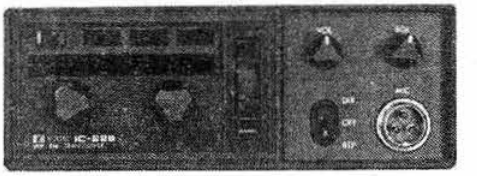


IC-22A
The 22 channel FM mobile rig with 10 channels fitted—these being the most useful 5 simplex channels and the 5 UK repeater channels. The simplex channels are 145·0, S20, S21, S22, and S23. If you buy from us during the next two months we will also offer you S24 at a ridiculous price—thus giving you a 22 channel rig WHICH IS HALF FULL OF CRYSTALS. This is worth thinking about when you consider that 11 pairs of crystals can cost you £61! There is an automatic CRYSTAL CONTROLLED tone burst fitted which operates on REPEATER CHANNELS ONLY. Ex stock at time of going to press.



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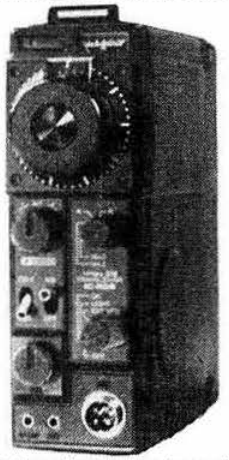
An **80 Channel** FM mobile rig with all 80 channels fitted. Uses an excellent phase lock loop system. Channels are at 25kHz spacing which fits in with the UK and continental channel systems giving *all* the UK simplex and repeater frequencies. A *crystal controlled* tone burst is introduced when working repeaters and reverse repeater facility is available on all channels by adding one extra 11·300MHz crystal. Ex-stock at time of going to press.



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Hand held SSB portable with **3 watts** p.e.p. output. Full VXO over the ranges 144·00–144·2 and 144·2 to 144·4. Two other ranges available with extra crystals. Internal batteries. RIT. True I.F. noise blanker. Add a linear if you want more power, but you'll be surprised what can be done with 3W p.e.p.!

IN AT THE END OF THIS MONTH!

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IC-3PA The perfect companion to convert your ICOM mobile into a base station. Provides 13·6V at 3·5A. Well regulated, with automatic electronic overload protection which is much faster than a fuse! Extra forward spacing speaker and quick release mounting bracket to fit ICOM mobiles. **£46.87.**

REVCO mobile antennas. An excellent range of $\frac{1}{4}\lambda$ antennas with a stainless steel whip and neat loading coil. The magnetic base is a beauty. All aerials are of the hinged mount type. $\frac{1}{4}\lambda$ whip with loading coil and base **£7.00** + £1 carriage, $\frac{1}{4}\lambda$ whip with loading coil and magnetic base and 3·5 metres of cable **£15.00** + £1 carriage, magnetic base alone with 3·5m cable **£9.00** + 75p carriage

IC-201
See January RADCOM for a fair report on this excellent rig. FM/SSB/CW with Full VFO coverage. Very, very stable. Mains or 13·6V supply. A 2 metre luxury! Ex stock at the time of going to press.

AND FOR 70 cms

ICOM® IC-30A

IC-30A
An excellent 10W rig for the new repeaters on 70cm. Comes with 433·2 fitted. 5 Crystals for the new FM simplex and repeater channels are included in the price and will be supplied when available.

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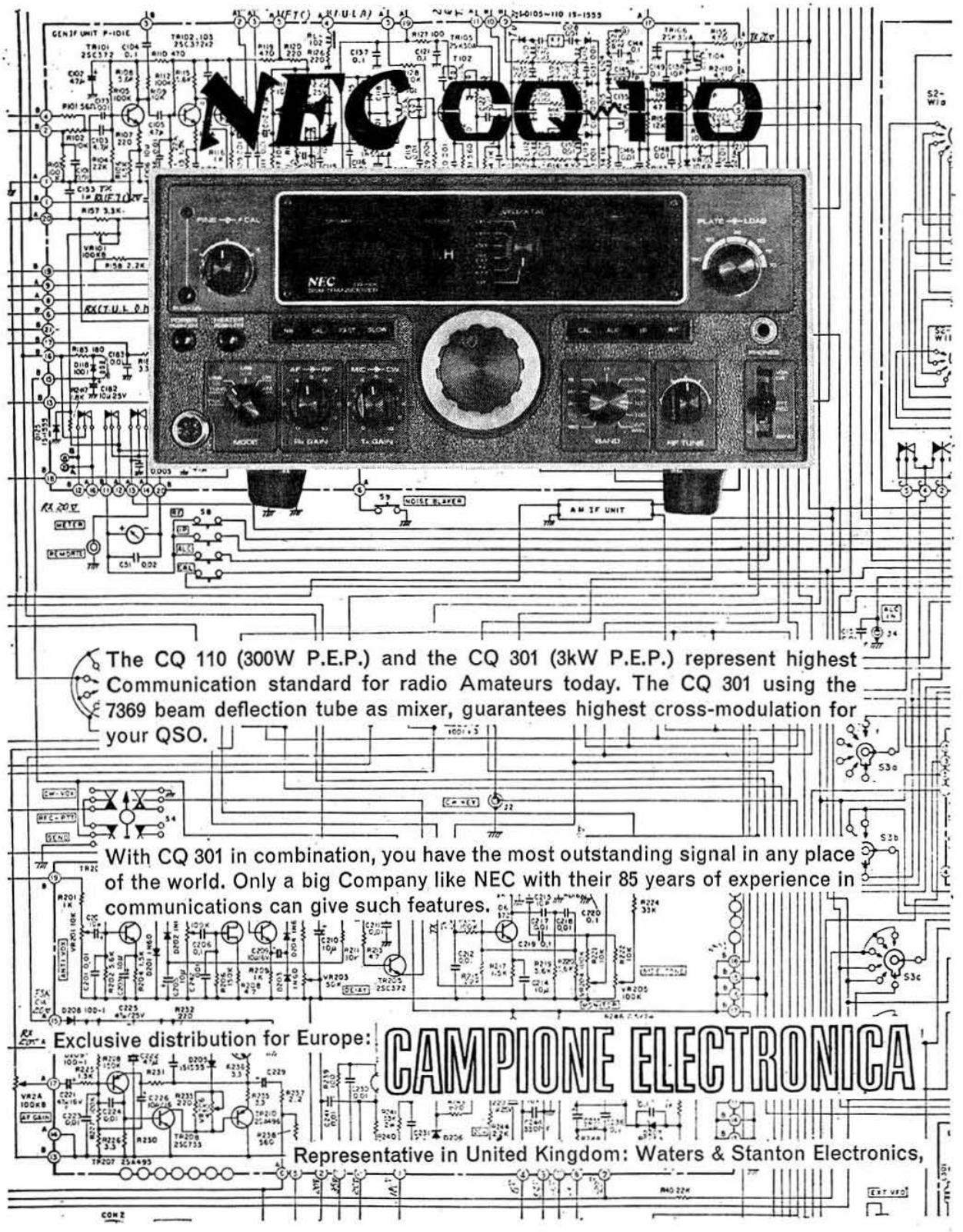

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75 ohm stan.	m.	10p (1p)
50 ohm UR43	m.	19p (1p)
50 ohm UR67	m.	36p (2p)
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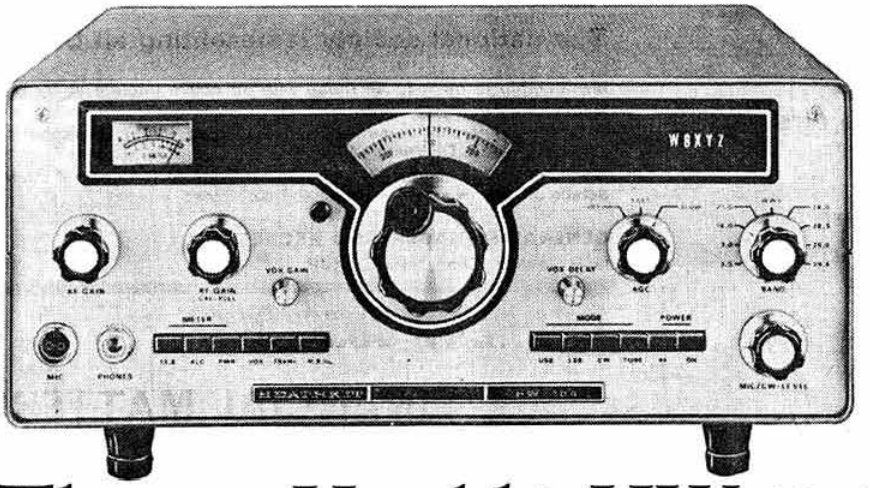

The new Heathkit HW-104.

Over the years, the Heathkit HW Series of transceivers has earned for itself a well deserved reputation for reliability and excellent performance.

So naturally we're pleased to introduce the latest model in the series, the new Heathkit HW-104.

Being completely solid-state and broadbanded, it eliminates the need for preselector, load or tune controls.

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Receiver sensitivity is 1μV and, because we've kept active components before the filter to a minimum, the HW-104 gives improved cross modulation and intermodulation performance. There's a built-in 100 kHz and 25 kHz calibrator too.

The Heathkit HW-104, needless to say, is easy to build with nearly all components mounted on plug-in P.C. boards. And pre-assembled looms just about eliminate point to point wiring.

Just take a look at the technical specifications and see what else the HW-104 has to offer.

Then post the coupon (enclosing 10p for postage) and we'll send you the latest Heathkit catalogue and full details.

Heath (Gloucester) Ltd., Dept. RC36 Bristol Road, Gloucester, GL2 6EE. Tel: Gloucester (0452) 29451.

Technical specifications

General

Audio frequency response: 350 to 2450 Hz ± 75 Hz (6 dB bandwidth).
Power requirements: 13.8 VDC nominal (max. 16 VDC) at: Receive: 2A; Transmit: (low power) 3A; Transmit: (high power) 20A.
Net Weight: 20 lbs. (7 kg.) *Cabinet Dimensions:* (less knobs, feet, sockets and rails) 5¾"H. × 14¹⁵⁄₃₂"W. × 13⅞"D. (14.6 cm. × 36.75 cm. × 35.24 cm.)

Transmitter

RF Power Output: High Power (50Ω nonreactive load): SSB: 100 watts PEP ± 1 dB; CW: 100 watts ± 1 dB. Low Power: SSB: 1 watt PEP (min.); CW: 1 watt (min.).
Output impedance: 50Ω, less than 2: 1 SWR.
Transmit/Receive Operation: SSB: PTT or Vox; CW: Keyed-tone Vox or Manual. Note: In the low power mode all transmit-receive switching is solid state.
CW Sidetone: Internally switched to speaker or headphones in CW mode.
Microphone Input: High impedance.

Receiver

Sensitivity: Less than 1 microvolt for 10 dB signal-plus-noise-to-noise for SSB operation.
Selectivity: 2.1 kHz min. at 6 dB down.
CW Selectivity (with accessory CW filter): 400 Hz at 6 dB down; 2 kHz at 60 dB down.
Audio Output: 2.5 watts into 4Ω.
AGC: Less than 1 millisecond attack time; switch selectable 100μ sec and 1 S release and OFF.

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RADIO SOCIETY OF GREAT BRITAIN

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Telephone 01-837 8688

Founded 1913 — Member society, International
Incorporated 1926 — Amateur Radio Union

PATRON: HRH The Prince Phillip, Duke of Edinburgh, KG

The national society representing all UK radio amateurs

Membership is open to all those with an active interest in radio experimentation and communication as a hobby.

Annual membership rates: UK—£8 (including VAT); Unlicensed members under 18 years of age, £3. Overseas—£7.50.

Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

GENERAL MANAGER AND SECRETARY — G. R. Jessop, CEng, MIERE, G6JP

EDITOR — A. W. Hutchinson

CURRENT COMMENT

FINANCIAL MATTERS

Half year results

The financial results for the six months to 31 December 1975 show a deficiency of approximately £7,000. The budgeted figure was £8,000, and, as the first quarter's result gave a deficiency larger than estimated, the indications are that the rate of loss is slowing down. This is certainly no reason to be complacent, however (remember we had a deficiency of over £12,000 last year, but this was after taking into account a substantial VAT repayment), but our book sales and advertising income are doing better than we had expected, although overheads have also increased. The second six months should show improved results from the increase in the subscription, provided that some members do not decide to call it a day at the new figure.

Data processor

The Society has been considering for a while the purchase of a data processor (or mini-computer, call it what you will) and demonstrations have been attended and the pros and cons have been discussed at length by Council and the Finance & Staff Committee. The almost unanimous view is that we must attempt to move forward and that the machine in question, an IBM32, will do all required of it and more.

The great problem which remains to be settled is finding sufficient funds to pay for the machine, but arrangements are being made with the bank. I am sure that many members will raise their eyebrows on reading this and reflect whether, while the RSGB is still running at a deficiency and members are being asked for increased subscriptions, the Society is wise to involve itself in expenditure in the region of £25,000 spread over some years. However, we have done our homework as carefully as possible and the figures appear to say that we can save money with this processor, and that not only will there be a vast improvement in membership records but that we can expect a long-term economic benefit.

An order, has, therefore, been placed for the machine, but this can be cancelled at any time before delivery (six months), which will leave time for further debate and careful thought.

J. O. Brown, G3DVV
Hon Treasurer

QTC

amateur radio news

A magnificent gift

Following the death of Mrs Sherley-Price, widow of the late G8SP, the RSGB has received a very generous legacy of £4,292.50 from her estate.

When G8SP died, Mrs Sherley-Price's solicitors contacted Mr A. H. Othen, G8FSZ, information officer at RSGB HQ, who at their request valued G8SP's equipment and arranged for its disposal, as a result of which the Radio Amateur Invalid & Bedfast Club received a legacy from G8SP's estate.

It would appear that the assistance given by Mr Othen has been most generously rewarded by this most magnificent gift to the Society.

Disposal of equipment on death

Instances are frequently notified to the RSGB of the equipment of deceased amateurs being disposed of to the disadvantage of the estates. Often these are due to lack of knowledge of what to do and of the value of the equipment, and/or that some unscrupulous persons are involved.

The Society is always available to give help and advice when needed in these circumstances. A note, prominently displayed in the shack or included with a Will, stating that free advice on the disposal of equipment may be obtained from the Society, would be a wise precaution.

QSL Bureau

Callsigns in the series beginning G4FAA will be issued in the near future and members issued with calls in this series should note that their QSL Bureau sub-manager will be Mr E. Gibbins, 23 Derry Down, Orpington, Kent BR5 4DT. Please arrange for a supply of envelopes to be sent to him. Each envelope should be approximately 5in by 7½in, and numbered so that members will know when to renew the supply.

There is a tendency to use cards which are bigger than normal size, and these cause difficulties because the QSL Bureau has to send cards in bulk to foreign bureaux by printed paper rate, in unsealed packets. To protect the cards, it is necessary to tie them tightly and large cards tend to buckle in transit and jeopardize the rigidity of the packet and therefore the safety of the cards. The ideal size for a card is 5½in by 3½in: very large cards have to be folded and this wastes time and spoils the cards.

GB2ITU

It is hoped to operate GB2ITU during the month of March 1976 from Tonbridge School. The purpose of this is to draw attention to the work of the International Telecommunication Union.

"Nothing new under . . ."

The curator of the National Wireless Museum was recently given a one-valve receiver of typically 2LO vintage. Complete with bright emitter valve and plug-in "What are the wild waves saying" coil on top of an ebonite panel, it obviously came from the early 'twenties, but G3KPO was amazed to see the name on the front—"RADCOM".

Facsimile transmissions

The Home Office advises that licensed amateurs are now permitted to conduct facsimile transmissions in the following frequency bands: 3·5–3·8, 7–7·10, 14–14·35, 21–21·45, 28–29·7, and 144–146MHz. When the licence is next reprinted, emissions A4 and F4 with a bandwidth not greater than 6kHz authorizing facsimile will be included.

This means that licensees wishing to carry out facsimile transmissions are not required to obtain special permission from the Home Office.

Reciprocal licensing—Cyprus

The Home Office has announced a reciprocal agreement with the Republic of Cyprus effective for Class A licence holders of both countries. There is no vhf-only licence in Cyprus and holders of Class B licences who wish to operate there should produce evidence of passing the RAE and take a 12wpm morse test when in Cyprus. Holders of current UK Class A licences may obtain a licence in Cyprus by sending a photostat copy of their UK licence to: Mr R. Michaelides, Chief Communications Officer, Ministry of Communications and Works, Nicosia.

IARU information

A member of the RSGB's IARU Working Group, John Bazley, G3HCT, has agreed to act as the information officer for the group. Requests for specific information on aspects of the Society's work within IARU and requests for speakers at club meetings may be sent to G3HCT, who according to the nature of the query or the area involved may divert the request to another member of the group. Correspondence should be addressed to G3HCT, QTHR, and *not* to RSGB HQ.

Radio Amateur Old Timers' Association

Members are advised that the next reunion will be held at the Cora Hotel, Upper Woburn Place, London WC1, on Saturday 1 May. It was decided at the 1975 AGM that, as an experiment, the reunion should be held on a Saturday in 1976. Details of membership of RAOTA can be obtained from Miss May Gadsden, 79 New River Crescent, London N13 5RQ.

Sunspot numbers

The table of definitive sunspot numbers for 1975 prepared by Prof M. Waldmeir of the Swiss Federal Observatory has been received. Any member desiring a photocopy of this information should enclose an sae with the request to the editor at RSGB HQ.

Proposed amateur morse examination

It is proposed to hold an amateur morse examination (subject to sufficient applicants and Post Office approval) during the month of March at the Ounsdale School, Wombourne, Nr Wolverhampton, West Midlands. If anyone is interested would they please write to Mr D. Battison at the above school.

Last year the examination was held at Wombourne to reduce applicants' travelling time and it is hoped that it will be possible to do the same again this year and establish Wombourne as the official test centre for the Midlands.

Further information from M. J. Sparrow, G3KQJ/G6KQJ/T or the morse instructor, M. Brown, G3ZPW, QTHR. □

RSGB PRESIDENTIAL INSTALLATION 1976

Following last year's innovation when Cyril Parsons, GW8NP, became the first RSGB President to be installed outside London, this year's Presidential Installation took place on 23 January in Birmingham, home of the new President. In the unique setting of the Executive Suite atop the main stand at the Warwickshire County Cricket Club's ground at Edgbaston, Dr John Allaway, G3FKM, was installed as the 42nd President of the Society by his immediate predecessor.

Over 200 members and guests assembled for this Midlands amateur event of the year, which also gave them an opportunity to meet members of Council, regional representatives and officers of the Society. To greet them at the door was the Region 3 (Midlands) representative, Henry Pinchin, G3VPE, and after signing in they were able to mingle and meet old and new friends, and to refresh themselves at the bar.

After this initial warming-up period, the zonal Council member, Bob Fisher, G3PWJ, introduced the retiring and new Presidents to the company and invited Cyril Parsons to install John Allaway as President for 1976. After a brief introduction, he did this in the traditional manner by investing him with the chain of office.

John Allaway, after thanking Cyril and all present for the honour bestowed on him said:

"When joining the RSGB 30 years ago, my last thought was undergoing such an experience as this—deeply moved and honoured at being chosen as 42nd President. This chain of office bears the names of many pioneers in the development of radio communication, and one of particular interest to those living in the Midlands is that of our 5th President, Sir Oliver Lodge, the world-famous scientist who was also the first Principal of the University of Birmingham.

"A few words now about our retiring President, Wing Cdr Parsons, a man of great integrity who has worked for the Society for about 30 years in one capacity or another, and his year in office has been very difficult but also very successful. You may recall that at the end of 1974 our then general manager had to resign due to ill health, and our 1974 President took over his job on 1 January 1975—the day Cyril assumed office. This meant that he began his year with a new and inexperienced (but very willing) general manager and a situation at HQ which left something to be desired. However, during 1975 there was an enormous improvement and very few Past-Presidents could look back and see so much progress during their year of office. Many of you may not realize that all Cyril's work has been done in spite of periods of very poor health—there have been many occasions when he should have stayed at home rather than travel to London for a meeting or attend a function, but such is the spirit of the man that he rarely failed to keep his engagements. Tonight is a good example of this, because only yesterday he was ill and in bed.

"I should like to mention Cyril's wife, Jean, at this point because we owe a great deal to her for the enormous support which she has given Cyril, and to the Society, especially during the past year. Ladies and gentlemen, I feel sure that you would like to join all our other members and myself in thanking Jean and Cyril for a job extremely well done. (*applause*)

"You will all be pleased to know that at this afternoon's Council meeting we unanimously elected John Brown, G3DVV, our hon treasurer, to be Executive Vice-President for 1976. John has very kindly accepted this addition to the great amount of work he is already doing, and has done for the Society during the past few years, because we are most fortunate in having secured the agreement of Lord Wallace of Coslany to be nominated as President for 1977. Lord Wallace, when in the House of Commons, did a great deal of work for the amateur radio cause, and among other things was responsible for our acquisition of reciprocal licensing.

"I should like to say a few words to those here tonight who are not really familiar with what the amateur radio service really is. The Radio Regulations say that it is a "service of self-training, intercommunication, and technical investigations carried out by amateurs . . ." This mouthful of words accurately describes what, in fact, is a wonderful international fellowship in which nationality, race and creed stand for nothing. At the present time the only countries where amateur radio is completely prohibited are those associated with China—and even there, I understand, there is some hope of a change in the not too distant future.

"Through the years we have been allowed to use wavelengths which, at the time, were believed to be useless for commercial purposes. At one time the whole short-wave band below 200m was available to us, but thanks to our work it was shown that these were in fact the very best wavelengths for long distance communication. We were among the first to use equipment containing valves, and have done a great deal of research into propagation of radio signals by constructing and maintaining radio beacons and by studying the behaviour of signals reflected off satellites and from the moon's surface. In fact, we have been involved in almost every important development in the field of radio communication.

"At the present time a great deal of research is taking place on the very short wavebands, and a good example of this was exhibited at the TELECOM 75 Exhibition in Geneva recently. This consisted of equipment which had been used by our Council member, Dr Dain Evans, to establish a new long-distance record for direct contact at 10GHz. It was greatly admired by the many professional engineers who examined it. Another exhibit consisted of a model of one of our satellites, Oscar 7—the name Oscar being derived from the initials of "Orbiting Satellite Carrying Amateur Radio." We have two Oscars in orbit at the present time, and these enable us to communicate over distances of several thousands of miles using very short wavelengths—a feat not otherwise possible. Our first satellite was launched in 1961, and each and every one has been entirely amateur designed and built. It is interesting to note that in many countries the first two-way space communication has been made via one of our satellites, rather than by one of the professional models.

"The esteem with which amateur radio is regarded at international level was very well demonstrated by events at the IARU Conference in Poland last year. M Mili, secretary-general of the ITU, and head of world telecommunications, travelled specially to Warsaw to open the event, and in his speech he pointed out (among other things) that the past half century has amply demonstrated the importance of the part played by radio amateurs. Even more significantly he also indicated his strong support for our continuing existence. The meeting was similarly addressed by Dr Kowalczyk, the Polish Minister of Telecommunications.

"Many distinguished people in the scientific and communications field have been, and are, members of our society. They started with Senatore Marconi and Admiral of the Fleet Sir Henry Jackson, the first man to establish ship to shore wireless, and have continued through the years to Professor Sir Martin Ryle, the Astronomer-Royal, and Dr John Saxton, Director of the Appleton Laboratory where British research into space communication takes place, at the present time. We have members all over the world, among them HM King Hussein of Jordan, and last (but not least) I should like to remind you that our Patron is none other than HRH Prince Philip.

"Tonight has been an innovation in RSGB Presidential

Installations because, as far as I am aware, this is the first to be held in England outside London. Like many of you I used to believe that the Society was organized mostly for the benefit of its London members. When I became involved with Society affairs I very quickly learned that this was not true. This evening is meant to emphasize this fact, and I am very grateful indeed to you for coming here in such large numbers because it shows that there is still a place for this kind of informal get-together. Some of my personal friends have travelled very long distances to support me this evening and I thank them very sincerely.

"One advantage of holding a Council meeting in the afternoon preceding an event of this kind is that you have the chance to meet many of your elected representatives, who hitherto may only have been names or callsigns to you. If I may hold your attention for just a few more minutes I should like to take the opportunity to introduce you to each of those who is here. I will go through the list alphabetically, and for added interest also tell you where each comes from—please note how few come from the London area!

"Council members D. Andrews, G3MXJ (Uckfield); P. Balestrini, G3BPT (Gravesend); J. Brown, G3DVV (Tadworth, Surrey); D. Byrne, G3KPO (Isle of Wight); D. Evans, G3RPE (Hemel Hempstead); R. Fisher, G3PWJ (Kingswinford); W. McGonigle, GI3GXP (Northern Ireland); D. Pratt, G3KEP (Bingley, Yorks); W. Scarr, G2WS (Weston-super-Mare); R. Stevens, G2BVN (Romford); G. Stone, G3FZL (London); C. Thomas, G3PSM (Leeds); D. Thomas, GW3RWX (Cardiff). We also have our Region 3 representative H. Pinchin, G3VPE, and Region 4 representative T. Darn, G3FGY, and from south Wales Region 10 representative R. Barrett, G8HEZ. From headquarters we have G. Jessop, G6JP, our general manager; A. Hutchinson, our editor; and D. Evans, G3OUF, our assistant general manager. Last, but certainly not least, we have HF Certificates Manager C. Emary, G5GH; Historian L. Newman, G6NZ, and Trophies Manager P. Miles, G3KDB.

"I should like to conclude by appealing for a special effort during 1976 to recruit new members—remember that we need united strength for 1979, and that you are at present subsidizing the cost of the defence of the non-members' licences as well as your own.

"Thank you all for being here, and thank you also to all those who have helped in any way in the running of this event."

The President's speech was warmly applauded, as were the following messages of congratulation which were then read to the assembly:

de IARU President, Noel Eaton, VE3CJ: "Regret I cannot be present to extend congratulations and good wishes for your term as President. I know RSGB will continue to be a leader in preparations for 1979 under your guidance."

de IARU Region III Secretary, David Rankin, 9V1RH (Singapore): "Congrats your installation as President RSGB. Wish all success in your efforts tc further IARU aims for WARC 1979."

de DARC International Liaison Officer, DL1FL, Alfred Muller: "Please receive the sincerest congratulations to your installation as RSGB President 1976 from DARC and me personally. We are glad that such a competent representative of amateur radio stands at the top of the eldest and one of the foremost amateur radio societies."

de HM King Hussein: "Heartfelt congratulations on becoming the new President of the Radio Society of Great Britain."

de Harry Dannals, W2TUK, President of ARRL: "Warm greetings and hearty congratulations on the occasion of your selection as President of the RSGB. On behalf of the officers, directorate, staff, and members of the American Radio Relay League, I offer you our sincere best wishes for a most successful term in office as President of the Society. If there is any way that the League can be of mutual assistance as we approach the most significant meeting of our time . . . the World Administrative Radio Conference of 1979 . . . do not hesitate to call. The members of our League are becoming increasingly more interested in preparations for WARC and a greater awareness of the need for co-operation among the world societies of amateur radio is evident. Success in our efforts to maintain the stature of amateur radio is essential. Unity in our preparations for WARC-79 is paramount. I look forward to working with you through the medium of the International Amateur Radio Union as we work towards that success."

The following message was received by Council from Louis van de Nadort, PA0LOU, chairman of IARU Region 1:

"On behalf of IARU Region 1 Division I have the pleasure to congratulate you, the Council, as well as all members of the RSGB on the election of Dr E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM, as your President for 1976. Having had the privilege to meet John in person on two occasions (Warsaw and Barneveld), I am sure that he is convinced of the value of the IARU and will give us the support we so much need. I am sure that, in spite of all the work and travel involved—completely different from chasing dx and dx-news—he will find 1976 to be a very interesting and gratifying year. I wish him luck to do this job to the good of RSGB—and RSGB being one of our major member societies—to the good of us all!"

Best wishes to the new President were also received from the Rt Hon Mrs Jill Knight, MP, member for the Edgbaston constituency.

That ended the formal part of the occasion, and thereafter all present were able to enjoy the delights of the social gathering, sustained by an excellent buffet and liquid refreshments, until time ran out and reluctantly they had to leave.

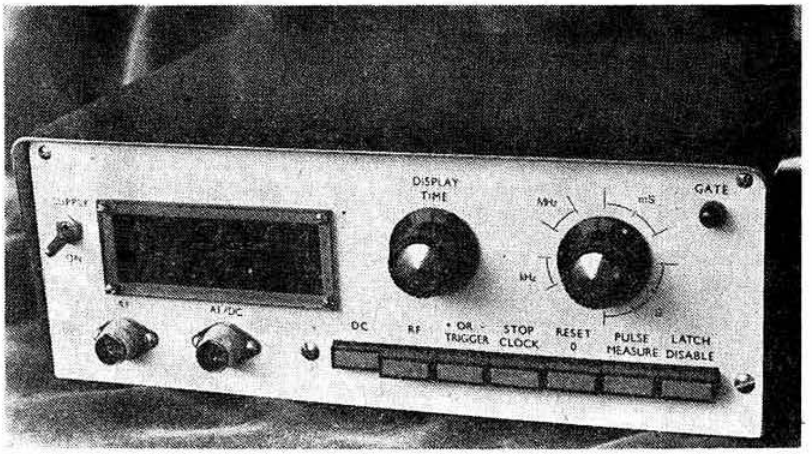
For most this was their first visit to an event of this kind, and their thanks are extended to all who played a part in organizing such a successful occasion. □

30th anniversary of ZB2A, Gibraltar

The RAF Gibraltar AS is celebrating this anniversary from 25 May to 1 June and during that period hopes to put all amateur radio modes on the air on all bands. It is hoped that as many old-timers who served on the "Rock" as possible will be present, and anyone interested should contact R. A. Butterworth, G8BI, QTHR. G8BI was the first post-war holder of ZB2A and would particularly like to contact three other founder members: Maurice Bussell, Des Pye and Jimmy Hassell. □

A digital frequency counter and timer

(direct read-out at 150MHz)



by G. F. FIRTH, G3MFJ,* and D. M. PRATT, G3KEP†

THE instrument to be described is a digital frequency counter and timer which was designed to measure frequency up to 150MHz and periods of time from 1μs upwards. No apology is offered for submitting details of another counter/timer as it is felt that other published designs do not fully exploit all the facilities which such an instrument is capable of providing. Using new components the counter/timer can be built for approximately £35, which compares favourably with commercially available counters of similar specification currently selling for well over £100.

* 9 Moorland Avenue, Bingley, West Yorkshire BD16 3EA.
† 30 Lyndale Road, Bingley, West Yorkshire BD16 3HE.

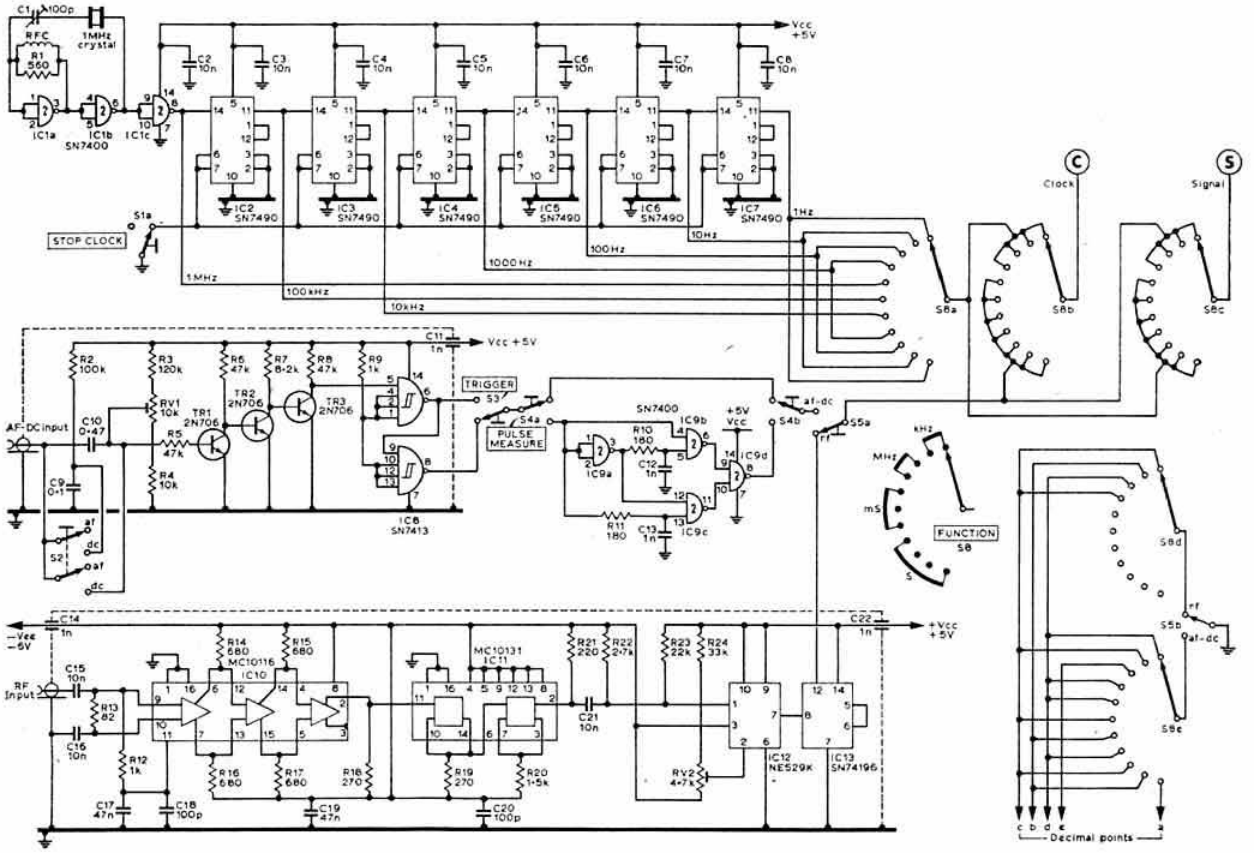


Fig 1 (above and right). Circuit diagram of the counter/timer

Specification

The instrument has two principal functions—(a) a frequency counter, and (b) a period timer. The facilities of each function are as follows:

(a) **Frequency counter**

(i) **af/dc input.** This input will accept frequencies within the range dc to 1·5MHz, resolution being to 1Hz. The average sensitivity on this range is approximately 25mV.

(ii) **rf input.** Frequencies from 200kHz to over 150MHz may be measured using this input, the upper frequency limit being determined by the individual characteristics of the ic used. Resolution is to 10Hz and the average sensitivity over the range is approximately 20mV.

Both the above input circuits give a steady, non-blinking display.

(b) **Period timer**

(i) Periods from 1μs to thousands of seconds can be measured, the resolution being determined by the five digits of display.

(ii) The timer may be started or stopped with a positive- or a negative-going pulse. The start and stop pulses may be of the same or of opposite polarities.

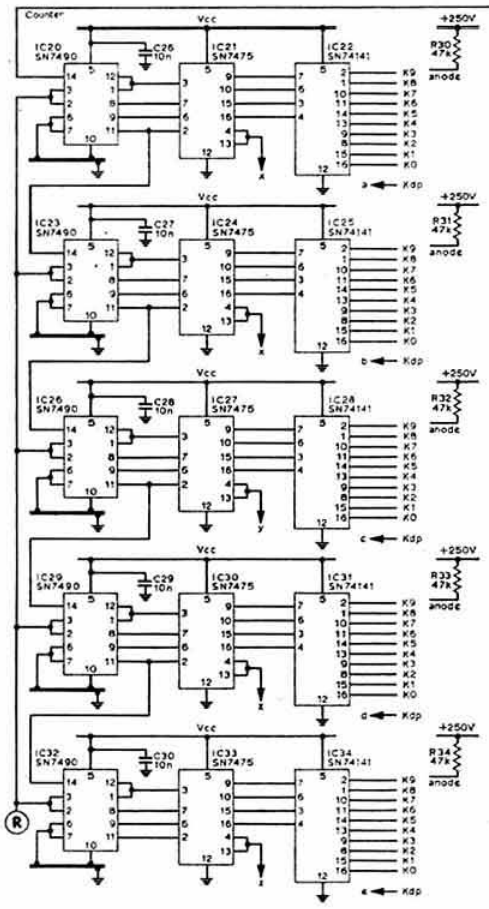
(iii) Using the memory facility, the display of time can be held for inspection while the unit continues to time. The display may be brought up to date with the time when desired.

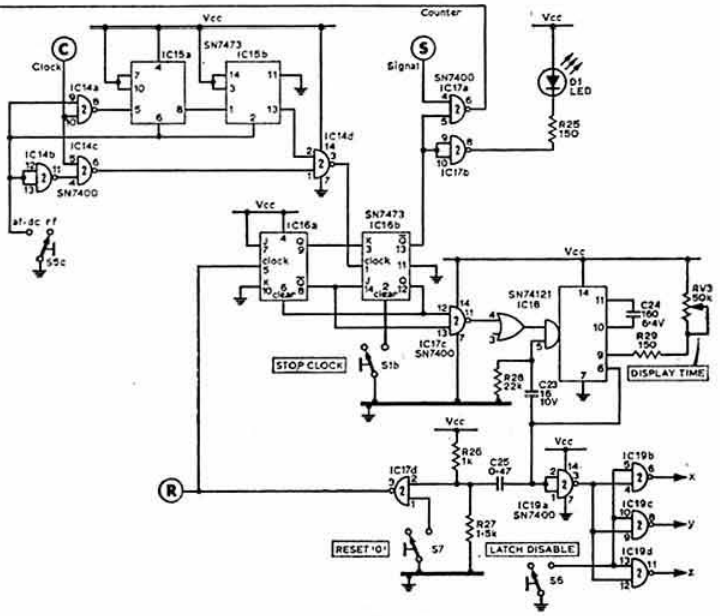
(iv) Pulses can be counted with the unit in its frequency counter mode with the clock stopped, ie the number of pulses fed to the input socket is counted rather than the duration or frequency of them.

The accuracy of the instrument will depend upon the quartz crystal standard. As a frequency counter a short term accuracy of 1 part in 10^7 should be easily obtainable. However, to this must be added a further inaccuracy of ± 1 digit due to the internal clock not being synchronized with the frequency being measured. This error may be overcome, but the additional circuitry involved was not considered justified.

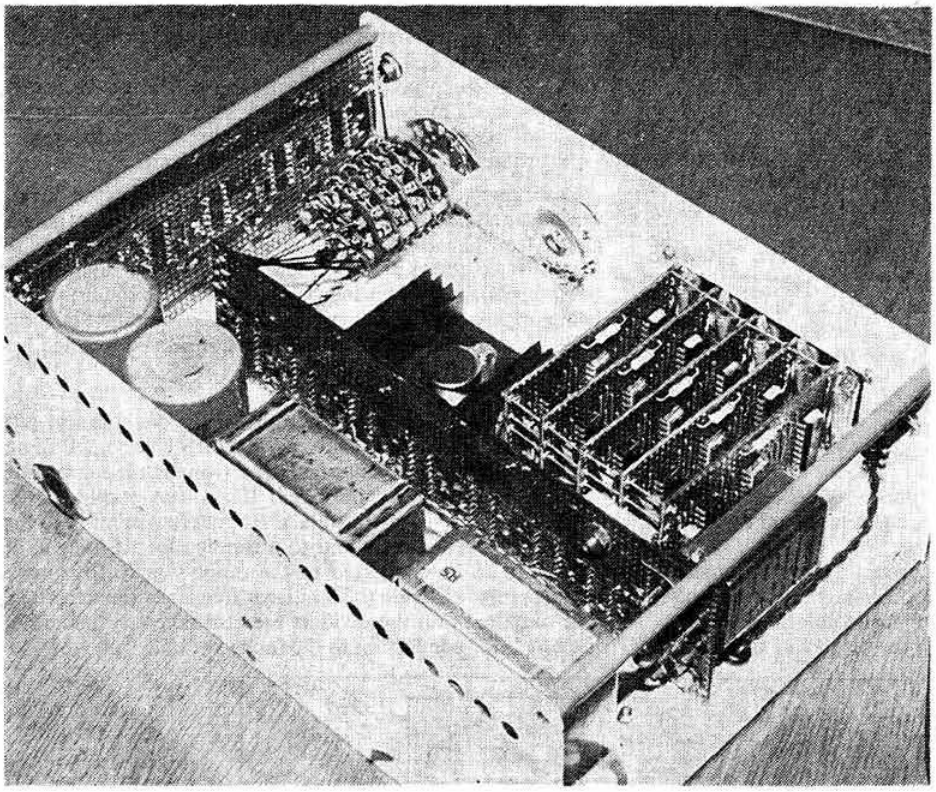
Circuit description

The clock pulse supply is the basis of the counter and this will be considered first. The crystal which is mounted in an oven for stability is connected to an oscillator comprising the two NAND gates IC1a and IC1b. The output of the oscillator is fed via the third NAND gate for isolation to the first decade divider IC2 and to a termination at the end of the board to be connected to the range switch. Five more dividers further divide the oscillator frequency down to 1Hz. The outputs of all the dividers are also taken to the end of the board for connection to the range switch.





The af/dc input circuit consists of a dual Schmitt trigger IC8, the two parts of which are connected in cascade to give two outputs 180° out of phase. The first of the Schmitt triggers is driven from three directly-coupled 2N706 transistors, the first one of these being given a preset bias control. This sets the operating condition for the whole amplifier. The input socket is capacity coupled to the first transistor and provision is made for short circuiting this capacitor C10 for dc control signals. In the dc position a capacitor C9 is connected across the input socket to overcome the effect of



Top view of the counter/timer showing the display boards (right); regulator ic mounted on heatsink, and clock board with crystal oven mounted on it (centre), and main control board (left)

contact bounce at the input signal source. A small additional bias is connected to the first stage via R2 so that a simple "make" contact will control the counter for timing purposes. The two outputs of this circuit are fed via the trigger polarity reversing switch S3 to a pulse doubler circuit IC9 if S4 is operated. The function of this circuit is to provide a positive-going 1μs pulse for every change of state of the input pulse. This allows the counter to time the length of a single input pulse, a facility not often found in other counter designs. IC9a and IC9b together provide a pulse for a positive-going input signal, and IC9a and IC9c do the same for a negative-going input signal. IC9d operates as an OR gate combining the two signals. The output of this circuit is connected to the range switch S8 via the af/dc—rf selector switch S5a. In the rf position of this switch the rf input circuit is connected.

The rf input circuit uses a triple-stage amplifier IC10, the sections of which are connected in cascade. The output is fed to two divide-by-two circuits in IC11 which gives an output of one quarter of the input frequency. These two ICs have a guaranteed minimum operating frequency of 150MHz. In the prototype the counter operated satisfactorily up to 185MHz. As these two ICs use emitter coupled logic (ecl) which requires a negative supply rail V_{ee}, the output is not compatible with ttl and therefore some form of level converter is necessary. As the output frequency will be over 40MHz it was felt that something a little more sophisticated than the usual single transistor was required. The device chosen was a Signetics NE529K, IC12. This is a high-speed comparator with a differential input and a ttl compatible output. The samples checked before the device was finally incorporated all operated to over 70MHz. The output of this is fed into a high-speed ttl decade divider, IC13, a 74196 which will operate to at least 50MHz. This means that the input frequency is divided by 40, and the output frequency will be less than 5MHz, well within the capacity of normal ttl.

The outputs of the clock board are fed to S8a which selects the appropriate clock rate, and the wiper of S8a together with the wiper of S5a are fed to S8b and S8c. These two wafers act as a double-pole changeover switch connecting either the appropriate clock pulse or the input signal to the gate control circuit, the opposite applying to the display. S8c is fed direct to one input of the control gate IC17a, the other input being fed from the control circuit. The output of IC17a is connected to the first digit board, ie the least significant digit.

All the digit boards are identical and each consists of a decade counter IC20, IC23 etc, a quad latch IC21, IC24 etc, and a decoder IC22, IC25 etc. The binary coded decimal (bcd) outputs of the decade counter are fed into the quad latch which acts as a temporary store and holds the last digit while the next one is being counted. The output of the latch is fed to the decoder. In this design cold cathode indicating tubes are used, but if other types of display are required then it is a simple matter to fit the appropriate type of decoder here. The "D" output of each decade counter is also fed to the next digit board input except of course for the last (most significant) digit.

The control circuit operation is as follows. The clock signal from S8b is fed into IC14 and IC15. The function of this circuit is to divide the clock frequency either by four or

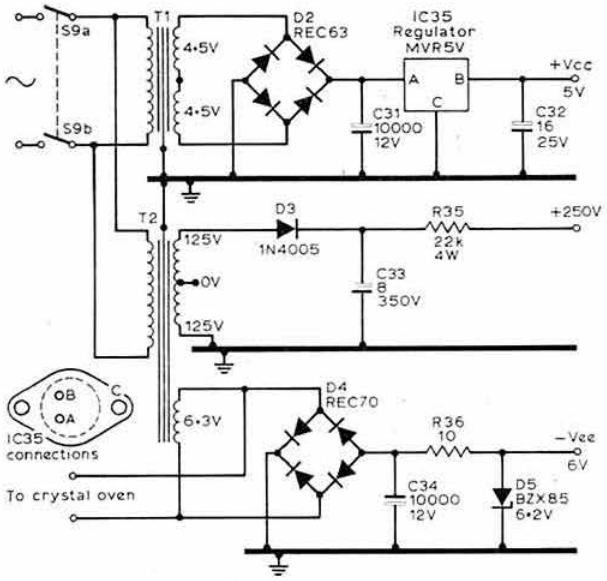
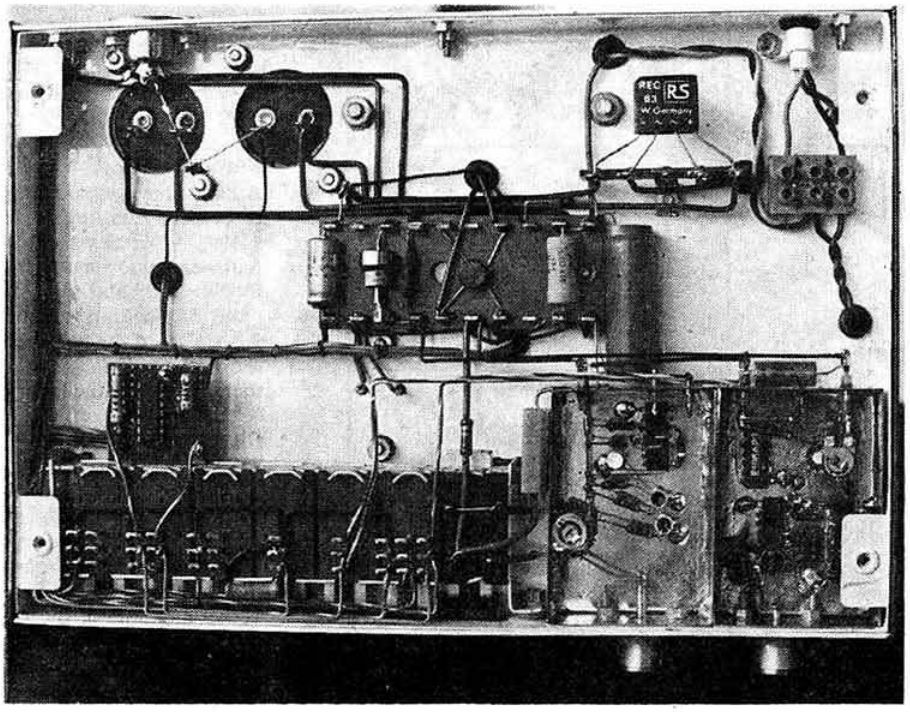


Fig 2. Power supply circuitry

by one. It is divided by four when the rf input circuit is in use, so cancelling out the effect of the divide-by-four section of that circuit. When the af/dc input circuit is in use no division is necessary. The action of this circuit is controlled by S5c. The output of IC14d is fed into the clock input of IC16b, the $\bar{Q}$ output of which controls the control gate. IC16b also controls IC17b, the gate indicator LED driver. The operation of this portion of the circuit is as follows. Assuming that IC16a Q is high and IC16b $\bar{Q}$ is low, the next clock pulse will cause IC16b $\bar{Q}$ to go high thus opening the main control gate. When IC16b $\bar{Q}$ is high IC16b Q will be low clearing IC16a, ie makes IC16a Q low. The next clock pulse will cause IC16b $\bar{Q}$ to go low which will close the main control gate. At this point the output of IC17c will go high and trigger the monostable IC18. The Q output of IC18 will go high so releasing the latch inputs on all the display boards via IC19. After a period determined by the capacitor C24 and RV3 the Q will go low again. The low on IC18 Q through IC19 latches the count on all the displays. After a short delay produced by C25, IC17d will give a short high pulse which will reset all the decade dividers to zero. This also makes IC16b ready for the next clock pulse by making IC16a Q high.

S8d and S8e control the decimal points on the indicator tubes. Two wafers are required and these are selected by S5b which moves the decimal point one place to the right when the rf input is used. The tubes used in the prototype have both left- and right-hand decimal points and the circuit diagram assumes that the right-hand one is used. If the display devices used have only a left-hand decimal point, appropriate rearrangement of S8d and S8e will be necessary.

The power supply uses standard circuitry using two transformers. Transformer T1 has two secondary windings connected in series providing a 9V output which is rectified by D2. Smoothing is achieved with C31, and a fixed-voltage regulator IC35 provides a stabilized 5V positive supply V_{cc}. Transformer T2 has two secondary windings, the first being used after rectification and smoothing to provide 250V for the indicator tubes. A 6·3V winding is used for the crystal oven, and is also rectified to provide a negative supply for the rf input circuit (V_{ee}). A zener diode D5 is used in a simple stabilization circuit. A three-way DIN socket is



Underside view of the instrument. The rf input circuit is in the bottom right-hand corner with the af/dc circuit in the box to its left. The power supply components are mounted on a 10-way tag board in the centre. The small Veroboard panel containing one ic is the pulse measure circuit IC9

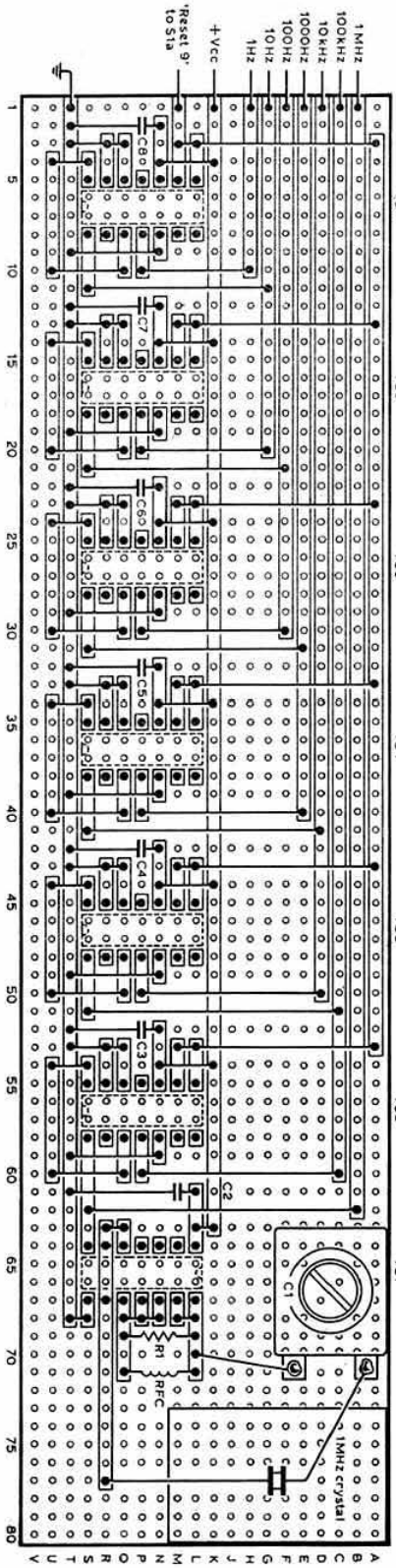


Fig 3. Veroboard layout of the clock board viewed from the copper side, the link wires and components being inserted into the reverse side

provided on the rear of the instrument giving access to the positive and negative low voltage supplies if required for ancillary equipment.

Construction

Two prototypes of the counter have been made, and while some readers may wish to adopt their own layout and techniques, constructional guidelines are included for those wishing to use them. The illustrations show clearly the relative positions of the components and the notes which follow may also prove useful.

The clock, control circuits and decade display boards are built on 0·1in matrix Veroboard. Details of the Veroboard panels are given in Figs 3, 4, 5 and 6. Each panel contains a minimum of discrete components and included on the clock panel is a Cathodeon 6V HC6U crystal oven currently available from *Radio Communication* advertisers. The diagrams of the Veroboard layout show the areas of copper which have been removed. Readers experienced in the use of Veroboard will appreciate that it is not essential to remove all unwanted copper provided a break is made in the appropriate places. However, it was felt that removal of all the unwanted copper produced a more tidy result. It should be mentioned here that the pulse measure facility was an added refinement and IC9 was built on a separate board. There is no reason why this circuit could not be incorporated on the main control board.

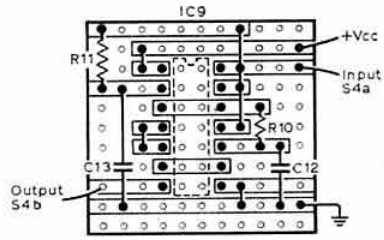


Fig 4. The pulse measure panel

Components

A list of the components is shown in the table. A comment is necessary in regard to the seven-position push-button switch. A switch was obtained from J. Birkett of Lincoln but required minor modification for use in the counter. The locking mechanism on the "Reset 0" position should be removed, making the control a self-returning push button. Also, a set of the unused contacts on the "Reset O" position should be taken out and added to the "af/dc—rf" position, thereby making the latter a three-pole changeover switch.

Chassis and cabinet

The unit is assembled on a conventional four-sided chassis 9½in by 6½in by 1in with aluminium base plate. The chassis is made from tinplate for ease of construction—it is made up of flat sheets soldered together. Brackets for fixing the base plate and Veroboard panels are also of tinplate soldered to the main chassis. The front and rear panels are 9⅝in by 3½in, 18swg aluminium, the tops of which are rounded to mate with a suitably shaped top cover, also of aluminium. After drilling, but prior to assembly of the components, a smart finish was obtained by painting the chassis and panels in

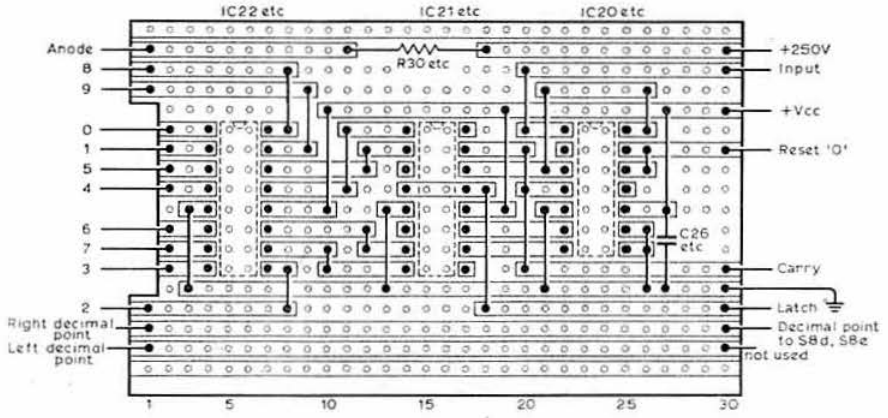


Fig 5. The display panel for cold cathode indicating tubes. Five of these are required

white gloss and the top cover in polychromatic violet in contrast. Instant lettering such as Panel Print (available from Doram Electronics Ltd) may be used for labelling the front panel and will provide a professional finish.

Assembly

It is recommended that assembly be carried out in the following sequence. The clock board should be built first and tested on a 5V positive supply. A temporary connection will be necessary between the "Reset 9" point and earth. An oscilloscope may be used to check the output from each stage or a receiver could be used to listen to the harmonics of the output. Accurate adjustment of the crystal frequency should be made with the trimmer C1 when the instrument is finally completed and the oven has been allowed to attain its normal working temperature. A standard frequency such as the BBC's 200kHz transmission or MSF may be used for this purpose.

Next the display boards should be made and tested individually using the 1Hz output from the clock board. Again a temporary connection will be necessary from the "Reset 0" point and earth. All five display boards may then be mounted together with the relevant interconnections and tested using any clock output. These boards may then be fitted to the chassis, and the control board, power supply and associated circuitry assembled.

Components list

R1	560Ω
R2	100kΩ
R3	120kΩ
R4	10kΩ
R5, 6, 8	47kΩ
R7	8·2kΩ
R9, 12, 26	1kΩ
R10, 11	180Ω
R13	82Ω
R14, 15, 16, 17	680Ω
R18, 19	270Ω
R20, 27, 29	1·5kΩ
R21	220Ω
R22	2·7kΩ
R23, 28	22kΩ
R24	33kΩ
R25	150Ω
R30, 31, 32, 33, 34	47kΩ, ¼W
R35	22kΩ, 4W
R36	10Ω, 2W
RV1	10kΩ preset pot
RV2	4·7kΩ preset pot
RV3	50kΩ linear pot
C1	100pF compression trimmer
C2, 3, 4, 5, 6, 7, 8, 15, 16, 21, 26, 27, 28, 29, 30	10nF ceramic
C9	0·1μF polyester film
C10, 25	0·47μF 100V polyester film
C11, 14, 22	1,000pF feedthrough ceramic
C12, 13	1,000pF ceramic
C17, 19	47nF ceramic
C18, 20	100pF ceramic
C23	16μF 10V electrolytic
C24	160μF 6·4V electrolytic
C31, 34	10,000μF 12V electrolytic
C32	16μF 25V electrolytic
C33	8μF 350V electrolytic
IC1, 9, 14, 17, 19	SN7400
IC2, 3, 4, 5, 6, 7, 20, 23, 26, 29, 32	SN7490
IC8	SN7413
IC10	MC10116 Motorola
IC11	MC10131 Motorola
IC12	NE529K Signetics
IC13	SN74196
IC15, 16	SN7473
IC18	SN74121
IC21, 24, 27, 30, 33	SN7475
IC22, 25, 28, 31, 34	SN74141
IC35	MVR 5V Regulator (RS Components 305-377)
D1	Red indicator LED (RS Components 576-327)
D2	REC 63 (RS Components 261-491)
D3	1N4005 (RS Components 261-182)
D4	REC 70 (RS Components 261-328)
D5	BZX85 (6·2V) (RS Components 283-031)
TR1, 2, 3	2N706
S1, 2, 3, 4, 5, 6, 7	Seven-way push-button switch (see text)
S8	5-pole, 11-way rotary switch, "break" before "make"
S9	DPST miniature toggle switch
T1	4·5V + 4·5V, 20VA mains transformer (RS Components 207-122)
T2	250V 50mA, 6·3V 1·2A mains transformer (RS Components 196-117)

Cold cathode numerical indicator tubes
Heat sink for regulator (RS Components 401-497)
1,000kHz HC6U crystal
6V HC6U crystal oven (Cathodeon type MCO-2M)

RS Components items may be obtained from Doram Electronics Ltd, PO Box TR8, Wellington Road Industrial Estate, Leeds LS12 2UF.

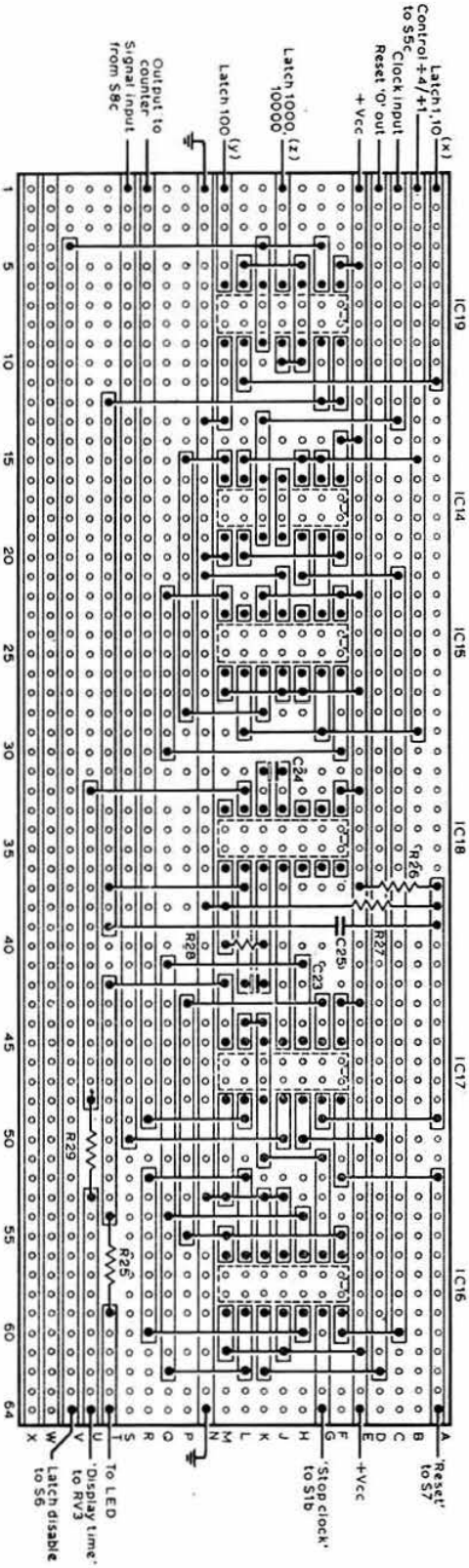


Fig 6. Veroboard layout of the main control panel. As in the other diagrams, the components and link wires are inserted into the other side of the panel

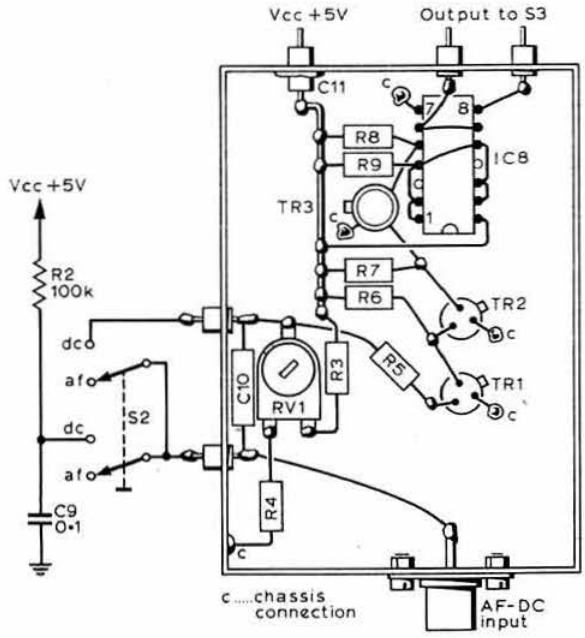


Fig 7. Layout diagram of the af/dc input circuit. TR1, TR2 and IC8 are shown viewed from the underside, while TR3 is mounted the other way round for ease of assembly

Input circuits

Each of the two input circuits is built into a small tinplate open box 2½in by 1¾in by ¾in soldered at the corners. The layout of the af/dc input components is shown in Fig 7. The supply voltage V_{ee} is taken via a feedthrough capacitor C11, while glass seals or nylon feedthroughs may be used for the outputs and connections to the af/dc switch S2. The side feedthroughs are positioned directly adjacent to S2 in order that the wiring to the switch may be as short as possible. The anti-bounce capacitor C9 and R2 are connected directly to the switch external to the af/dc input circuit sub-chassis. RV1 in the input circuit is provided to obtain optimum sensitivity and this will correspond to its maximum operating frequency.

Particular care should be exercised in the assembly of the rf input circuit, a suggested layout of which is shown in Fig 8. It will be desirable to build IC10 and IC11 as sub-assemblies before fitting them into the box. Readers may find it useful to refer to an article [1] in which the design and construction of the two input ICs was described. The potentiometer RV2 controls the bias on one input of the differential amplifier in IC12 and should be adjusted to give reliable operation.

Operation

The operation as a frequency counter is self-evident but it is felt that a few words of explanation are necessary in order to exploit the full potential of the instrument as a period timer.

With only the dc button depressed, a "make" condition on the af/dc input socket will start the instrument timing and a second "make" condition will stop it. The gate lamp will light on the first "make" and, unless the latch disable button is depressed, the timer will continue to read zero or

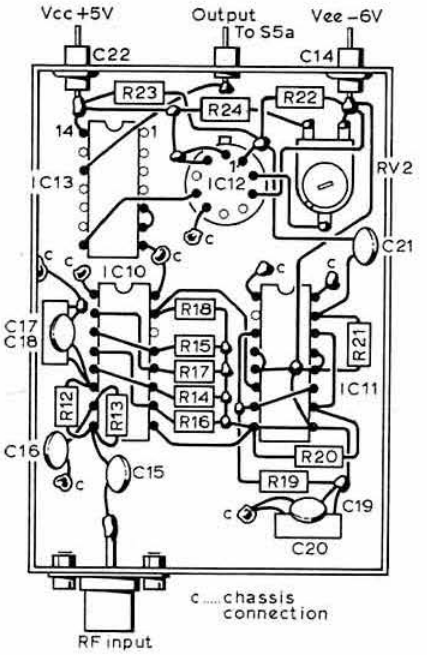


Fig 8. Layout diagram of the rf input circuit. The integrated circuits are shown viewed from the underside

the previous period measured. On the second "make" condition the gate lamp will go out and the timer will display the elapsed time.

The latch button may be used during a time measurement to provide the equivalent of a split-second hand on a stop watch.

When the trigger button is depressed, operation is the same as described above except that the timer is started or stopped with a "break" of a previously made contact.

The pulse measure button when operated allows the instrument to be started and stopped by consecutive "make" and "break" or "break" and "make" conditions.

With the stop clock button depressed the instrument will count the number of pulses fed to the input socket. For this facility the range switch should be in any frequency position and the latch disable button depressed.

Conclusion

Several instruments have been made to this design and their performance has fully met the design specification. The instrument described will provide a useful addition to any amateur station. Not only will it satisfy Post Office requirements in regard to frequency measurement, but will also enable time measurements to be made.

Reference

[1] "A 200MHz counter prescaler", D. J. Taylor, *Wireless World* January 1973, pp 27-8. □

WARC 1979

This phrase is heard whenever amateur service frequency allocations are under discussion. What is it? The initial letters stand for World Administrative Radio Conference which is to be held in the autumn of 1979 at Geneva under the auspices of the International Telecommunication Union. The decisions will be made by the delegates of the 147 member nations who will take part, and, in common with all UN organizations, the rule will be one country, one vote. The final terms of reference of the WARC have not yet been issued but it is likely that they will embrace all frequency allocations from 10kHz to 275GHz.

What is the amateur service doing about this event? The answer is, a lot; but at the moment it would be unwise to make public details of the planning. The Society has been advised by the Home Office that it will be fully involved in matters affecting the amateur service, and the Telecommunications Liaison Committee is fully briefed. Through the medium of the IARU Working Group and Region 1 IARU, the plans and thoughts of national societies are available. Make no mistake, it is only by the adoption of a world-wide plan, modified only to regional conditions, that the amateur service is going to survive in the form that we know it today.

Regions 1 and 3 (VK, ZL, JA etc) have already held their conferences and have agreed a plan. The Region 2 (N & S America) meeting is to be held in Miami commencing 11 April 1976 and will be followed by a meeting of the representatives of all three regions. What is to follow these discussions? The action is then for all national societies to put the plans to their administrations and secure their support at the WARC. Ultimately the only thing that counts is an "aye" vote at the conference. The difficulties lie not with the countries of W Europe, N America and the Commonwealth, who have traditionally supported the amateur service, but with many countries in Africa and Asia who see no value in amateur radio. Again it must be said that if it had not been for the support of the UK delegation at the 1971 Space Conference the amateur satellite service would not exist as we know it today. What is now needed is similar support from tens of countries round the world. This can only be achieved by continual effort from our representatives.

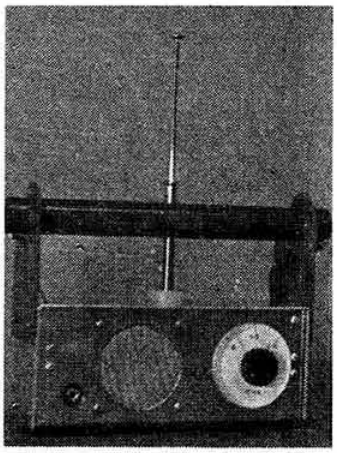
The national societies fully support the co-ordinating work of the IARU, and, in turn, are entitled to support from the radio amateurs who are the users of the frequencies.

The message is: **Support YOUR national society, the RSGB, and when on the air operate in a responsible manner.**

Dick Baldwin, W1RU, general manager of the ARRL, considers frequency allocation problems pointed out by G2BVN while Alfred Muller, DL1FL, looks on. The frequency chart formed part of the amateur radio stand at Telecom 75.
(Photo: DL1FL)

C

A 1·8MHz direction finding receiver



by P. DOWDING, G3XQA*

THE very successful design described by Geoff Mills, G3EDM, in the May 1969 *Radio Communication* has provided the basis of an almost standard item of equipment used by members of many societies. Unfortunately the Mullard i.f. and af modules used do not seem to be as cheap or as plentiful as they once were. The receiver described below is based on the Mullard TAD100 integrated circuit and the LP1175 470kHz a.m. block filter. The Toko CFU filter has also been used successfully and an alternative arrangement for the printed circuit board is shown. The Toko MFH41T, which has superior selectivity and bandwidth characteristics, has not been tried but will almost certainly produce a superior result, albeit at an increased cost. The author hopes would-be constructors will not be put off by the sight of a printed circuit board. A few hints and tips on pcb making are included to encourage the faint-hearted.

*146 Oakfield Road, Benfleet, Essex.

General details

The receiver must be housed in a metal or screened cabinet; the well-known double-U construction is easy to reproduce. The beauty of this method is that only one important dimension is associated with the bending process and small errors are usually easily corrected.

The TAD100 provides the frequency changer and oscillator, i.f. amplifier, detector and af driver. This is followed by a Class B output pair of transistors. A bfo is included in the main pcb. The sense amplifier is separate. Miniature components must be used unless the sizes of the pc boards are increased, but the latter practice is not recommended. Providing suitable components are used the boards will not be found to be overcrowded. The original receiver used one rotary switch to turn on the bfo or the sense amplifier, or both. Miniature toggle switches would be more satisfactory,

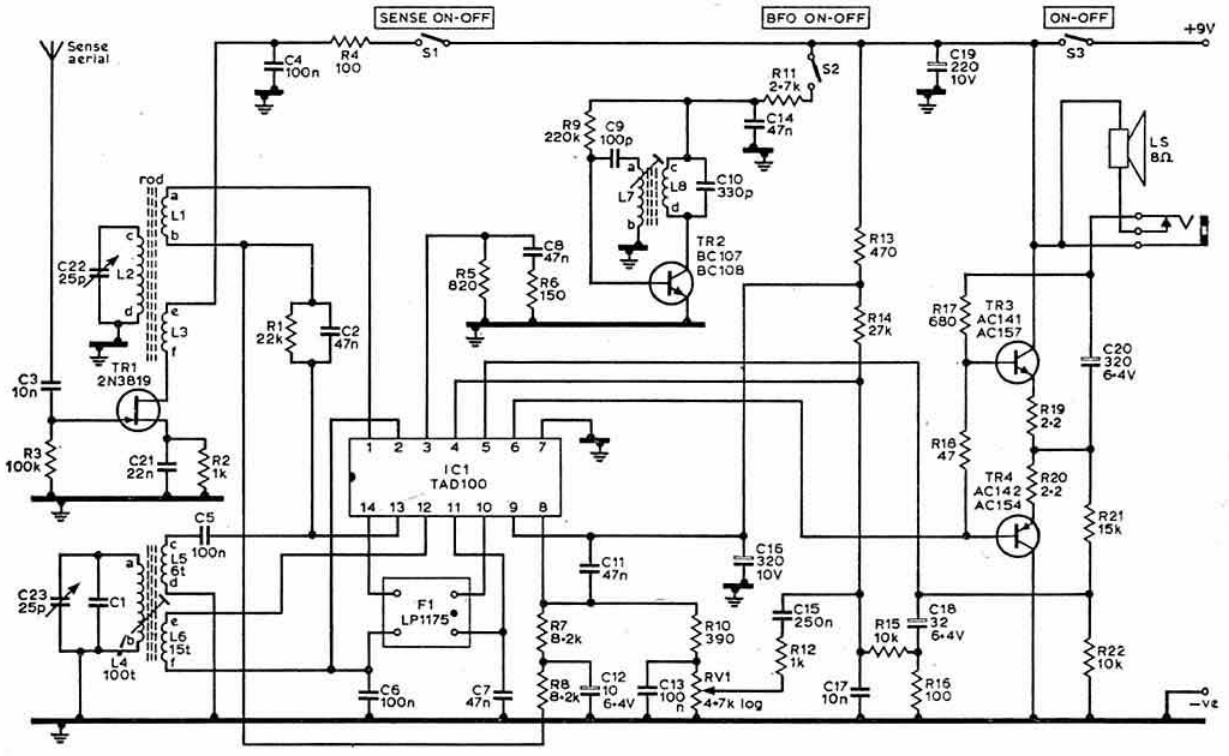


Fig 1. Circuit diagram of the receiver

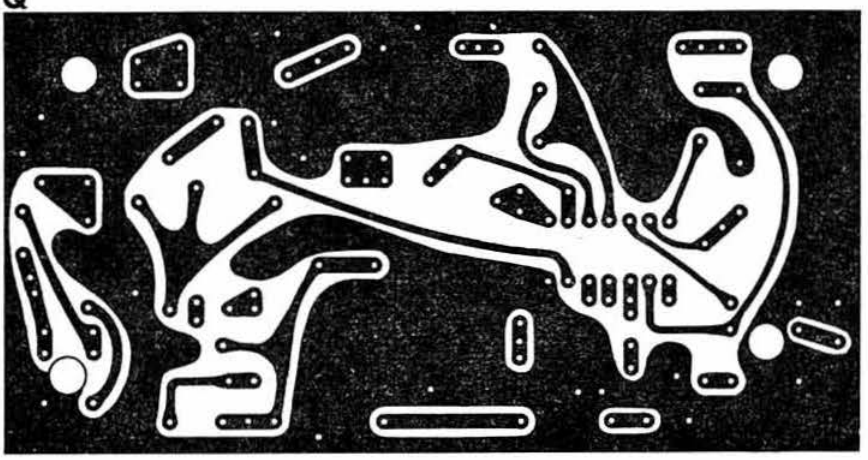


Fig 2. Main pc board, actual size

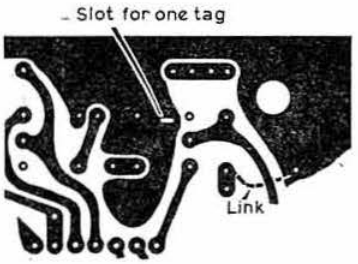


Fig 4. Modifications required to part of main pcb for Toko filter CFU

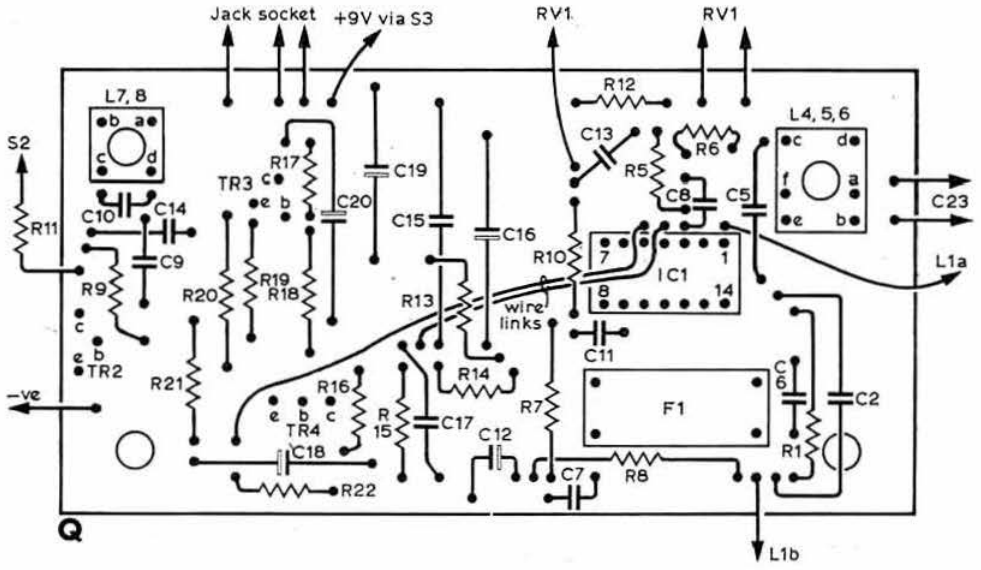
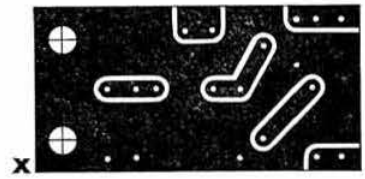


Fig 3. Main pc board connections



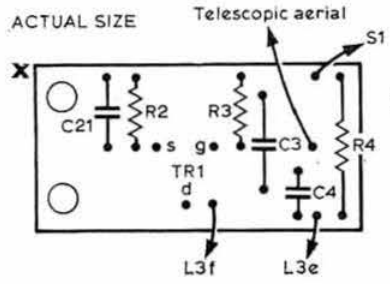


Fig 5. Sense amplifier pcb

but are slightly more expensive. The rf attenuator (patent not applied for) consists of a loop of wire which is moved on to the rod aerial when required.

Construction

Starting with the largest pcb, use only a good, single-sided, heat-resisting material. Unless the etching process is to be done photographically it is suggested that the board be drilled before etching.

First use a piece of 0·1in pitch Veroboard as a drilling jig and drill the 14 holes for the TAD100 using a 1mm drill. An Eclipse pin chuck is useful for holding small drills and preventing breakage. Only about a $\frac{3}{16}$in length of drill need be exposed. Other holes are then added to accommodate the components to be used. One or two holes drilled in error will not usually matter. The holes should then be connected with the resist material. In the author's experience cellulose paint

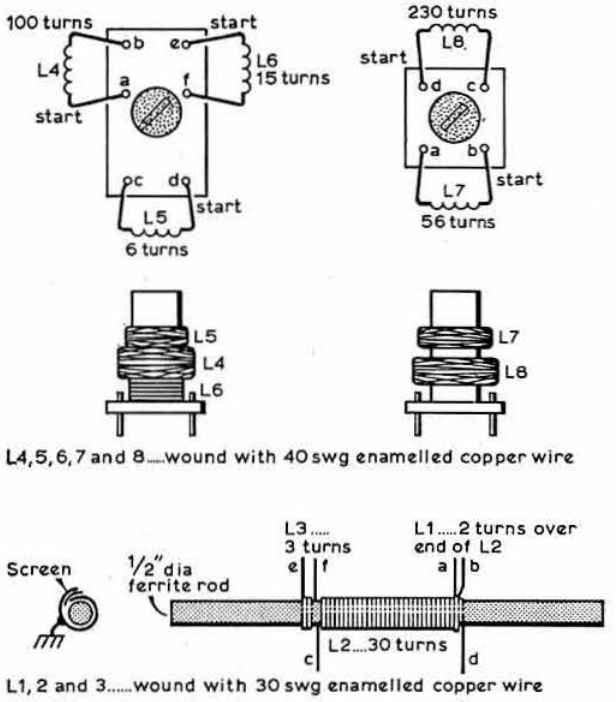


Fig 6. Coil winding details

provides the most reliable protection, and if the holes are drilled first as suggested the use of one of the special resist pens is not recommended.

The paint is applied with a fine artist's brush or a loop of fine wire. When the paint is dry and the circuit has been checked, the board should be floated upside down on the surface of a strong solution in water of ferric chloride. Etching is often completed in 10 to 15mins. The resist is then cleaned off with cellulose thinners. The sense amplifier board is made in the same way.

The oscillator and bfo coils are wound on $\frac{3}{16}$in diameter formers of the type often found in old radio/telephone equipment or offered for rewinding by firms advertising in *Radio Communication*. They should be wound as shown and preferably checked for resonance together with their respective tuning capacitors with a gdo. The oscillator coil has its tuned winding pile wound on top of the 15-turn winding. The other 6-turn winding is put on last. The number of turns made by the last winding may be modified to obtain the best result in individual cases. If the circuit does not oscillate, try reversing the direction of this winding.

When complete, both coils should be painted with polystyrene cement. The coils, other components and flyleads connecting IC1-4 to the junction of R14 and R15, and IC1-5 to the junction of R21 and R22, are then soldered on to the boards.

If V bending equipment is available it may be more convenient to fit the back of the cabinet separately—this was done in the original. Bending can be done very successfully over blocks of wood, providing that bending-quality aluminium is used. If the lid does not fit well, the inside dimension is easily adjusted as shown, providing there is a small radius at the bend. Precise dimensions of the front and back panel layouts have not been given because these will depend on the components available.

The directional aerial is wound on an 8in-long, $\frac{1}{2}$in diameter ferrite rod. The number of turns for this diameter is shown but may be adjusted for other rods. Again, it is a good idea to check the result with a gdo. The screen is made from aluminium cooking foil, and, by insulating the ends with varnished paper, care can be taken to avoid a short-circuited turn. The screen is then connected to the case. The rod is best protected in a handle made from an srbp tube. The sense aerial is made from a telescopic portable aerial and need only be 6–9in long.

The main pcb is mounted above the floor of the cabinet on two suitable spacers, and the sense amplifier is carried on a small bracket screwed to the back. A suitable epicyclic slow-motion drive is required for the tuning capacitor, and is probably best held in position with an aluminium ring and self-tapping screws. The tuning capacitor is mounted on a separate bracket as shown.

When the receiver is wired up and working, check the effectiveness of the sense aerial. There should be a minimum

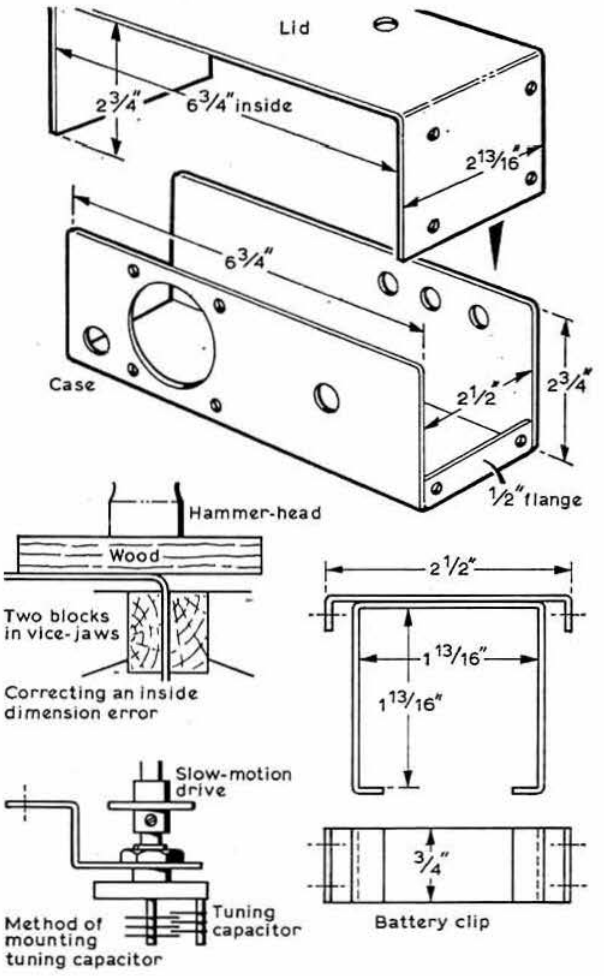


Fig 7. Constructional details

Components list

R1	22kΩ	**R9**	220kΩ	**R17**	680Ω
R2	1kΩ	**R10**	390Ω	**R18**	47Ω
R3	100kΩ	**R11**	2·7kΩ	**R19**	2·2Ω
R4	100Ω	**R12**	1kΩ	**R20**	2·2Ω
R5	820Ω	**R13**	470Ω	**R21**	15kΩ
R6	150Ω	**R14**	27kΩ	**R22**	10kΩ
R7	8·2kΩ	**R15**	10kΩ	All min. ¼W	
R8	8·2kΩ	**R16**	100Ω	**RV1**	4·7kΩ log

C1	Select	**C9**	100pF	**C17**	10nF
C2	47nF	**C10**	330pF	**C18**	32μF 6·4V
C3	10nF	**C11**	47nF	**C19**	220μF 10V
C4	100nF	**C12**	10μF 6·4V	**C20**	320μF 6·4V
C5	100nF	**C13**	100nF	**C21**	22nF
C6	100nF	**C14**	47nF	**VC1, VC2**	
C7	47nF	**C15**	250nF		25pF airspaced
C8	47nF	**C16**	320μF 10V		

IC1 TAD100
TR1 2N3819
TR2 BC107, BC108
Ferrite rod ¼in dia, 8in long
Speaker 8Ω, 2½in dia
Epicyclic slow motion drive
Insulated jack socket, 3·5mm

TR3 AC157, AC141
TR4 AC154, AC142
Block filter LP1175
Miniature toggle switch off/on, 3 off
¼in dia coil formers and slugs
Battery clips

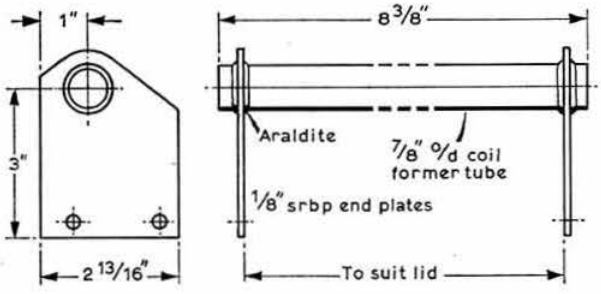


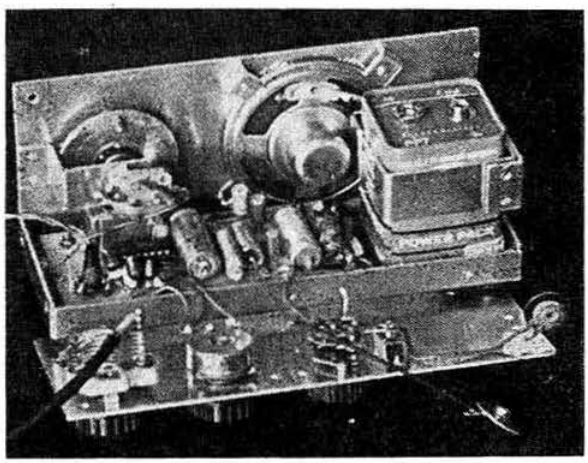
Fig 8. Details of directional aerial and mounting plate

signal when the transmitting station is at right angles to the axis of the rod, and a maximum when the receiver is turned through 180°. With the sense aerial switched off a sharper null is found in the direction of the axis of the rod.

Sense mechanism

A signal derived from the vertical aerial is amplified by a simple fet before being added to the signal obtained from the ferrite rod. The effective strength of this received signal is almost independent of the horizontal position of the receiver, provided that the number of turns in the rod which forms the coupling winding are few in number (as indicated in the rod winding diagram).

The amplitude of the sense signal is adjusted by altering the length of the vertical whip, and when this is of the correct magnitude it will almost cancel the signal from the rod when the receiver is at right angles to the direction of propagation of the wanted signal in one position. The two signals are additive when the rod is turned through 180°. Thus it is possible to roughly determine the direction of the hidden station, but the null is not normally sharp enough to be used for taking an accurate bearing. Once a rough indication is obtained, the sense amplifier is switched off and the receiver is turned through 90° to obtain a more accurate result.



Internal view of the instrument

Using the receiver

Results are sometimes more reliable when the receiver is near to the ground. Avoid wire fences and other metal objects which might distort the signal field pattern. In a walk-round hunt it is hardly worthwhile taking compass bearings, and a follow-your-nose technique may best be used; otherwise bearings may be taken with an oil-damped compass and plotted on an Ordnance Survey map. Note that the compass needle points to magnetic north, which does not correspond to true north and the grid lines on the map, but there is a simple method of making allowances for this on every map. The author uses a Swiss Recta compass which is set to allow automatically for the error; no doubt others have the same facility.

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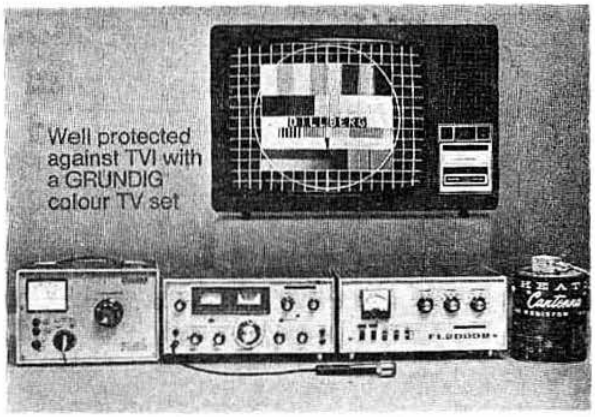


This is a black and white reproduction of an attractive multi-colour QSL card now being offered by the W German tv manufacturers, Grundig. An article in the magazine "Funkschau" contained details of the tests carried out. We will be pleased to reproduce any similar card offered by a UK manufacturer.

A dustbin-lid aerial for 10GHz

by DAIN EVANS, G3RPE*

Introduction

Careful measurement of several ordinary galvanized iron dustbin lids of the smoothly-rounded type has shown them to be sufficiently accurate paraboloids to be usable as dish reflectors even at the highest microwave frequencies available to amateurs. Since this observation was made in *Microwaves* [1] a number of people have asked for more details on checking the lid and on the constructional methods used in fabricating this type of aerial. It appears that the lack of a suitable dish has discouraged many from getting on these bands. Although specifically written around the use of a dustbin lid, most of the principles discussed apply of course to other forms of dishes and other frequencies.

In the design and construction of the actual aerial described below, some lathework was involved because this is probably the easiest way of achieving a well-engineered structure. However, some alternative methods of construction are suggested which do not require the use of a lathe.

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

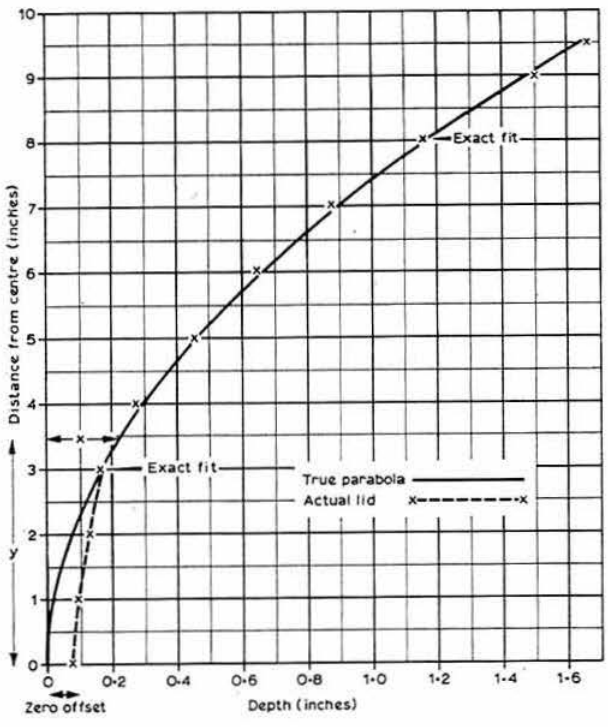
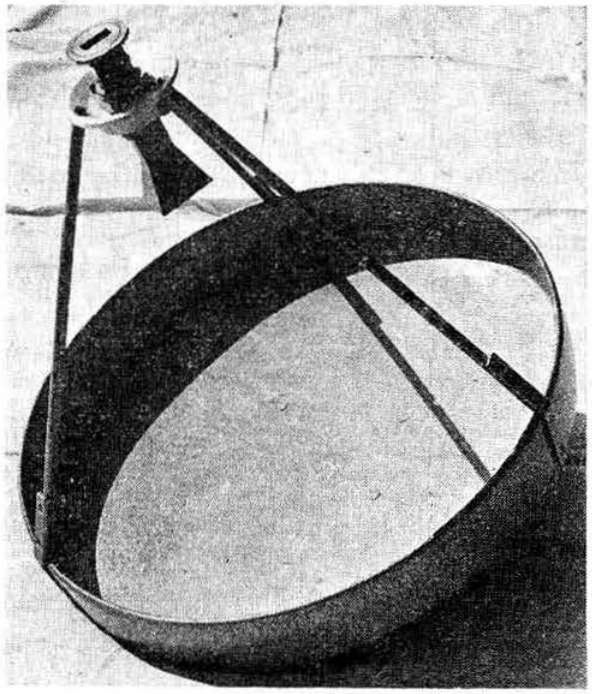


Fig 1. Comparison of the profile of a typical lid with a true parabola



The design uses the direct method of feeding, which the author prefers because of its mechanical simplicity and electrical efficiency, but a paper design for a Cassegrain feed is given for comparison. The method used to align the completed aerial and to check its efficiency is also described.

Checking the lid

Most of the lids that have been examined have had a relatively long focal length, typically 0·7 to 0·9 of the diameter. If a selection of lids is available, normally that with the shortest focal length is preferable since this will reduce the overall length of the aerial. A quick method of determining the *approximate* focal length f is from the equation:

$$f = D^2/16c$$

where D is the diameter of the lid and c is the depth of the curved part at its centre. Lids which have many dents or wrinkles greater in depth than about $\lambda/10$ at the design frequency should preferably be avoided.

It is well worthwhile spending some effort in measuring the profile of the lid accurately for two reasons: the "best-fit" paraboloid it will represent needs to be known with fair precision in designing the rest of the aerial, and the deviation of the lid from a true paraboloid will determine the maximum frequency at which the dish can be used. The procedure used was to cut a piece of hardboard (preferably coated with emulsion paint) to fit the profile of the lid within about $\frac{1}{8}$in and then position it across a diameter. A short length of very hard pencil was held against the lid and moved across its surface to transfer the profile to the hardboard. This operation was repeated using a thin spacer, and a third profile taken at right angles. A comparison of the curves indicated both the reliability of the process and the uniformity of curvature: generally this was within the accuracy of measurement, about 0·01in.

A straight line was drawn to connect the ends of one curve, and the difference between the two lines was measured at intervals of 1in on both sides of the centre. Comparing corresponding values gave a measure of the accuracy achieved which again was generally within 0·01in. A systematic change in the differences would have indicated that the straight line had not been positioned properly. By subtracting the average value of each pair of points from the value corresponding to the centre of the lid, the profile could then be tabulated in a more convenient form.

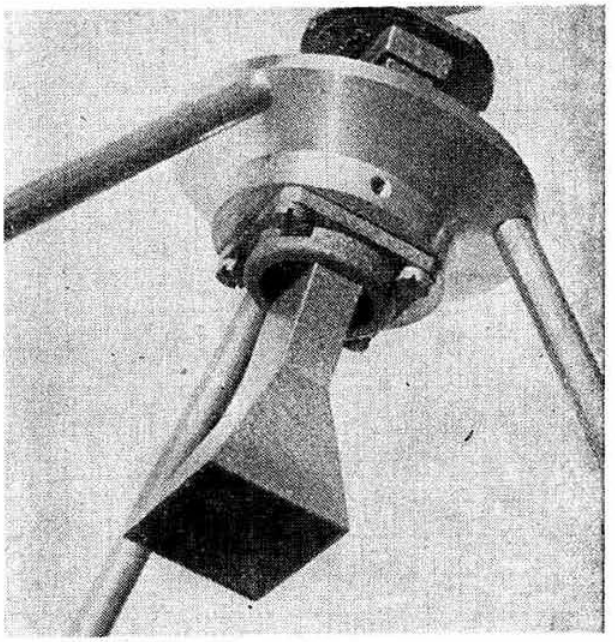
In determining the "best-fit" parabola to the lid profile, the parabola was made to fit exactly at distances roughly 30 and 80 per cent from the centre, the area between these points corresponding to the part of the dish that does most of the work. The focal length of this parabola is given by the equation:

$$f = \frac{y_2^2 - y_1^2}{4(x_2 - x_1)}$$

where x_1, y_1 and x_2, y_2 are the points on the lid profile to be fitted.

For the 19in diameter lid used in the aerial shown in the photographs the fit was made at points y = 3in and y = 8in, the corresponding x values for the lid being 0·09in and 0·19in respectively. The focal length calculated from the equation above was 13·75in, and this value was used in the equation $x = y^2/4f$ to calculate the required parabola. This curve is shown as the full line in Fig 1. Also plotted as crosses are the measurements taken from the lid, to all of which have been added a zero offset value of 0·07in to make the two curves coincide at the y = 3in and y = 8in points.

The fit between the two curves is remarkably good: the largest deviation of this lid from a true parabola is at the centre, 0·07in, and elsewhere is less than 0·02in. These values correspond respectively to less than $\lambda/17$ and $\lambda/50$ at 10GHz and therefore would be expected to reduce the overall gain of the aerial by a fraction of a decibel only. Had the deviation exceeded $\lambda/10$ over much of the profile, then the lid would have been unsuitable for use at this high a frequency.



The feed and its support system

Design of the horn feed

The virtues of horn feeds have been extolled in a previous article [2]. As is shown by Fig 2, the feed consists of a length of waveguide flared in one or two directions to produce the correct beamwidth of radiation for efficient illumination of the dish. The aperture of the feed is dependent on the ratio of the focal length of the dish to its diameter, and this relationship is given in Fig 3. In the design example, the f/d ratio is 13·75/19 = 0·73, and the aperture of the horn required for a frequency of 10,050MHz becomes 1·75 × 1·30in. This was made to taper to the internal dimensions of WG16, 0·9 by

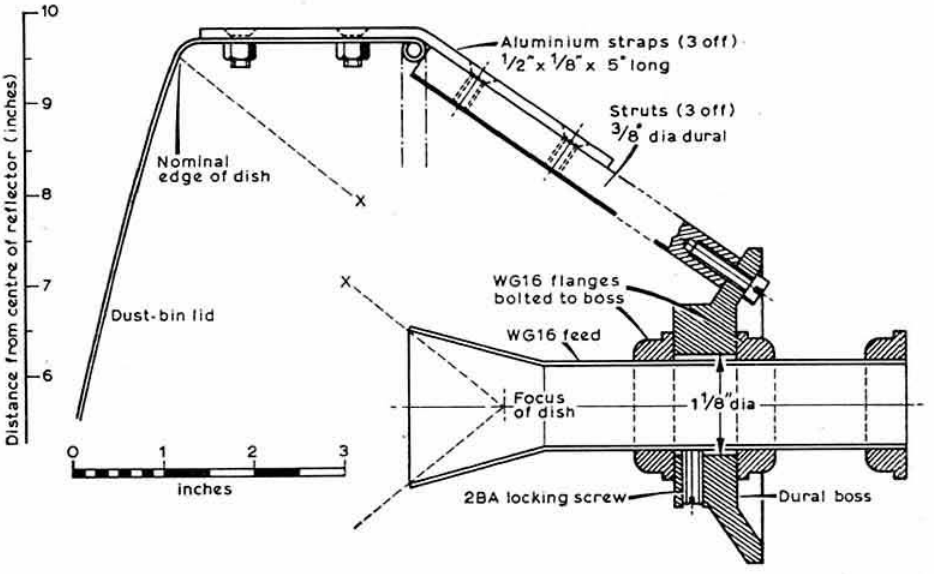


Fig 2. Detail drawing of feed support arrangement

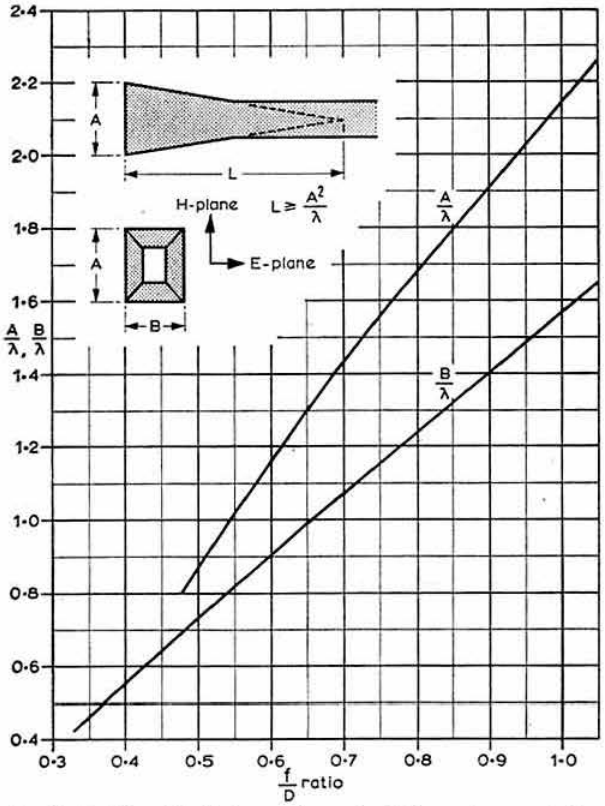


Fig 3. Relationship between horn feed dimensions and the focal length/diameter ratio of a dish

0·4in, over a length of 1·5in which is sufficient to exceed the critical minimum length necessary.

Constructional details

In the direct-feed method, the feed is mounted in a bearing which is supported from the rim of the dish by three or four struts. The bearing allows the distance between the feed and the dish to be adjusted to allow for uncertainty in the positions of the phase centre of the feed and the focus of the dish. A rigid structure is necessary: it must be remembered that the 3dB beamwidth of the aerial shown here is only $\pm 2°$, and that the total angular play of the feed relative to the dish must be a small fraction of this value, otherwise the aerial will be unreliable in operation.

The aerial layout was planned by plotting on squared paper the profile of the lid including its rim. Lines were drawn to connect the curved part of the lid to the focus and the horn feed positioned so as to just intercept these lines in the way shown in the detail drawing, Fig 2. A range of adjustment of 1in was considered adequate, and therefore this gap was left between the tapered part of the horn feed and the inside face of the feed mounting boss. Square waveguide flanges bolted to this boss acted as bearings for the feed. The size of the boss set the radius at which the struts could be fixed, and this in turn fixed the angle at which the boss skirt was set back. This angle is the same as that between the struts and the axis of the aerial. The size of the boss used, 3·5in diameter, causes less than 0·3dB loss in aerial gain although it might appear rather large.

The boss was turned on a single centre from dural. To jig the flanges in position while drilling the holes for their clamping screws, a 1 by ½in bar was passed through them and the 1⅛in hole in the boss in which it is a close fit. The struts were cut to the same length by taping three slightly oversize lengths together and turning them down in a lathe fitted with a three-jaw chuck. In drilling the fixing holes in these rods at the dish end, the aerial was assembled with two of the three struts taped in position to their straps. The third was clamped tight against the rim with a Mole wrench, the holes drilled and the bolts inserted, when the process was repeated for the other rods. By using techniques such as these, accurate alignment of the feed is virtually guaranteed.

To facilitate mounting the aerial on a mast, the handle on the lid was cut and the ends straightened and threaded ⅜in BSF.

Construction of the horn

The horn was fabricated by cutting the two larger side plates accurately to the shape of the inside dimensions of the horn. These were jigged in position on the end of a length of waveguide one at a time using a template to ensure the correct angle and then brazed. Oversized top and bottom plates were soldered in place and trimmed to shape. The excess solder and braze on the inside joints were carefully removed by filing, and the waveguide/horn transition rounded smoothly. Finally the flange was soldered with the boss in place.

Another method is to cut the four plates accurately to shape and tack solder them in place with isolated joints using a large soldering iron. Each joint can then be soldered completely, applying wet pieces of cloth as necessary to prevent melting other joints.

Alternative boss designs

Two other types of boss have been used on other aerials. In one, the waveguide part of the feed is built up by soldering 1 by $\frac{5}{16}$in or 1 by ⅜in brass bars to the broad faces of the guide, the assembly then being turned down to 1⅛in diameter. This guide is made a sliding fit in a hole in a boss of similar design to that shown in Fig 2, the waveguide flanges of course being omitted.

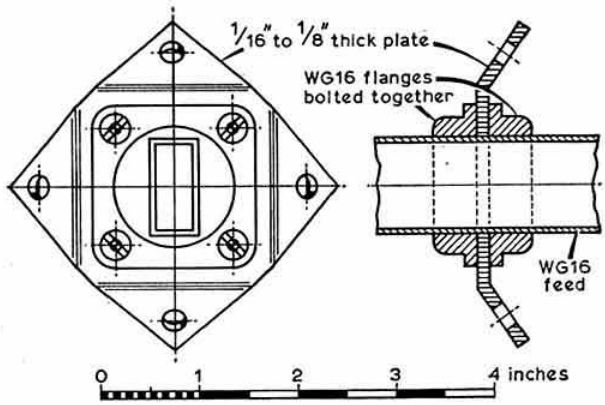


Fig 4. Alternative form of feed bearing

For those without access to a lathe, the arrangement shown in Fig 4 can be used. Construction is simplified if four struts are used. Care is required in bending the corner tabs to the correct angle otherwise the mounting will be forced out of alignment.

Vertex plate matching

A well-matched feed for a parabolic dish will, of course, have a vswr close to unity. However, when the feed is then positioned in front of the dish some of the power reflected by the dish will be intercepted by the feed, and the aerial will no longer appear as a good match to the transmitter. This may cause problems with transmitters such as self-excited oscillators and varactor multipliers which tend to be rather sensitive to the quality of the match.

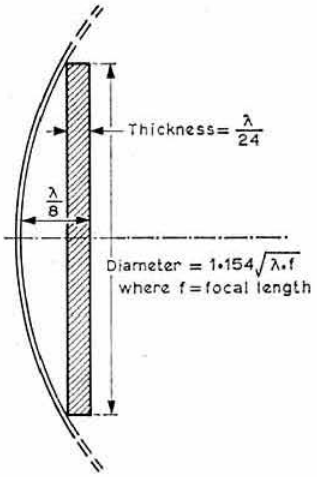


Fig 5. The dimensions of a vertex plate for matching a feed to a parabolic reflector

One method for eliminating this mismatch is to fit a so-called vertex plate to the centre of the dish which will reflect back on to the feed just sufficient power of the correct phase so as to cancel that reflected from the rest of the dish. The dimensions of the plate, as given in the reference, are shown in Fig 5. It can be shown that for all dishes the centre of the front face of the vertex plate will be spaced $\lambda/8$ from the centre of the dish, and this results in the $\lambda/4$ phase shift that is required to cause cancellation.

The vertex plate will be independent of the type of feed employed provided of course it illuminates the dish efficiently, but will only operate effectively at the frequency for which it was designed.

Cassegrain version

A paper design of an aerial using a rear feed method, which some seem to prefer, is shown in Fig 6. The procedure used in its design was to plot the profile of the lid as before, connecting lines from the edge of the dish to the focus. The diameter of the sub-reflector is a compromise between one of large diameter, which will reduce the proportion of radiation lost by diffraction around its edge, and one of small diameter which will cause less of an obstruction. The diameter selected, 5in, corresponds to about 3λ at 10GHz. At this value, both the losses are about 1dB.

The position of the sub-reflector was fixed by making its edge intercept lines drawn from the real focus of the dish to its rim. This sets the position of the virtual focus: it is as far in front of the sub-reflector as the real focus is behind. An approximate position of the horn feed was obtained by making the edge of the horn just intercept lines drawn from the virtual focus to the edge of the sub-reflector.

In this design, the horn projects over 8in from the dish, and a fairly robust bearing is therefore required if it is not to be knocked out of alignment. This also applies to the sub-reflector, which may be mounted directly on the dish by three struts, or from the feed itself as shown in Fig 4. With the latter arrangement it is important that the sub-reflector be kept in the same position with respect to the *dish* when the feed is moved during final adjustment.

Aligning and checking the aerial

The aerial is aligned by connecting some form of power detector and maximizing its output from signals received from a relatively distant transmitter. The only real problem is that of ensuring that the aerial responds only to the direct signal from the transmitter, and not to any signals reflected from intermediate objects. The risk of receiving reflections usually increases as the aerials are spaced further apart, but there is a minimum desirable spacing: each aerial should be operated well within the far field of the other. This means that the spacing should exceed $2D^2/\lambda$, where D is the diameter of the larger aerial, and λ is the wavelength in the same units. For a dish 3ft in diameter used at 10GHz, for example, this distance is at least 200ft. A good test site is where the aerial is mounted on one hill and the transmitter at the same height on another a fraction of a mile away, with the valley between them broken up by trees, houses and rough ground. Again to minimize reflections, the transmitter aerial should have as high a gain as is available.

When large aerials and a powerful transmitter are used over a comparatively short path, a convenient detector can be

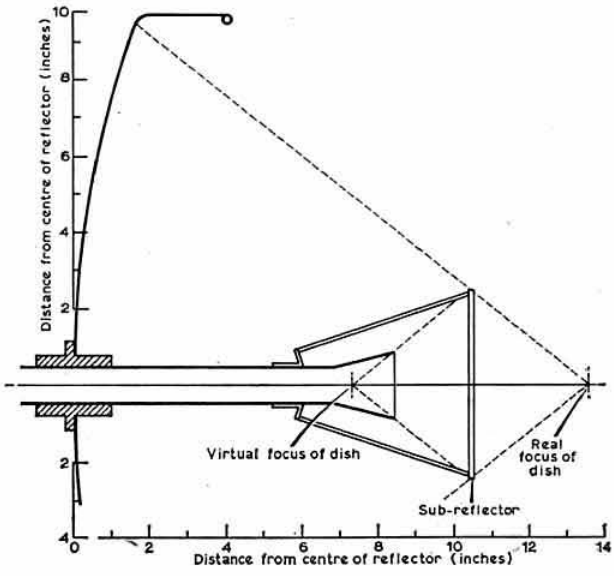


Fig 6. Cassegrain version of aerial

a conventional mixer. The meter measuring diode current should be the most sensitive available so that an attenuator can be fitted between the aerial and the detector to minimize any mismatch. Over longer paths it may be necessary to use a receiver as the detector. If this is an fm receiver a variable attenuator should be fitted so that the level of the signal applied to the receiver can be kept to the minimum possible and certainly below that at which limiting occurs.

The operations that need to be done are as follows:

(a) Adjustment of the feed with respect to the dish. This is necessary because there is always some uncertainty in the precise position of the phase centre of the feed, and possibly that of the focus. The feed is slid in or out to maximize the received signal and then clamped in place.

(b) It is not safe to assume that the aerial is free from squint, however accurately it has been made. It must be remembered that the vertical beamwidth of even a small aerial such as that described above is only $\pm 2°$, and that a tilt in the vertical plane of only 3°–4° will reduce its effective gain by about 10dB. Squint in the horizontal plane is unimportant as this will be eliminated in peaking the aerial on a transmitter.

It is important to recognize that the axis of rotation of the aerial should be truly vertical, otherwise the aerial will be tilted when it is rotated into a different direction. This means that the pole supporting the aerial must be vertical, or the rotating platform of a tripod, for example, must be horizontal within a fraction of the beamwidth of the aerial in use. When this has been arranged the aerial is adjusted in the vertical plane for maximum signal. Repeat (a) and (b) while keeping the aerial in optimum position in azimuth as these adjustments will interact.

(c) Checking the gain of the aerial. If a calibrated attenuator is available, substituting a second aerial of known gain and adjusting the attenuator to produce the same detected signal will provide a direct measure of aerial gain. For an aerial of this type, an efficiency of 50–60 per cent of the theoretical value, which is given by $(\pi D/\lambda)^2$, is a practical limit. The gain of a conventional pyramidal horn [4] is sufficiently predictable to be used as a standard.

(d) An invaluable facility is some sort of optical sighting device aligned precisely with the electrical axis of the aerial. One form of this consists of a tube 0·5–1in diameter fitted with a small hole at one end and with cross wires at the other, which is clamped to the aerial mount. It is aligned by rotating the aerial for maximum signal over a clear path. If the transmitter is visible the sighting tube is simply pointed at the transmitter and clamped in place. If the transmitter is not visible, the aerial is rotated precisely through the angle between it and a visible landmark as measured from a map, and the sighting tube set on the landmark. Subsequently, when operating from other sites, the aerial can usually be oriented accurately by reference to local landmarks. Such a sighting system can be specially useful when it is necessary to point the aerial in other than a horizontal direction—for example, when using knife-edge diffraction to cross hills.

It is well worthwhile checking the alignment of the aerial over a second path. If adjustments produce the same optimum alignment one can be reasonably sure that this is the correct one. A significantly different path is usually obtained by raising or lowering the aerial a few feet, or moving it sideways a short distance.

The aerial described above was aligned and checked by these methods. The gain was measured as 31–32dB, which corresponds to an efficiency of about 50–60 per cent. This would be regarded as satisfactory for a normal dish, let alone a dustbin lid.

References

[1] *Radio Communication* October 1974, p691.

[2] *Radio Communication* March 1975, p186.

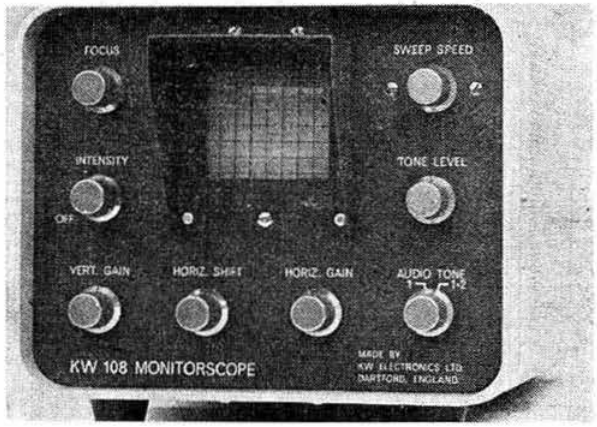
[3] *Antenna Engineering Handbook*, Ed. H. Jasik, McGraw-Hill.

[4] *Radio Communication* February 1972, p81. □

EQUIPMENT REVIEW

The KW108 Monitorscope

by P.J. HORWOOD, G3FRB*



THE oscilloscope is one of the most useful tools in the hands of professional and amateur alike, but while never particularly cheap to purchase, the various specialized versions—sampling scopes, storage scopes and spectrum analysers—have been even more expensive. The latest version of the latter in fact costs more than £5,000; but it is British, and outdates the previously accepted supremacy of its American predecessor.

After the foregoing it is a pleasure to mention a specialized oscilloscope that is cheaper than the standard product. This is the KW108, which has a bandwidth of 30MHz plus, yet only costs £83 + VAT and carriage.

How? Simple, it does not have a vertical amplifier but relies on the rf voltage output of a transmitter for Y deflection. Its purpose is to display the output waveform of a transmitter, not just for test purposes but to monitor signals continuously. CW keying, a.m. modulation depth, ssb flat-topping and many more phenomena can be observed. The companion handbook illustrates most applications; both correct waveforms and undesirable ones, and gives useful guidance on cause and cure.

The instrument is basically simple. The typical KW cabinet houses a 3in flat-faced crt, eht and transistor supplies, a variable time-base, and a two-tone audio oscillator. Vertical deflection is carried out by sampling the rf voltage on an in-out coaxial connection terminated with uhf sockets. The actual sample is obtained via a variable capacitive divider, and later test figures will confirm the tube has sufficient sensitivity to display a 10W signal on top band.

Taking a sample of rf is not simple; random inductive or capacitive pick-up is never flat with regard to frequency. The correct way is by using a high-level attenuator, such as the Bird Tenuline series, but for this application the rf is required to feed an aerial rather than to be dissipated in a non-reactive load.

In theory the capacitive attenuator used in the KW108 should have a level frequency response; however, tests show there are some shortcomings above 20MHz, but not sufficient to invalidate its usefulness as a monitor.

Comments

The makers' specification given here is essentially correct, but the following measured results and comments should be noted.

*14 Main Road, Hextable, Swanley, Kent.

Specification

Frequency coverage	1·5–30MHz
Input impedance	High, for 50 or 75Ω bridging
Sensitivity	Useful with 10W input to transmitter
Maximum input	1kW cw, 2kW p.e.p.
Sweep speed	20–200Hz
Tone oscillators	Nominal 1·3 and 2·3kHz
Tone level	0–50mV rms per tone in 50kΩ
Front panel controls	Focus Intensity and on/off Horizontal shift Horizontal gain Single/two tone af Vertical gain (variable capacitive divider) Tone level Sweep speed
Rear controls	Astigmatism Tone balance Y shift
Power requirements	115/230V±20% 10W
Measured results	Vertical deflection sensitivity, two squares (¼in each, not 1cm) for 8W carrier at 1·8MHz.
Tone oscillators	1,293 and 2,156Hz, 5% total distortion, either tone. Maximum emf, 1 tone, 200mV p-p (70mV rms)

The vertical deflection is not quite flat to 30MHz, but good to 29MHz.

The deflection is slightly non-linear, possibly due to unavoidable reactance.

Some peak flattening is evident at all input levels on 10 and 15m; 20m is satisfactory. (Flattening became visible at 18MHz).

The time-base-speed helipot was wired back-to-front (clockwise reduces speed).

The rear controls were not identified.

Useful additions

It would not have added significantly to the cost to provide an audio switch which gave T1, T2 and T1 + T2. Although the audio output is terminated in the usual three-circuit jack plug, no local s-r switch is fitted.

(Transmitters must be switched to vox or mox).

Having said that, provided one knows the shortcomings of any instrument it can be usefully employed. The KW108 is eminently useful and has spent several weeks monitoring the reviewer's signals. The best accolade it can be given is to say he would like to keep it. □

Improving the keying characteristics of the AT5 transmitter

by T. HALL, BSc, GM3HBT*

Introduction

The author is in a situation where he and other local amateurs living less than a mile or so apart, when operating on 1·8MHz, suffer mutually from key clicks and shock excitation over quite a wide frequency range, caused by the close proximity and the use of cathode keying of the AT5 and similar transmitters. The same problem is not evident on other bands where transceivers with much higher input powers are used. Experiments with various key-click filter circuits have not proved wholly successful, so an investigation was carried out to find a satisfactory and simple method of grid-block keying the AT5, which it was hoped would produce results approaching those obtained with transceivers, and which would eliminate local QRM.

Results

The AT5 and its power supply were modified as shown and the results have been most gratifying. The keying characteristics have been cleaned up completely, and even on very local receivers it is possible to tune very close indeed to the author's cw signal before being aware of its presence. Comments from wider afield have indicated that the keying has improved "out of recognition", and T9x reports have been received.

Modification details

All the components which were added to the power supply fitted easily into the space available above and below the chassis. The wiring of the negative voltage supply into the existing power supply circuit was arrived at after experimentation, and was necessary because of the centre tap of the mains transformer secondary being isolated in the STANDBY mode. The system shown prevents the voltage across the 10μF reservoir capacitor from floating to too high a level on standby. The 1N4007 rectifier used in the bias supply has a piv rating of 1,000V, which affords an adequate factor of safety. The circuit supplies approximately 200V of negative bias to the pa grid circuit; this is necessary (if surprising) to

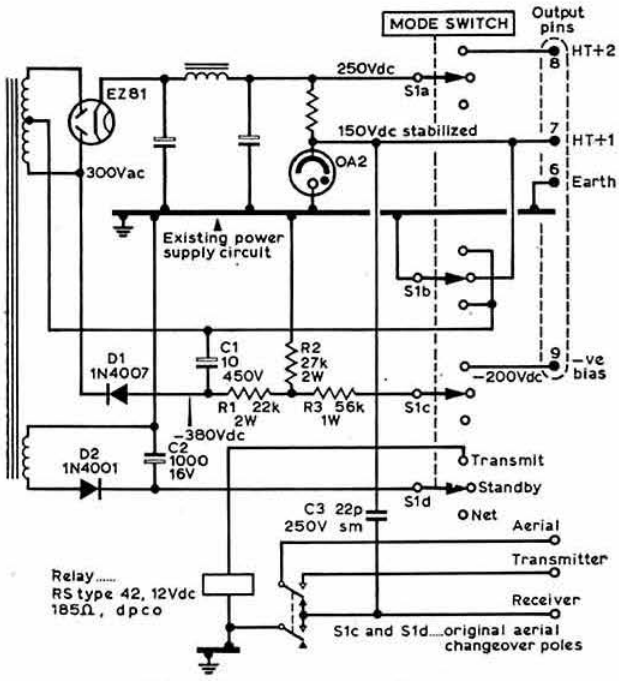


Fig 1. Power supply modifications

obtain a satisfactory cut-off of the 6BW6. Initial experiments with lower voltages produced incomplete cut-off and considerable leakage from the driver stage. At 200V the current being keyed is only a few milliamperes.

To conform to the original power switching arrangements, and to offer a degree of safety with regard to preventing rather high voltages from appearing across the key contacts during standby or netting, it was decided to arrange that the negative bias supply should be switched to the transmitter in the TRANSMIT mode only. To obtain a switching facility to permit this, the aerial changeover circuitry was removed from the two poles of the mode switch which it occupied; one of these poles was utilized to switch a small relay to provide alternative operation of the aerial changeover, and the other to connect the negative bias to the AT5 when transmitting. The relay supply was obtained by connecting a 1N4001 rectifier to the 6·3V heater supply and using a 1,000μF reservoir capacitor; this gave ample dc voltage to pull in the relay effectively. The relay was conveniently mounted on a small bracket on top of the chassis between the smoothing choke and the mode switch.

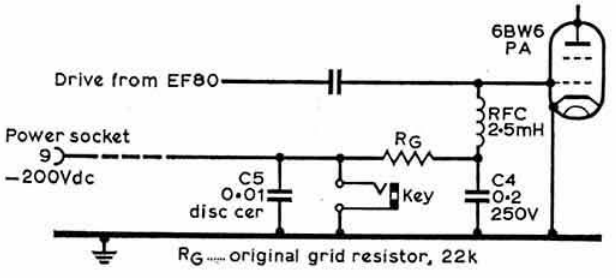


Fig 2. Transmitter pa modifications

*50 Hamilton Street, Larkhall, Lanarkshire.

Components list

D1	1N4007
D2	1N4001
C1	10μF 450V dc
C2	1,000μF 16V dc
C3	22pF silver mica 250V dc
C4	0·2μF 250V dc
C5	0·01μF ceramic disc
R1	22kΩ 2W
R2	27kΩ 2W
R3	56kΩ 1W
RG	22kΩ (original grid resistor)
RFC	2·5mH rf choke
Relay	RS type 42. 12V dc 185Ω-dpco

One final point: to improve the rather weak signal from the vfo in the NET mode, a 22pF capacitor was connected from the receive aerial terminal to the stabilized 150V supply line to the vfo. This was based on a similar arrangement used by the manufacturers of the AT5 on later models, and works very well indeed, giving a much better level of vfo signal for netting purposes. It would appear, surprisingly, that a small leakage of vfo signal is picked up from the 150V line which is just sufficient to provide a satisfactory level of injection. The addition of the small capacitor makes no noticeable difference to signal levels received.

The unused No 9 pins on the B9A power sockets on the power supply and transmitter provided a convenient connection on both units for the negative voltage supply, and the extra lead required to join the units was easily introduced into the little twisted-lead power cable.

In the AT5 the original keying components were removed from the cathode circuit, the cathode being connected to the chassis. The grid circuit was modified as shown.

Conclusion

This is a neat and inexpensive method of improving the keying characteristics of the AT5 which could equally be applied to similar transmitters. It could well provide an answer to others in a similar situation, and has been considered by the author as well worth the effort to install.

Reference

Radio Communication Handbook, p. 8.5 (grid-block keying).

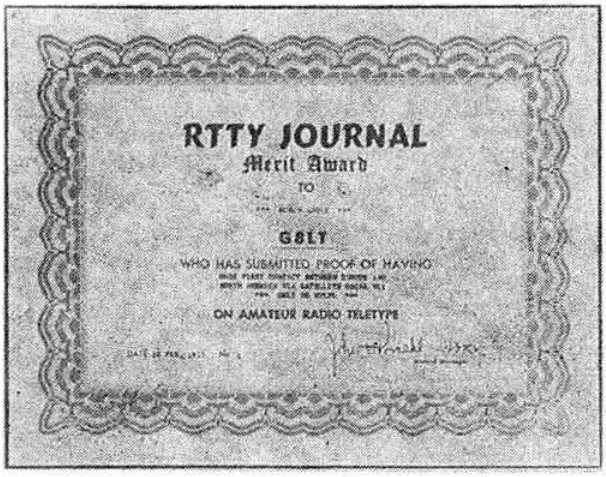
oscar news

Orbital calendar

A 1976 calendar for Oscar 6 and 7 is available from David Walland, c/o G3UEA, QTHR. The cost, including postage within the UK, is £1.

Oscar award

AMSAT is offering an award for Oscar satellite communications achievement recognition and this is being administered by G8KLO on behalf of AMSAT-UK. Further information can be obtained by sending an sae to J. K. Harvey, G8KLO, 22 Elm Grove, Bromsgrove, Worcs B61 0EH.



The certificate awarded to G8LT for the first Europe—North America contact via Oscar 7 on rtty

Keeping track of Oscar

Copies of the booklet containing the series of articles by Bill Browning, G2AOX, are again available from RSGB Publications, price 30p post paid.

Reference orbits

These are made available by G3ZCZ/W3, information officer of AMSAT. The orbit given is the first of the gmt day. To ascertain subsequent orbits use the following constants: Oscar 6—add 28·74° and 114·99min per orbit: Oscar 7—add 28·73° and 114·94 min per orbit.

Oscar 6			
Orbit	Date March	Time (Z)	Long W
15457	3	0100·15	67·95
15469	4	0000·08	52·94
15482	5	0055·01	66·67
15495	6	0149·94	80·40
15507	7	0049·87	65·39
15520	8	0144·80	79·12
15532	9	0044·73	64·10
15545	10	0139·66	77·84
15557	11	0039·59	62·82
15570	12	0134·52	76·55
15582	13	0034·45	61·54
15595	14	0129·38	75·27
15607	15	0029·32	60·25
15620	16	0124·24	73·98
15632	17	0024·18	58·97
15645	18	0119·11	72·70
15657	19	0019·04	57·68
15670	20	0113·97	71·42
15682	21	0013·90	56·40
15695	22	0108·83	70·13
15707	23	0008·76	55·12
15720	24	0103·69	68·85
15732	25	0003·62	53·83
15745	26	0058·55	67·57
15758	27	0153·48	81·30
15770	28	0053·41	66·28
15783	29	0148·34	80·02
15795	30	0048·27	65·00
15808	31	0143·20	78·73

Oscar 7			
Orbit	Date March	Time (Z)	Long W
5930X	3	0043·94	60·80
5943B	4	0138·23	74·37
5955A	5	0037·56	59·20
5968B	6	0131·85	72·77
5980A	7	0031·18	57·61
5993B	8	0125·47	71·18
6005A	9	0024·81	56·01
6018X	10	0119·09	69·58
6030A	11	0018·43	54·42
6043B	12	0112·71	67·99
6055A	13	0012·05	52·82
6068B	14	0106·33	66·39
6080A	15	0005·67	51·23
6093B	16	0059·95	64·80
6106X	17	0154·23	78·37
6118B	18	0053·57	63·20
6131A	19	0147·85	76·78
6143B	20	0047·19	61·61
6156A	21	0141·48	75·18
6168B	22	0040·81	60·01
6181A	23	0135·10	73·59
6193X	24	0034·43	58·42
6206A	25	0128·72	71·99
6218B	26	0028·06	56·83
6231A	27	0122·34	70·40
6243B	28	0021·68	55·23
6256A	29	0115·96	68·80
6268B	30	0015·30	53·64
6281X	31	0109·58	67·21

microwaves

Dain Evans, G3RPE*

A 10GHz varactor multiplier

A single varactor multiplier driven by a crystal-controlled source at a much lower frequency, a 432MHz transmitter for example, would appear to be an attractive way of getting on 10GHz. However, there are two problems with this type of multiplier system. The first is the vulnerability to changes in operating conditions: minor variations in drive level or in their load, for instance, can cause the output to break up into a large number of spurii. This effect may be difficult to detect, let alone cure, without the use of a spectrum analyser, an instrument to which not many amateurs are likely to have ready access. The second problem is that the output, even though crystal-controlled, may have a (perhaps surprisingly) large bandwidth, and therefore may be far from "narrow-band" by the standards of lower frequencies.

G8DEK has continued his earlier work (briefly covered in July 1975 *Microwaves*) in trying to tame this technique and make it safer for general use. He appears to have made some progress in this direction: when he tested two versions of the multiplier circuit shown in Figs 1 and 2, each with four diodes, it was not found possible to make the output break up under any conditions of normal operation.

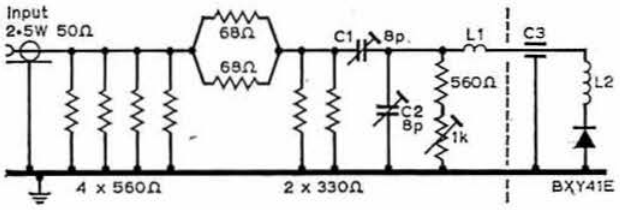


Fig 1. Circuit of multiplier. All resistors ¼W carbon, leads to be kept as short as practical. L1 1¼ t 4mm id; C1, C2 Mullard film dielectric capacitors; C3 capacitor formed between diode post and wall of guide; L2 inductance of diode post

An important feature of the design is the carefully-tuned impulse generator represented in Fig 1 by L2/C3. This has been optimized for the BXY41E snap varactor diode and may not work properly with other diodes. A second feature is the 6dB attenuator which is fitted between the varactor circuit proper and the driver in order to reduce the amount of interaction between the two. It appears that many of the problems with this type of multiplier are due to instability in the preceding driver stage caused by the widely-varying load represented by the varactor. The attenuator of course contributes to the low overall efficiency of the circuit (a characteristic which amateurs as a group appear unduly reluctant to accept), but this seems to be a small price to pay for reliability of operation. For a drive of about 2·5W at 350-550MHz, about 2-4mW of rf at 10GHz can be obtained, which is sufficient for the local oscillator of a receiver, for a small transmitter or as the driver to a travelling-wave tube.

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

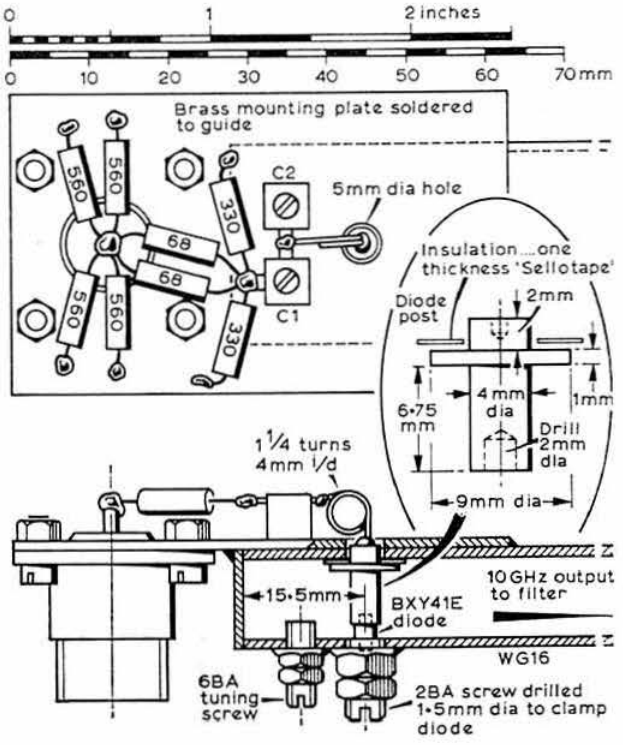


Fig 2. Layout of main components of the multiplier

A filter is essential to remove harmonics from the output: the one described in August 1973 *Microwaves* has been used although its performance is barely adequate in this application.

The second major problem with this approach to getting on 10GHz is the noise bandwidth of the 10GHz output. This noise originates in the oscillator and early multiplier circuits and is always present. However, it becomes much more apparent at 10GHz because the bandwidth is proportional to the square of the overall multiplication factor. Even with the least noisy driver available, which used a 101 MHz neutralized glass crystal in a carefully-designed Butler circuit, the noise measured by G8DEK from a single-ended mixer was about 10dB worse than a Gunn oscillator when using a 10·7MHz i.f. and about 7dB when using a 30MHz i.f. Clearly, there will have to be a big improvement in the quality of drivers before the full advantages of going truly narrow-band are fully realized.

Dishes from rods

Recent issues of *Ham Radio* have contained some interesting articles in the microwaves area. In the May 1975 issue, WA9HUV discusses the construction of dishes from a series of rods which have been bent into parabolas. His measurements suggest that provided that their spacing in the plane of polarization of the signal is less than 0·4λ, the loss compared with a solid dish is only about 1dB. Data given in *Antenna Engineering Handbook* (McGraw-Hill) suggest that this spacing would result in a loss of 1·5-2dB, but nevertheless this approach to the problem of making large dishes deserves more attention than it has received. □

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

These slow morse practice transmissions are sponsored by the RSGB. Alterations and additions to this list should be sent to the honorary organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Clock time	Callsign	MHz	Mode	Town
Sundays				
0930	G3LEQ	1·815 144·250 145·250	A2/A3 A1/A3J F2/F3	Knutsford, Cheshire
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3NPB	1·875	A1	St Ives, Cornwall
1030	G3LR	1·810	A1	Accrington, Lancs
1030	G4DKK	1·970	A2/A3	Caterham, Surrey
1100	G2FXA	1·900	A1/A3	Stockton-on-Tees
1130	G3WYW	144·300 to south-east	A1/A3	Newcastle upon Tyne
1200	G3HVI	144·100 omni-directional	A2/A3	Stoke-on-Trent, Staffs
1230	GC4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1500	G4EHW	144·250 omni-directional	A1/A3J	Peterborough
1815	G4DVZ	1·915	A1/A3J	Leeds, Yorks
1830	G3NCZ	1·920	A1/A3	Blackburn, Lancs
Mondays				
1800	G3SWR	1·980	A1/A3	Birmingham
1830	G3VBI	1·910	A1/A3	Goole, Yorks
1930	G3RAF	1·910 3·590 144·024	A1	Locking, Som
1930	GI3SXG	3·575	A1/A3J	Newtownards, Co Down
2000	G3IBJ	1·910	A1/A3	Southampton, Hants
2000	G3XWZ	1·910	A1/A3J	Mansfield, Notts
2000	G3YZB	1·845	A1/A3	East Molesey, Surrey
2030	G3ASR/A	1·875	A2/A3	Harrow, Middlesex
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
Tuesdays				
1800	G3SWR	1·940	A1/A3	Birmingham
1830	G4BNA	3·590	A1	Swindon, Wilts
1930	G3RAF	1·910 3·590 144·024	A1	Locking, Som
2000	G4AEU	1·910	A1/A3	Southampton, Hants
2045	GM3CRY	3·550	A1/A3J	St Andrews, Fife
2045	G4AEU	145·550 omni-directional vertical	F2/F3	Southampton, Hants
2130	GM3UAG	145·800 to south		Ellon, Aberdeenshire
Wednesdays				
1930	G3RAF	1·910 3·590 144·024	A1	Locking, Som
2000	G8QU	1·970	A1	London N22
2000	G3BPE	1·975	A1/A3	Bexley, Kent
2000	G3SWP	144·200 omni-directional	A2/A3J	Doncaster, Yorks
2000	G4EHW	144·250 omni-directional	A1/A3J	Peterborough
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2100	G3HVI	144·100 omni-directional	A2/A3	Stoke-on-Trent, Staffs
Thursdays				
1800	G3SWR	1·980	A1/A3	Birmingham
1830	G4BNA	3·590	A1	Swindon, Wilts
1830	G3NC	1·968	A1	Swindon, Wilts
1900	G3YEI	1·850	A1	Fleetwood, Lancs
1930	G3RAF	1·910 3·590 144·024	A1	Locking, Som
2130	GM4CAU	145·800 to north		Aberdeen
2130	G3LQI	145·300	F2/F3	Lancing, Sussex

Clock time	Callsign	MHz	Mode	Town
Fridays				
1800	G3SWR	1·940	A1/A3	Birmingham
1900	G3NPB	1·875	A1	St Ives, Cornwall
1900	GC4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1930	G3PQF	144·360 to north-east	F2/F3	Farnborough, Hants
1930	G3RAF	1·910 3·590 144·024	A1	Locking, Som
2000	G4EHW	144·250 omni-directional	A1/A3J	Peterborough
Saturdays				
0930	G2FNK	1·930	A1/A3J	Staines, Middlesex

G3BZU morse proficiency transmissions at 15, 20, 25, 30, 35 and 40wpm are made at 2000 clock time on the first Tuesday of each month on a frequency of 3·520MHz. For 100 per cent copy at 15wpm a certificate is awarded, and endorsement stickers are available for 100 per cent copy at the higher speeds. A charge of 15p or three IRCs is made for the basic certificate, and 5p or one IRC for each endorsement sticker claimed. All claims should be sent to—The QRQ Manager, RNARS, HMS *Mercury*, Leydene, Petersfield, Hants.

A plea from GM

The Editor
Radio Communication

Sir—I write to ask if any member in the west of Scotland area would consider sending slow morse practice transmissions on the 80m band any evening.

While realizing that this can be a very trying and perhaps mundane task for a licensed amateur, I am sure it would be appreciated very much. Only three Scottish amateurs at present transmit slow morse, and two of them are vhf. I find it very difficult to receive the transmissions because of QRM, rtty etc on channel.

The slow morse service is a very valuable one and, for someone awaiting the results of the RAE, a very important source of learning the code. Joining a club may be one answer but for some the club evening may not be suitable. So how about it, all you west of Scotland GMs? Perhaps even a club could radiate slow morse with several members taking it week about.

T. G. Wylie, BRS36166

technical topics

Pat Hawker, G3VA

FROM us has now gone, at the age of 89, one of the great pioneers of aerials and microwave communications—a man who in his lifetime has had his memorial erected on millions of roof-tops, on millions of homes: Hidetsugu Yagi. Yet, despite the enormous influence of his work, his name seldom appears in the many histories of radio—for it was not until some 20 years after his classic work, with Uda, on directional arrays using parasitic elements, that any widespread use was made of the principle; even though, since then, this has become the most widely used of all arrays. The original work was carried out from about 1919 to 1927 and was thus roughly contemporary with the other directional systems such as the Franklin Beam for Marconi and the various long-wire techniques, including rhombics, mostly developed in the USA. One of his papers on microwave systems, where his work is less well known, was "Beam transmission of ultra short waves" *Proc IRE*, June 1928.

Hidetsugu Yagi, born 1886, was educated at the universities of Tokyo, London, Harvard and the Technische Hochschule at Dresden. Much of his pioneering work was carried out while he was a professor at Tohoku University. From 1953 to 1956 he was a member of the Japanese "House of Councillors"—but one wonders how many of the countless amateurs and television viewers who use Yagi aerials ever realized that this great radio engineer was still among us: when finally it came, his death passed almost unnoticed by the mass media.

New paths in hf design?

At present, amateur transceiver designs appear to be edging towards more use of frequency synthesis, digital counter frequency displays and (still rare) broadband semiconductor power amplifiers. Views may differ as to how much these trends contribute towards communications effectiveness, although most would agree that they represent an advance in operational convenience, but in each case at some considerable cost in complexity.

Meanwhile, what do the professional designers see as the coming trends in communications equipment? I have been reading two articles on this subject: "New technology developed for hf ssb communications" by William Schilb of Motorola (*Communications News* August 1975, kindly provided by Edgar Janes, G2FWA) and "Communications receivers of the future" by F. P. Chiffy and B. E. Bjerede (*Signal* November/December 1975). Both shed light on the way in which hf communications may be going in the years ahead.

Getting rid of mechanical switching

The first of these articles describes a number of techniques which have already been developed for multi-channel, fixed-tuned ssb transceivers and mostly directly applicable to amateur equipment. For example, one major objective is seen as the elimination of the rotary multi-contact, channel-changing switches which dominate so many existing designs and contribute significantly to reliability problems as well as degrading performance due to the inevitable stray capacitances and inter-couplings formed by the mass of wiring to these switches, corresponding to the bandchange switches in amateur rigs. This can be achieved by the extensive use of diode-switching for all the small-signal circuits (ie as suggested in *TT* July 1975) and by using special reed relays for the power circuits in the transmitter and aerial matching networks.

Virtually all tuning adjustments for setting up different channels can be eliminated by broadband circuits in both

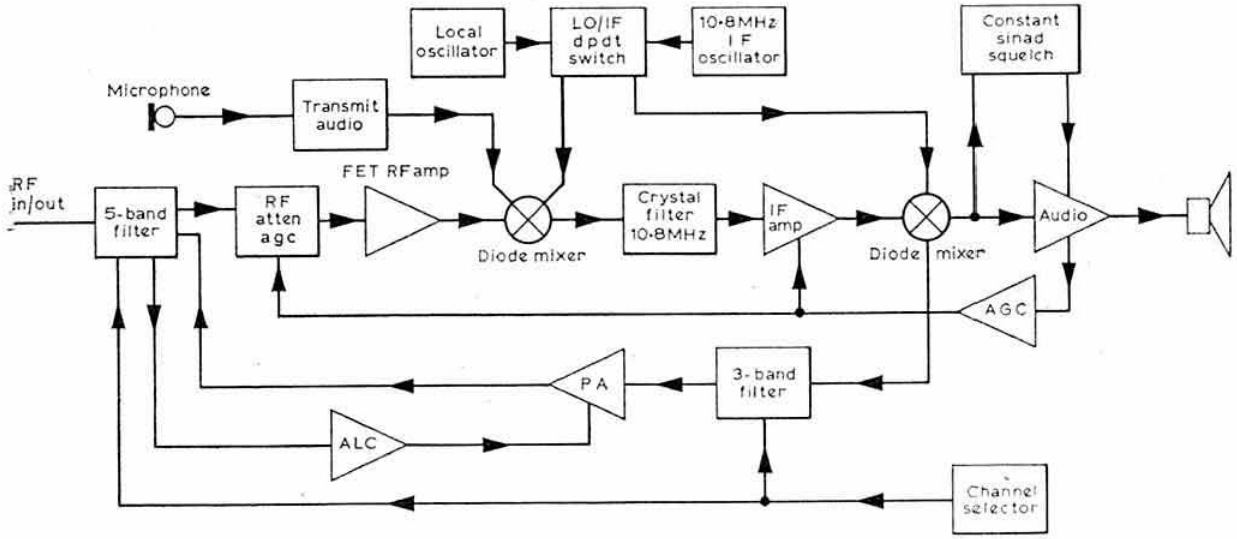


Fig 1. Block schematic of a "new-generation" approach to hf ssb transceiver design as described by Motorola engineer in "Communications News". The filter frequency is shown as 10·8MHz but this may be in error for the more likely 10·7MHz

receiver and transmitter provided that care is taken that these do not impair the dynamic range of the receiver or increase spurious outputs from the transmitter. For instance, switched computer-designed rf filters can be placed immediately at the input of the receiver, followed by an automatic gain-controlled rf attenuator (several designs have been featured in *TT* and *ART*). Then a low-gain fet rf amplifier (or you could use an rf power bipolar) provides the signal into the well-recognized hot-carrier-diode balanced or double-balanced mixer, followed immediately by a high-grade 10·7MHz crystal filter (improved ssb filters can now give a 6dB nose bandwidth of 2·4kHz and 60dB skirt bandwidth of less than 4·8kHz, with ultimate rejection better than 80dB). For agc-type rf attenuators it is suggested that broadband rf transformers and FETs are together capable of at least 50dB attenuation across a full frequency decade.

Among other items of "new technology" listed are improved rf power transistors and the use of computer analysis of heat-sink requirements. The latter provides improved distribution of temperature within equipment and eliminates the need for fans which, apart from other problems, may mean that one is blowing increased quantities of a corrosive atmosphere through the equipment.

FM constant SINAD squelch

The article also draws attention to an improved form of squelch that reflects research into speech recognition and the spectral content of human speech. Such research has shown that there is considerable fm information in each syllable of speech, whereas such information is notably absent from random noise and electrical interference. In turn this has led, it is claimed, to a remarkably effective way of providing squelch in the difficult conditions of an hf channel: see Fig 2.

Demodulated audio signals are applied to a hard limiter, which removes all amplitude changes to provide a constant signal for a pulse-counter type of fm discriminator. The discriminator produces an output proportional to the *fm* signal applied and this output is used to control the squelch gate circuitry. Thus only relatively rapid changes in received average audio frequency will cause the squelch to open.

The system, it is claimed, will effectively distinguish between *voice* signals and band-limited noise, even though both may appear to a conventional squelch circuit as peaky amplitude modulated signals. The result is thus a system which is relatively immune to appreciable changes in noise level or to changes in signal-to-noise level, both of which have to be expected in hf operation. William Schilb suggests that this form of squelch represents a technical breakthrough of considerable practical importance. One wonders whether, carrying this idea a stage further, we may eventually have squelch systems which are tailored to respond only to a particular voice or to the callsign of the station!

Another feature of this design (which presumably represents a new line of Motorola professional equipments) is an aerial tuning unit using special high-voltage (5,000V) hermetically-sealed reed relays so that the channel-to-channel interaction can be eliminated by switching binary increments of inductance and capacitance in and out, with the switches capable of being automatically controlled from an external "memory".

Digital receivers

The article on communication receivers of the future is a good deal more radical, with its emphasis on digital signal processing and its incorporation of a special-purpose high-speed micro-programmed-computer—even though in these days of pocket calculators we are learning not to be too frightened at the idea of using small computers or microprocessors as just one part of an equipment.

The authors accept that it will be some time before analogue to digital conversion of incoming signals is likely to be carried out at signal frequency but suggest that it can be done at intermediate frequency; thereafter digital numerical processing techniques would be used for filters (ie all crystal filters etc replaced by digital filters); demodulation; bandwidth control; mode of operation etc. The digital processing parameters would be determined by coefficients and control words stored in read-only memories (ROMs).

It is suggested that such digital processing receivers are already feasible with existing off-the-shelf components, and might cut component cost to less than half that for a conventional high-grade receiver and would be capable of a performance that would compare favourably with normal analogue receivers.

There is a generally-accepted belief that the future of electronics and communications will be largely dominated by digital techniques; much of the current debate is about just when this is likely to happen in each branch. So if you believe that it will not be long before the digits take over in amateur radio, perhaps this is the sort of communications receiver you should be working on!

DL1FK and the G6XN multiband element

To know or find out just when you have discovered something that is completely novel is an extremely difficult problem. It is not made any easier by the fact that many very good ideas remain little used for several years, or by the "information explosion" that makes it virtually impossible to search *all* the literature on any given subject. I often wonder how Patent Office examiners can ever really be sure that patent applications are not invalidated by prior publication.

All this leads to an apology for what was a completely unintended breach of our "fair play to inventors" code by

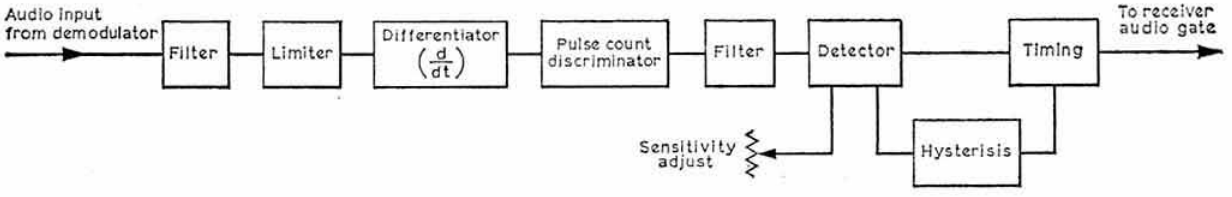


Fig 2. The principle of the constant SINAD fm squelch system which distinguishes the voice spectrum from random noise and is claimed to provide effective squelch for hf operation

claiming (*TT* January) that the G6XN technique of adding capacitors across current modes to form multiband aerial elements was not only an important development (which we feel it is) but also as something completely new. B. Bossert, HB9QO, recalled that the basic technique had been described as long ago as July 1960 in *DL-QTC* by Richard Auerbach, DL1FK, following work in 1958 which led to the issue of a German patent (DBPa Nr A 30652–A12438 Gm). DL1FK in fact used the technique in a miniature three-element, three-band Yagi beam (maximum element length 7·4m with inductive loading) which was subsequently included in the German *Antennenbuch* by Karl Rothammel, DM2ABK, and has achieved some popularity among German amateurs, though I cannot trace it as having crossed the English Channel.

The work which led Leslie Moxon, G6XN, to this rediscovery was, of course, entirely independent of the German design and would seem to exploit the principle rather differently and more comprehensively; but there is no doubt that credit for first discovering this idea belongs to Richard Auerbach—a view with which G6XN fully concurs.

In fact G6XN is particularly impressed by the fact that DL1FK was able to use the idea in compact beams where one might have expected the high circulating currents that result from the lower radiation resistance to have presented particular problems. On the other hand it would appear that DL1FK thought that the idea could not be used successfully for a full-sized 14/21/28MHz beam; nor did he use it for his driven element which he simply fed with resonant lines. The DL1FK compact beam, in effect, uses this approach only for the parasitic elements and only for two of the three bands, although his text outlines a possible three-band element that uses two capacitors but requires no other form of switching.

It would thus seem that G6XN's work has already significantly advanced knowledge of how this system can be applied to a very much wider range of circumstances than was originally supposed, offering:

(1) non-resonant feeding of the driven element, a problem not solved in the DL1FK or in the G4ZU multiband designs;

(2) true triband operation with full-sized elements and without any lumped circuit components;

(3) possibly a rather better understanding of some of the physical processes involved, including the "disappearing inductance" concept.

So the discovery of DL1FK's work only reinforces the view that this type of multiband element has a very great deal to offer the amateur—and possibly also to the professional for certain applications.

One of the additional possibilities offered by the use of distributed resonant circuits of this type, G6XN suggests, is to replace the usual traps in multiband dipoles. Losses should be considerably reduced (though this may not be of great practical significance); the main advantages would be negligible cost, less weight to be supported by the dipole and no weatherproofing problems. G6XN has in fact made some preliminary tests of such an arrangement, quite successfully. But here again it should be stressed that this seems to be the only one of many applications of this technique of hanging a capacitor across part or parts of an aerial.

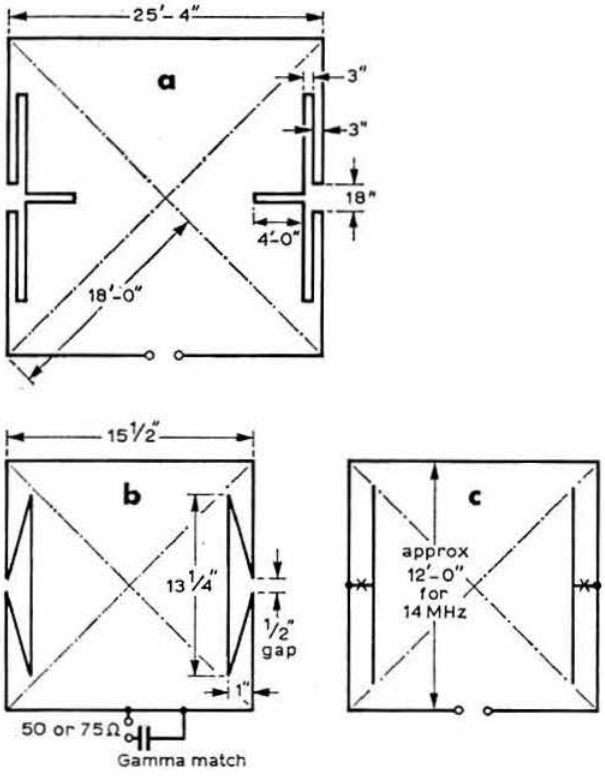


Fig 3. Three techniques for reducing the size of quad-loop elements: (a) system developed for 7MHz operation by G3FPQ; (b) G3MWV's scaled down quad element as tested on 144MHz consists of a 15½in square compared with a full-sized 144MHz quad which would have 21½in sides. Wire used was 18swg tcw. Loop dimension is 34 per cent longer than that given by standard 1,005/f (MHz) length; (c) use of capacitive end loading results in high values of radiation resistance—this arrangement was originally described in a patent application by G3IMX who also uses traps at points X to provide two-band operation, although other techniques might be used for this purpose

Miniaturized quad elements

A number of ideas have been floating around during the past few years on the miniaturizing of quad elements which are often considered completely unmanageable on 7MHz and rather too large even on 14MHz. For example there is the technique described by D. L. Courtier-Dutton, G3FPQ, some years ago in *QST* (and included in some recent editions of the ARRL's *Radio Amateur's Handbook*): see Fig 3(a). This is designed to provide linear loading and allows a 7MHz element to have 25ft 4in sides (still big enough but a lot smaller than a full-sized 7MHz quad element).

Recently, seeking a replacement for a gale-written-off full-sized 14/21MHz quad, Dave Blake, G3MWV, has been investigating several forms of mini-quad arrangements and has come up with a system having some similarities to the G3FPQ element. While he intends soon to try this on hf, he has been conducting tests of a scaled-down element on 144MHz: Fig 3(b). To provide reference information he has used this two-thirds-sized loop as a single-element aerial, a similar but full-sized element and a reference dipole, put at the same height of 30ft. The feed impedance of a full-sized element was approximately 140Ω; the folded, two-thirds-sized element 75Ω. Tests were carried out over a 50-mile path to G2FT, and on both transmission and reception indicate

only a very slight drop of signal strength when the folded element is compared with the standard element; both loops show a marked improvement over the reference dipole.

As a result of these tests G3MWV is now building a 14/21MHz version, adding a reflector element of the same configuration.

G6XN also recently commented on the use of miniaturized quad elements. In his estimation there is one arrangement, permitting 12ft sides for 14MHz, which he considers superior to all others that he has tried: Fig 3(c). This arrangement does not appear to be widely known although in fact it is described in a system patented by E. G. Jolliffe, G3IMX, also utilizing traps to form a two-band quad.

The "top hats" (if one can call these "sideburns" this) provide the equivalent of capacitive end-loading and this technique results in much higher values of radiation resistance than most other commonly-used arrangements; it also avoids the use of lossy components such as the loading coils used in a number of the miniature quads. G6XN has measured (and calculated) a radiation resistance of 75Ω which makes this approach a sound basis for essentially a "no compromise" mini-quad.

IVT and braid-breakers

In the special interference issue (May 1975, pp 378–9) I raised again the long-standing question of tvi in reverse; in other words the infuriating radiation from tv receivers of hundreds of whiskery signals spaced throughout the mf and hf bands. These stem largely from harmonics of the 15kHz (625-line) or 10kHz (405-line) energy used in the line time-bases and eht supplies, although an additional source in recent years may well be the switched-mode power supply techniques commonly used in transistorized receivers. Several letters were received from readers, mostly confirming that they still found this a real problem and usually expressing the hope that someone would try and discover ways of reducing those unwanted signals.

Now E. Margetts, GM4BOA, provides some interesting results of an investigation he has been making into ivt, and while there is no guarantee that his findings necessarily apply in other circumstances at least they do give some practical suggestions to try. He writes:

"It is generally accepted that braid-breakers often give an improvement in the case of tvi and this approach was adopted when tvi on sound was caused to my ITT (KB) 19in black-and-white uhf tv set, caused by my FTdx401 (plus compressor) feeding a two-element mini-beam in the loft space, modified slightly to allow rotation. The tv aerial is outside the house, attached to the chimney stack and about 10ft from the mini-beam.

"Subsequently a test of ivt S-meter readings for 14, 21 and 28MHz was made during periods when the bands were closed, the 14MHz being the band most affected by ivt. I feel that these tests tend to show that: (a) a braid-breaker does indeed help; (b) it is not a mains-induction problem; and (c) the improvement obtainable with a braid-breaker can be maximized, and in my case S-meter readings of ivt reduced to *no movement* (S 0) by positioning the braid-breaker some distance from the tv set (the reverse of the usual recommendation for tvi), in my case approximately 5ft from the tv set."

Since direct radiation from the time-base components may be expected to fall away in accordance with the inverse square law, the main coupling to the television aerial feeder

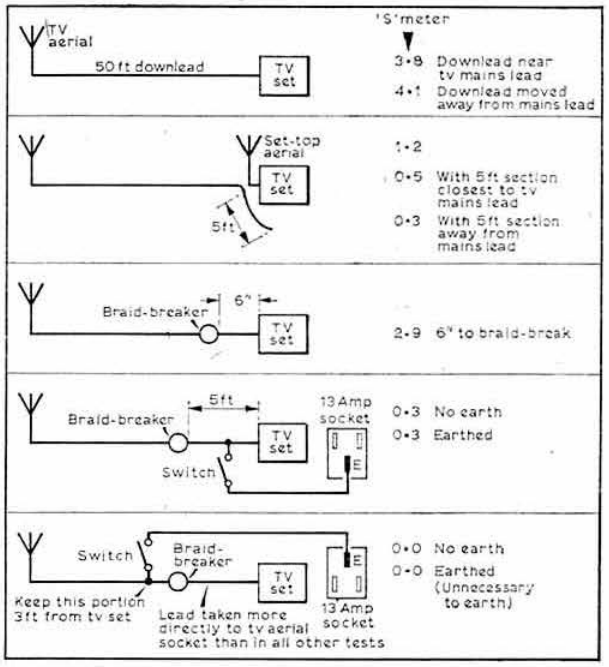


Fig 4. Results of GM4BOA's experiments to reduce reverse-tvi showing how the S-meter readings for 14MHz ivt "whiskers" were gradually reduced from about 4 to 0. It should be noted that the last portion of coaxial into the tv set tended to form a ½-turn link to the tv set "chassis" in all except the last two cases, which may account for the apparent discrepancy in readings with switch open in the two bottom diagrams. Tests were carried out after signals on the band had faded out on 14, 21 and 28MHz

cable would seem to occur along the first few feet of the cable, so explaining this effect. It would also seem desirable, suggests GM4BOA, to avoid a "coil" of feeder cable near the tv set, and there could arise a need to compromise between a filter as near as possible to the tv input socket to improve tvi and one spaced at some feet distant to improve ivt; perhaps the important point (if the filter is at about 5ft) is to try and minimize pick-up of the amateur signals on the cable to the set (of course, if you are fitting a filter to minimize ivt and you are not bothered with tvi this problem will not arise). Results of his experiments (which may not apply in all cases) are shown in Fig 4.

The braid-breaker filter used by GM4BOA consists of

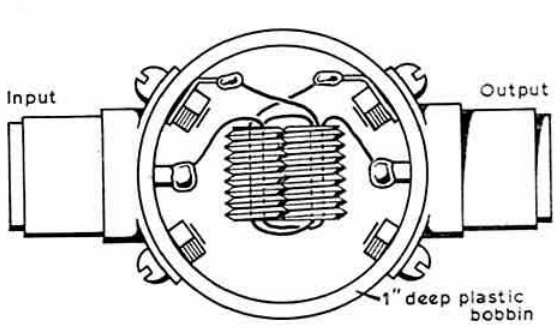


Fig 5. "Braid-breaker" filter used by GM4BOA during ivt experiments

two turns, wound bifilarly with 28swg enamel wire mounted inside a 2in diameter former from a roll of 1in computer paper tape and fitted with Belling-Lee sockets at each side; see Fig 5. The core of the actual transformer consists of two pieces of ferrite material as used in variable coils having the hexagonal hole right through the centre, but there is no reason to suppose that other designs of braid-breakers would not be equally suitable for reducing ivt.

Filters for tvi

On the more usual question of filters for the cure of tvi, it may be of interest to quote from the *Newsletter* of the Wirral Amateur Radio Society (December 1975/January 1976 issue). Among the notes of a lecture given to the Stockport Amateur Radio Society by Sam Torkington of the Post Office Interference Department it is stated that: "The filter described in the February 1974 issue of *Radio Communication* has been found to be extremely effective by PO staff".

This design was the one by K. S. Beddoe, G3YOM, in which double-sided copper laminate board was used to form the capacitors. Details will be found on page 93 of the February 1974 issue or in *Amateur Radio Techniques*, 5th edition, page 187. G3YOM showed how either single-section or, for the more difficult cases, double-section filters could be made up.

Although in the UK most attention is now given to curing tvi caused to uhf channels (not much more than about five to eight per cent of viewers still depend on vhf (405-line) transmissions) there are some parts of the country where vhf television remains important. This is partly because the vhf transmitter networks, despite their far fewer numbers, still provide the only satisfactory coverage for about three per cent of the population, and partly because in some areas a fair amount of use is still made of vhf to receive programmes from alternative ITV programme companies.

The amateur can thus still occasionally run into tvi problems even when all is nicely clear on uhf. For instance, R. H. Roling, GW6WM, writes from South Wales as follows:

"In testing a new ssb transmitter I was surprised to run into severe interference on 3·5MHz when using my own dual-standard black-and-white receiver. At this location I am able to receive four vhf channels, and each channel was affected by virtual obliteration of the picture. My tv aerial is about 12ft from the transmitting aerial, and strength of the tv signals is good. There is no interference at all on the 625-line uhf channels.

"In looking through an old notebook I came across a form of modified trap that I had successfully used to cure 3·5MHz bci in the old days of valve radio receivers. This consisted of about 110 turns of 36swg enamelled wire jumble wound on a ¼in former, slug-tuned. The winding length is ⅜in and the coil fitted into a Denco coil shield, and the whole unit fitted as closely as possible to the tv receiver socket: see Fig 6. On adjustment of the slug, all tvi completely disappeared on all channels; yet the filter does not block the vhf or uhf signals. The filter tuning is reasonably broad-band and allows some change of frequency in the 3·5MHz band.

"I have never seen this form of filter mentioned in print and feel that it may help to solve a problem for others; it is cheap to build and fitted outside the affected tv set."

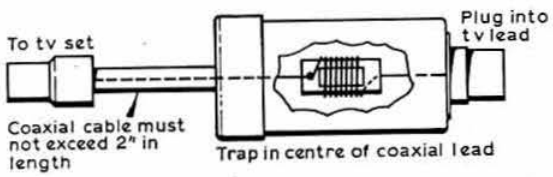


Fig 6. Filter used by GW6WM to clear 3·5MHz tvi experienced on vhf (405-line) channels when the uhf channels were clean

Transequatorial signal paths

Ray Cracknell, ZE2JV, who with Rowland Whiting, ZC4WR (now 5B4WR), did so much valiant work at the time of the IGY in the late 'fifties in probing diligently into transequatorial propagation (tep), was interested in the notes (*TT* December 1975) on the Germany-Tsumeb experiments which found that hf chordal hop signals could apparently deviate by up to ±50° from the true great circle path. He writes:

"During the period of the IGY and the following two years the tests from here in Salisbury to ZC4WR on 50MHz included beam rotation tests. These were conducted three times nightly for a year, and were designed to attempt to correlate the phenomena of loss of beam directivity and the presence, or otherwise (and degree of) flutter fading during the three types of propagation experienced over the route (ie 2F2, F/TE (gradient supported chordal hop without earth reflection) and pure TE (late night scatter chordal propagation) via the drifting blobs of high density ionizations after the high density equatorial zones had broken up.

"Rather to our surprise, little correlation occurred. Loss of beam directivity tended to increase with the muf (to about r = 0·7) and was sometimes complete, that is to say equal signal strength with the 4-element Yagi north, south, east or west was received in Cyprus, indicating that provided the ionosphere was illuminated the angle or direction of arrival was of little importance. Although such complete loss of directivity was rare, it did occur under all modes of propagation and in both the presence and absence of flutter fading.

"Our timing tests (achieved by sending off a pulse train on 50MHz and receiving it back on 29MHz rebroadcast from Cyprus and then photographing the time delay indicated on the cro) showed little evidence of more than a few milliseconds extra time delay, although on a few rare occasions there were return pulses all over the picture (two return pulses were a relatively common occurrence). Unfortunately the timing tests were designed solely to disprove Professor Obayashi's theory that signals were propagated across the Equator via the exosphere (as with vlf 'whistlers'). Our timing tests did this conclusively, but we did not attempt to consider extra time delays in terms of off-path propagation but rather only the varying modes and state of the ionosphere; but clearly off-path routes up to and down from the ionosphere could likewise be operative, and are much more likely to be in evidence at sunspot minimum when only certain areas of the ionosphere may be dense enough to support propagation, rather than when the muf across the equator was around 70 to 80MHz.

"This brings me to a feature of the present sunspot minimum; conditions on 28MHz are very similar to 50MHz at sunspot maximum. The seasonal pattern is consistent. Excellent conditions exist at the equinox from Rhodesia to the Mediterranean area together with extensions to North America in November and February plus consistent openings to the UK through the solstice periods, as indicated by

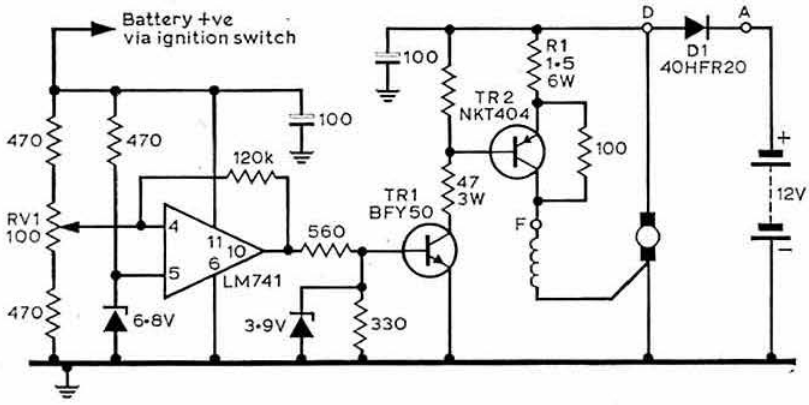


Fig 7. Solid-state voltage regulator used by G4CFJ to overcome the problem of regulator interference to 1·8MHz mobile operation. Unmarked resistor to base of TR2 is 20Ω

GB3SX and the number of cross-town natterings that go on at a just audible level sometimes for hours on end."

Zener plus diode temperature coefficients

Geoff Southern, G3RWW, comments usefully on the *QST* suggestion (*TT* January, page 46) of adding silicon diodes in series with zener diodes in order to achieve the required voltage characteristic: he points out that this is not the only characteristic that is changed, a fact that may sometimes be a disadvantage but can also be turned to good use. He writes:

"Generally a silicon diode has a temperature coefficient of the order of −2·5mV/°C, whereas the temperature coefficient of a zener diode varies with voltage type. For a BZY88, a 5·6V diode has a zero temperature coefficient, whereas a 3·3V diode has a negative temperature coefficient and a 6·8V device a positive one (−2·5 and +2·5mV/°C).

"Thus, adding a silicon diode in series with a 6·8V zener, or two silicon diodes in series with an 8·2V zener will reduce the overall temperature coefficient to zero, as well as increasing the overall reference voltages. A silicon transistor base-emitter junction has the same coefficient as a silicon diode.

"Thus this method can also be used to provide an effective means of adjusting the temperature coefficient of a zener diode".

Interference-free car regulator

Electronic solid-state voltage regulators as a part of "car electrics" are attractive for a number of reasons—not least because they have no mechanical contacts to produce sparks that can be a difficult-to-eliminate source of interference to mobile operation.

John King, G4CFJ, when using a 1·8MHz mobile rig in a car with a Fibreglass (glass reinforced plastics) body, found it impossible to suppress the voltage regulator with any of the usual techniques. So in the end he adopted the solid-state regulator arrangement shown in Fig 7.

In this system the battery volts are compared with the reference volts across a 6·8V zener diode. When the battery voltage is low, the 741 operational amplifier ic provides an output of about +12V, turning on TR1 and TR2. This causes dynamo field current to flow and the dynamo output to charge the battery. As soon as the battery volts rise beyond that of the zener reference, the 741 output drops to about +2V and the field current is turned off. The battery is prevented from discharging through the dynamo by diode D1 which should have a current rating of at least 20A.

G4CFJ mentions that when he installed the new regulator he left the original one in place but simply placed cardboard between its contacts to stop it from working. The wires to A, F and D connections were soldered to those already on the old regulator. It should be noted that the circuit as shown is suitable only for negative-earth systems, but by changing npn to pnp types and suitably connecting the diodes, it should be possible to adapt the system for positive-earth vehicles.

If the dynamo output is too low (or high) it can be adjusted by changing the value of R1 (1·5Ω nominal); RV1 should be set to give 13·5 to 14V from the battery.

Voltage-controlled zener

The use of two complementary bipolar transistors to form what is in effect an adjustable "zener" is fairly well known (see, for example, *ART*). A variation of this approach is noted in *Practical Electronics* (January 1976) suggested by I. D. Evans. He uses a junction fet (2N3819 etc) and bipolar

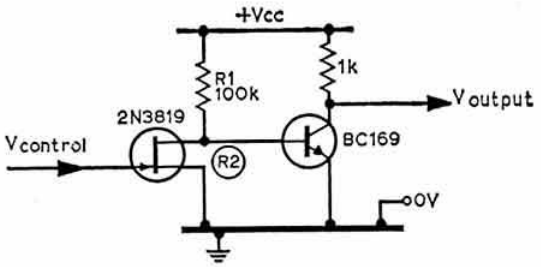


Fig 8. A fet and transistor combination used to provide the equivalent of a voltage-controlled zener diode

npn transistor (BC169) to form the equivalent of a voltage-controlled zener. This is based on the so-called "amplified zener" arrangement (also given in *ART*) but replaces the zener diode with a resistor (R1) and the usual resistive branch of the network with a fet whose resistance (R2) varies in accordance with an applied control voltage: see Fig 8. The fet resistance controls the voltage at which the transistor turns "on" and can, if required, be readily controlled remotely. □

4-2-70

Martin Dann, G3NHE*

DX news

During the lift at the end of December, G8CEZ operated /P from a location 16km south-west of Poole in Dorset at 650ft asl (QRA YK30e). Between 1800gmt and 0140gmt on 27–28 December, Bob worked 54 Continental and 18 UK stations using 10W ssb from a TS700 to a 10-el beam at 17ft agl. Twelve countries were worked, and a further four heard but not worked, but the most interesting contact was with IW1AHH in DF15c. G8CEZ gave the Italian a report of 33 and received 51, but what was most remarkable about the contact was the low power (5W) and screened QTH of IW1AHH. According to his QSL card, although the Italian is sited at 1,280m asl, he is screened by Mont Blanc which rises to 4,810m just 10km away. This gives IW1AHH an angle of elevation of 23° to clear the summit.

A couple of reports of QRP working to encourage those stuck on low power: G5HD (Salisbury) worked DJ8TFA in EH12a with 800mW of cw on 2m during the December lift, and G8GML's FMD Award claim this month included a 520-mile contact with an OZ made with just 40mW of rf from the British end.

Although the news is belated, the amazing success of 9H1CD during the sporadic-E opening on 1 June 1975 is worth recording. Unfortunately there did not appear to be a path between Malta and the UK, even though G–LZ contacts were being made on the same day. However, Henry's contact with OZ1OF in EQ78b, at 2,400km, is remarkable dx, and the OH he lost in the QRM must rate as a most startling "getaway". Between 1657 and 1751gmt Henry worked 22 stations on ssb, in OZ, DL, DM, OE and SM, making what must be several 9H1 "firsts". It may be recalled that G4CZW was heard by 9H1CD in 1974, so that first 9H1–G contact must surely be a strong possibility.

The continuing solar activity again produced a useful auroral opening on 10 January, although it is difficult to determine from reports just how many phases there were: it seems to have depended on one's location. Summarizing, there was auroral activity somewhere in the country from 1554 until 0140gmt, with one break between 2022 and 2155gmt. UR2RDR was reported to have been worked by several stations, as was SP. GM3YOR in Kirkcaldy had 18 contacts with G, GM, GW, GI, DJ and OZ on 144MHz cw, while at the other end of the country, G3DAO (Selsey) also used cw to work GM, GI and SM. Peter noted three separate phases, 1645-1945, 2155-2220gmt, and a faint trace of unidentifiable activity around midnight. GD3YEO, however, recorded just two phases, although he might not have been in at the beginning of either. His activity was from 1930 to 2022 and 2155 to 0130gmt, and included contacts with GM, GI and SP.

G8IMF in Swindon worked several GMs and GI during the opening, with 10W of ssb. With him the first signs of the opening came at 1554gmt, and the first phase lasted until 1840gmt. G8IMF reports no further activity until an hour-long second phase starting at 0040 the following morning. In Northwich, listener A8088 logged a fluctuating spell of auroral activity between 1800 and 1950gmt, and a second phase around 0030gmt, when cw only was heard.

The only report of any 70MHz activity came from GW3MHW, who managed ssb contacts with GM4AOR and GM3JNW. Apart from G4AIR, who was heard working both Scottish stations, John was disappointed to hear little else on the band.

Contest comment

The G5HD/G3WDG uhf/shf contest team express themselves opposed to the idea of combined 432/1,296MHz contests, as suggested by G8AYY. On the other hand, G3TQF is much in favour of the idea, and feels that the 432MHz cumulative contests would be enlivened by the injection of some 1·3GHz enthusiasm, which might even result in more regular activity.

As suspected, the abnormally good conditions for the first of the 432MHz Autumn 1975 cumulative contests resulted in a very low entry—the worst for any contest during G5HD's three years as a vhf contest adjudicator. Les is particularly concerned by the low level of activity on the band, and the only salvation he can envisage is the projected repeater activity. In view of the strict adherence by the Home Office to the 100-mile radius rule for 144MHz repeaters, G5HD wishes that more repeater groups would consider switching to 432MHz.

The appearance in the contests calendar of the new date of VHF NFD has produced some adverse reaction, all of which has been channelled to the VHF Contests Committee. In fairness to the VHF Contests Committee we would point out that under "Contest comment", p547 *4-2-70* July 1975, we asked on behalf of the committee for comment on the proposal to alter the VHF NFD date, and there appeared to be very little opposition at that time.

Four metres

From the number of stations who appeared on 70MHz for the cw contest on 18 January it is clear that the band is in a reasonably healthy state, even if activity is mainly limited to Sunday mornings. Conditions during the contest were variable, and seemed to depend on one's location. G3LVP (Benfleet, Essex), for example, found conditions somewhat below average, the Sheffield beacon being weaker with him than it had been during the same event last year. The writer found things a little above average from South Yorkshire, but G3RJX in Birmingham thought that conditions were very variable with heavy QSB on distant stations. However, in the last 15min of the contest both GM3JNW and GM3YOR/A came whispering out of the noise to give Brian some excellent dx and a new county. On the subject of band occupancy, G3RJX has noted a decline in the Wednesday evening activity period on 70MHz, and tells us that he is on the band most evenings between 6 and 7.30pm.

If the Wednesday evening session lacks support, the Tuesday lunchtime one does not, and G5UM reports a lively gathering of fixed and mobile stations in the Midlands, anchored by G3HVI in Stoke.

G3YKP of Nuneaton, Warwickshire, is keenly interested in the possibilities of 70MHz, and thinks the band deserves far more attention than it gets. He is now active with A1, A3 and A3j from a QQVO6-40 to a 3-el beam, and as his contribution to the level of activity, offers skeds to anyone who

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cares to write to him, QTHR. Preferred times are 0900–1000gmt weekdays, after 1500 on Wednesdays, and at weekends.

Ken Eastty, G3LVP, has once again provided a detailed and interesting review of his 70MHz activity last year, and in general thinks that things are going in the right direction on this band, albeit rather slowly. Although he worked slightly fewer new stations during 1975, the overall total was up, as was the number of stations using ssb.

A phenomenon that G3LVP finds amazing is the lack of cw activity below 70·1MHz, except during telegraphy contests when there is little activity *above* this frequency. Normally, cw tends to get mixed up with the a.m. on 70·26MHz, and ssb on 70·2MHz, and Ken wonders whether it is worth suggesting a separate cw calling frequency on 70·05MHz, although he feels that too many calling frequencies can become self-defeating.

Expeditions

Roger Hemmings, G3VCT, and Steve Rawlings, G4ALG, are planning a 70MHz expedition to Scotland in early August, taking in some of the rarer G counties en route. It is possible that 432/1,296MHz gear will also be taken, and more details will be published when they are available. In the meantime, G4ALG, QTHR, would like to hear from 70MHz operators who have suggestions for eastern and north-eastern English counties to visit on the way to Scotland, and would also like to hear from other groups planning similar trips so that unnecessary duplication can be avoided.

Graham Packer, G3UUS, asks UK stations to look out for G3UUS/LX/P during the 144MHz Open Contest on 6/7 March. The team, consisting of G3SLZ, G3WTS and G3UUS himself, will be operating from Clervaux in the Grand Duchy, about 4km from the RTL transmitter. During the same contest, F0DA will again be active from their site near Cherbourg. The operators will be G4CDY, G8AWM, G8FBG and the holder of the F0DA call, G8AUU.

FM channel

Kris Partridge, G8AUU/PA9WF, as PRO for the UK FM Group (London), is arranging a trip to Amsterdam to meet Dutch fmers and other local amateurs. The outing is primarily intended for members of the group, but any other interested fm enthusiasts are invited to join them. The trip will take place on either the last weekend in March or the first in April, and details can be obtained from G8AUU, QTHR, on receipt of an sae.

The Kent Repeater Group have formed a sub-group (KRG-UHF) to finance the proposed 432MHz repeater GB3EK. Negotiations are underway to obtain a site in Margate offering good coverage of Thanet, and including Whitstable, Canterbury and Sandwich. The progress towards a 432MHz repeater notwithstanding, the KRG continue to press their case for a 144MHz repeater, despite the licence refusal because of the 100-mile rule.

The UK FM Group (Western) announce that the Home Office has authorized the commencement of operation of the repeater GB3MP. Located at the IBA tv station at Moel-y-Parc, Clwyd, the repeater will operate on Channel R6 (145·15MHz in, 145·75MHz out) and cover much of north Wales and north-west England. The group also have plans for 432MHz repeaters to serve Manchester (GB3MR), Colwyn Bay (GB3LL), Liverpool (GB3LI) and Stoke-on-Trent (GB3ST).

Class B

We should like to thank all those who responded to the request for comment on the suggestion that Class B licensees should be allowed restricted cw facilities, and commiserate with those who found the brief comment under this heading last month rather dampening, especially as many of the suggestions received would appear to overcome the main objections. Correspondence on the subject has been forwarded to the VHF Committee to see if anything further can be done.

International VHF Convention 1976

Details of this event appear elsewhere in this issue, and it is already clear that the epithet "bigger and better" can be applied to this year's convention. The new venue offers greater space and improved facilities, so this popular and successful occasion in the vhf calendar again promises to live up to all expectations.

Awards

70MHz Transmitting: No 120 to G3TBK of Newark.
144MHz Transmitting: No 477 to G8GED; No 478 to G3IEE/M; No 479 to G4ECQ, the first of the G4E-- series to gain this award; No 480 to G3JFO/P and No 481 to G8GML.

144MHz Senior Transmitting: the vhf awards manager was particularly pleased to be able to issue consecutive 144MHz Senior Awards to two of our overseas members; No 84 to ON8IW and No 85 to SM7AED, the latter containing some mouth-watering meteor-scatter contacts on cw with such places as Italy, the Ukraine, Spain and Yugoslavia. Previously, certificate No 83 had gone to G3PFR, who was using ssb on 144MHz as long ago as September 1969.

Operating from a poor site in the centre of Cambridge, G8GML adds Senior No 86 to his ordinary award listed above. Due to local difficulties G8GML had to spend two years using a poor aerial system, and during this time worked only two countries plus eight counties. The improvement on raising a 10-el to 38ft was almost beyond belief, and in short order both 144MHz Ordinary and Senior Transmitting awards have been gained.

432MHz Senior Transmitting: another rarity this month is the issue of certificate No 26 to G4AGE (ex-G8AVC). Ray Evans just managed to collect the necessary counties and countries before moving QTH and having to start all over again.

UHF tv

Chris Towns, GM8BKE (GM6AJG/T), reports that video activity on 432MHz is gathering momentum in the Forth-Clyde valley. GM8ARV (GM6SDB/T) in Edinburgh has been radiating 40W of video, and has been copied in Glasgow, a path of about 40 miles, by GMs 3SAN, 3KXM, 3YLD, 3KXQ and 8BKE. Among others showing interest are GM3EDL and GM8DKB, both in Edinburgh, and it is hoped soon to have regular two-way video contacts between Edinburgh and Glasgow. Chris also hopes to do a little outside broadcast work in the summer, as GM6AJG/T/P.

Those empty spaces

GW8KSF (Wrexham) has found that even if UK stations ignore the "untenanted area" of 144MHz referred to by G5UM in the January *4-2-70*, Continental stations do not. Alan Salisbury made several dx contacts on fm between 144·5 and 145MHz during the December lift, and he recommends fm/a.m. users who are vfo controlled to tune below 145MHz during the next opening and find out what they are missing.

Also picking up the comments by Jack Hum about the use of a.m. to fill the apparently unused spaces on 144MHz is G4DGU, who is surprised to see A3 still being advocated for local working. While allowing that the G5UM a.m. is impeccable, Chris Bartram questions the possibility of achieving anything approaching BBC quality using normal amateur techniques. G4DGU suggests that few amateur a.m. transmitters are capable of giving anything like one per cent or less envelope distortion at a reasonable modulation index (say, 0·8). A typical figure might well be five per cent or worse, and add to this the non-linearities of diode envelope detectors, and system distortion figures (microphone to loudspeaker) of 10 per cent plus are not uncommon. Comparing this with an average amateur fm set-up of less than three per cent system distortion, better s-n ratio, greater efficiency (no high-level modulator required) and ease of setting up, G4DGU can easily see why fm is so popular today.

By way of confirmation of the use on the Continent of the area between 144·5 and 145MHz, GW5BPC/DF3GI reports that his usual frequency when at home in Freiburg is 144·84MHz. He comments that on such frequencies, technical discussion nets are regularly held between local amateurs using home-built fm transmitters. In Joachim's opinion, fm is a far easier mode to install in an amateur transmitter than a.m., and provides superior quality. He goes so far as to say that a.m. is not a dying mode, but already dead, adding that with the availability of reasonably-priced ICs for the demodulation of fm, there should be no problems now with the reception of this mode.

Winter winds

The 2 January gales seem to have left a good many of us gazing ruefully aloft, but G8GVA of Leicester has no need to look upwards, for the chimney stack which supported the aerial system collapsed. While aerials and mast can be perfectly secure (the only damage to the G8GVA system was caused by the fall to the ground), this is of little use if the structure to which they are attached is unsound. It may well be advisable to have any brickwork structure examined by an expert before subjecting it to the stresses and strains of supporting a vhf aerial system.

VHF in South Africa

We were delighted to hear from Joe Ludlow, ex GW3ZTH, that he has settled down in Natal, South Africa, and is now able to let us know the state of vhf there. Joe has found himself a good vhf site, except to the north, some 15 miles inland from Durban and 1,000ft asl, although he says this does not compare with the 3,000ft asl location of another well-known ex-patriate, Jim Foster, ex G2JF and now ZS5JF.

Joe has not yet obtained his ZS call, the delay being caused by his not being able to present all the necessary documents to the licensing authorities. Any British amateur wishing to take out a reciprocal licence in South Africa should take with him: (a) his current amateur licence; (b) his RAE pass certificate; (c) his GPO morse test pass certificate (where applicable) and (d) a copy of his Amateur Radio Certificate.

Items (a) and (d) are the most important, for although the authorities may accept the lack of (b) and (c), they insist on having the Amateur Radio Certificate. It was the lack of this that caused the delay in GW3ZTH's case.

Joe Ludlow also advises potential emigrants to South Africa to bring their junk box, coaxial cable, vhf valves and bases, and other constructors items with them, for although Japanese transceivers and the like are cheaper than in the UK, the ancilliary items mentioned are either unobtainable or cost the earth.

As for vhf activity, this is more or less restricted to 144 MHz, mainly fm, but ssb and cw are catching on fast. Repeaters are very popular, with much mobile-to-mobile working, but most, if not all, the repeaters in the republic are carrier operated, with no access tone or time-out facility. The South African Radio League has adopted the IARU Region 1 vhf band plans, so there is no need to change crystals when taking fm gear into the country.

The idea of dx operating on 144MHz is only just beginning to find supporters, led by dedicated types such as Roger Davis, ZS5ZD (late of the Green and Davis vhf company), and ZS5JF, ex-G2JF. On 432MHz the situation is even worse, with only ZS5JF doing any serious work in Natal. Joe himself hopes to try 144MHz e-m-e when time permits, but is finding himself far too busy at present. We wish him every success in South Africa, and we are sure that vhf dx working in that country is about to be given a big boost!

Miscellany

G8IMF, writing on behalf of the Swindon & DARC, explains that they were successful last year in obtaining permission to use Liddington Castle as a /P site, a facility which they were able to extend to other individuals or groups, providing the conditions of use were adhered to. Unfortunately, the owner of the land has been upset by the way the site has been misused by people unconnected with amateur radio, so to avoid the danger of the use of this excellent vhf site being withdrawn altogether, the S & DARC ask that no-one use Liddington Castle until things have cooled down.

GM8BDX, Duns, now has 40W of ssb on 432MHz to a Multibeam at 45ft agl, and would like to hear from stations to the south wishing to try skeds. Preferred times are around 2000gmt on Fridays and Sundays, on 432·29MHz.

The 144MHz rtty activity night is Thursdays at 8pm. The BARTG recommend fsk on 144·6MHz and afsk on 145·3, and it is hoped that 144·6MHz will be used for longer distance contacts. To this end it is suggested that rtty stations in the London area make a habit of looking north; and northern stations, similarly, look south.

Finally, over the next few months the date by which we request readers' contributions may be earlier than usual, and most probably before the latest issue of *Radio Communication* has been received. This is due to temporary business commitments restricting your scribe's writing time, and we ask your forbearance until summer, when things should return to normal. The final date for correspondence to reach G3NHE for the April issue is 6 March, and for the May issue, 3 April. □

swl news

Bob Treacher, BRS32525 *

Table matters

Neville Spry, BRS19567, won the 1975 HF Countries Table with a total score of 793, all on ssb. Congratulations, Neville. The most remarkable thing about his score is the 200 countries amassed on 80m. Country No 200 came in the shape of VR4DX at 1600 on 31 December. The century on 40m just would not come, comments Neville, who beat Keith Kerr, BRS35943, into second place with a total of 779 countries heard, again all on ssb.

As your scribe mentioned in the last issue, the table will be run on the same lines this year. For ease of reference, I will repeat the very basic and easy rules.

(i) Note each different country heard on each band.
(ii) Before the deadline date add up all the countries heard on each band.
(iii) Note down the six (or five if the receiver does not cover 160m) band figures and their total and send them to your scribe, who **does not** want to see the list of countries itself—simply the figures.

The 80m dx scene

Each winter brings good propagation conditions to 80m and some of the country's listeners have been lucky enough to hear some real goodies in the shape of VR1AA, VR4DX, VR8A, 9M8HP, ZL3NR/Chatham Is and EA8CR/9 in Spanish Sahara. Conditions this year do not seem to have been quite up to last year's because of lack of activity, especially during late afternoons, but the quality seems to make up for the quantity.

Keith Kerr already boasts a score of 107 countries on 80m ssb at the end of January. No doubt he and others also managed JA8IEV/JD1 and 5W1AU, heard by your scribe in early February. Conditions on 80m should stay in reasonable shape until the end of March when, with the lengthening days, dx conditions will probably not be so good. It would be interesting to have an idea of high all-time 80 ssb scores from listeners, and transmitters for that matter, around the British Isles. Send in your scores (from 150 upwards) and a list will be included in the next issue if there is sufficient support.

The February mail

The postman has delivered enormous quantities of mail to *SWL News* recently, and it is very pleasing to hear from a large number of established contributors and from a few new names.

One such "new boy" is Keith Morrison, A8883, aged 14, from Sunderland, who has an entry in the 1976 table, achieved with the help of an AR88D and a simple 35ft end-fed long wire. He only manages to listen to ssb-type contacts at present, with his favourite bands being 20 and 80m. Keith is encountering good lower frequency conditions for the first time and has been pleased to hear VS5, YV, PZ and PJ2 on 80m plus 59 signals from 7P8 and EL on 40m. His main "moan" is that he still has not heard a ZL, JA or W6. Time and a better aerial will no doubt remedy this.

*392 Rochester Way, Eltham, London SE9 6LH.

FINAL PLACINGS—1975 HF COUNTRIES TABLE

Station	10	15	20	40	80	160	Total	Mode
BRS17567	84	163	235	96	200	15	793	ssb
BRS35943	84	128	234	116	157	—	779	ssb
BRS35608	59	130	205	173	97	23	688	cw
A8428	53	144	209	98	131	5	640	ssb
A8312	39	124	178	102	121	33	597	ssb/cw
A8849	40	117	150	56	73	12	448	ssb/cw
BRS25901	32	72	182	69	78	7	440	ssb
A8088	54	113	131	53	55	13	419	ssb
Alan Doherty	10	53	135	56	90	15	359	ssb
BRS35454	2	71	129	21	62	4	289	ssb
BRS34658	4	8	64	45	94	7	222	ssb
A9018	—	22	49	15	58	—	144	ssb/cw
BRS29641	6	38	35	27	30	—	136	ssb
BRS35754	—	—	38	—	51	1	90	ssb

1976 HF COUNTRIES TABLE

Station	10	15	20	40	80	160	Total	Mode
BRS35943	3	66	118	58	107	—	352	ssb
BRS35608	7	38	99	102	73	27	348	cw
A8883	10	27	41	27	58	3	156	ssb
BRS35454	2	27	53	17	47	4	150	ssb
BRS32286	3	8	48	19	59	—	142	ssb

Michael Green, A8088, has been rebuilding his receiver and also reorganizing the shack, which accounts for the lack of activity at his Northwich, Cheshire QTH. However, he seems to have put all this behind him and comes up with the interesting quote that 10m is not as dead as it seems—especially during contests! ZD8, FH8, 7Q7 and 5T5 certainly bear out this theory.

Another new contributor is Crosbie Rodgers from Dumfries, across the border in GM. He has an SB301 receiver and inverted-V dipoles at 55ft plus a 10m ground plane and 2m array. Ill-health unfortunately curtails his listening habits but it is hoped that 1976 will be a happier year and that a great deal of dxing can be achieved.

BRS33179, George Thompson from Selly Oak in Birmingham, is now G8KLI and writes to give a potted history of 1975 as he saw it. He too had his fair share of ill-health during the year, having to undergo an operation to save his sight. Fortunately, this seems to have been partially successful and he went on to study for the RAE, passed and managed to buy a secondhand Liner 2 and an 8XY 2m Yagi to get on the air. He is now active on 2m and is enjoying the hobby immensely. George has plans for the future however, the main one being to pass the morse test. Adjustments to the aerial farm are also required, and a secondhand transmitter to complement his FRDX400 also figures in the plans for 1976. I am sure every reader will wish him, and many other less fortunate listeners and transmitters, the very best of luck in his venture.

GI is represented this time by Alan Doherty, who failed to append his callsign to his letter. Alan has increased his heard totals lately, thanks to some previously mentioned 80m goodies. The equipment at Alan's QTH is an FR400SDX plus PR40 and an FR50B into an 80m $\lambda/2$ inverted-V and 12AVQ for the hf bands which is complemented by a G5RV.

Letters from A8961, A9018, BRS35914, BRS35895, BRS35088 and G8GOP are also acknowledged.

Keith Kerr has galloped off to an extremely good start in the 1976 table but is closely followed by Noel Phelps, BRS35608. The 80m band figures prominently in Keith's list but he also mentions 160m. He was threatening to QSX to 160m last January but his 160m score in December was . . . 0! It will be interesting to see if this changes during 1976!

Continued on page 217

the month on the air

John Allaway, G3FKM*

A CERTAIN amount of confusion seems to exist among readers concerning what is "legitimate" interference from non-amateur stations using parts of our amateur allocations. In IARU Region 1 only 7,000 to 7,100, 14,000 to 14,250, 21,000 to 21,450, and 28,000 to 29,700kHz are exclusive amateur bands. Certain stations in the USSR are permitted to use the band 14,250 to 14,350kHz, and 3,500 to 3,800kHz is shared by us *equally* with other services which therefore have a perfect right to be there. The band 1,800 to 2,000kHz is, of course, only available to us as secondary users—this means that *all* other users have priority over us, and that it is absolutely essential that we do not cause interference to them.

Your scribe would appreciate information concerning the present whereabouts of VP8LV who operated from S Orkney Is during 1970.

DX news

Apologies to ON5TO, whose out-of-date address was given in the January *QTH Corner*. A current one is given in this month's listing, and QSL cards for 9U5s CM, CR, DS and RH may be sent there, as well as those for ON0ITU. Omer says that the only officially authorized station in Burundi at present is 9U5DS—9U5CR has returned to Belgium and is now ON8OF and second operator at ON5TO. All other 9U5 calls to be heard at present are believed to be pirates.

The special station PA5GIF-A will be on the air until the end of March on all bands and modes. QSLs may be obtained from the address in *QTH Corner*.

HV3SJ wishes it to be known that he will no longer consider himself as a valid contact for the WAE award. This is the result of the enormous demand which he experiences for QSL cards with which he can no longer cope.

The Ten-Ten International Net of S California now has G2DRT in charge of its UK chapter. Members meet at 1100 on Sundays on 28,800kHz.

VP8NO reports that VP8MS and VP8OT should have arrived in S Georgia late in February. LU1ZA, in the S Orkney Is, is active almost daily at 2400 on 14,140, 14,240, 14,260 or 14,340kHz, and asks for QSLs via LU2CN.

It seems that AP2KS's callsign has been pirated on 3·5MHz cw. An "AP2KS" has been worked around 0000 on 3,510kHz using Khalid's name and giving SM1CNS as QSL manager, however the real AP2KS never uses cw.

Those still needing confirmations for contacts with KB6CZ, KG6ASC, MP4BHH, MP4MBB, MP4QBK, P29MN, VK9MN, 9L1GQ or 9L2SL should send details to K4MQG (G. Dixon, 801 Chelwood Place, Charlotte, NC, 28210, USA).

The rather confusing prefix allocation to islands in the Netherlands Antilles may be solved by reference to the following list: PJ1 and PJ0 = contest and special stations, PJ2 = Curacao, PJ3 = Aruba, PJ4 = Bonin, PJ5 = St Eustatius, PJ6 = Saba, PJ7 = St Maarten (residents), PJ8 = St Maarten (non-residents), PJ9 = Curacao, Aruba, Bonin (non-residents). Thus PJ0, 1, 2, 3, 4 and 9 count as Netherlands Antilles, and PJ5, 6, 7 and 8 as St Maarten.

The Northern California DX Foundation is believed to have arranged for a beam to be shipped to Horatio Torres, CR9AJ. Horatio's location is in an old lighthouse with his dipole aerial at present 400ft asl.

Those who missed making contact with Guy, FR7ZL/G, will be pleased to learn that FR7AI expects to visit Glorieuse Is in May for a two-month stay as FR7AI/G. F8US was expecting FR7ZL/Gs logs during February. It seems that F2MO will no longer deal with QSL requests for the FB8X stations for contacts made during 1976—he will however still QSL for contacts made in 1975 and before. Their new QSL manager is F5VU (see *QTH Corner*).

Current activity from the VK0 area consists of VK0CC, VK0CG, VK0GW (all located at Casey), VK0AL (Dovier), VK0DA (Macquarie Is) and VK0IN (Mawson, ITU Zone 69). Those looking for a contact with Christmas Is may like to look for VK9XI, the club station on the island, who is often to be heard on Wednesdays after 1300 around 14,245 kHz. The vast majority of European stations who have not yet contacted a station in Tuvalu might be interested to know that VR8A is said to be a regular check-in in the PACDXNET on 14,265kHz on Tuesdays and Fridays at 0600.

Don Rieboff, ex XU1DX, K7CBZ etc, is now in Portugal and has been worked using the callsign CT4AT. Harry, VQ9HCS, has been forced to return from Astove Is to Mahé as a result of a hurricane which destroyed his home and most of the rest of the island.

Doug Snowden, WB4KSE, will be on Christmas Is as VR3AH for several months and should be found on 7 and 14MHz.

9V1SH is active most days between 2230 and 2400 in the areas 3,505-3,520kHz and 3,790-3,800kHz looking for European contacts. He is willing to make schedules.

Dave, CE0AE, hopes to be active on all bands 1·8 to 28MHz before returning to the USA on three months leave in June.

There are now two stations on the air from Chatham Is. ZL3NR/C has been worked by many Europeans on 3·8MHz ssb, and Tony, ZL3LN/C (who will be on the islands for six months) has been reported on 7 and 14MHz.

Stations in Guatemala City may use the prefix TD76 during 1976 to celebrate the city's bicentenary.

News from overseas

A2CED (formerly 9J2ED) has written to say that he is still listening carefully for UK stations although they seem to be quite rare in Botswana. At the present time he is to be found on 7,035, 14,035 or 21,035kHz on Saturday afternoons, and Ed says that he will make every attempt to stay with Gs even when other stations fail to wait for a few minutes. He gets the impression that, while UK operating standards are still excellent, those of some other European countries have declined. RTTY operation should be available very soon.

G8FG has provided the results of the elections for Ex-G Radio Club officers for 1976. President will be WA5ZXZ (Danny), vice-president ZL3QA (Alf), secretary/treasurer

*10 Knightlow Road, Birmingham B17 8QB.

The station of HB9AMY (second from right) which operated from Lugano-Viganello, Switzerland, during JOTA 1975

(NZ) ZL1BAD (Bob), ditto (UK) G2FUX (Frank), awards manager (Europe) G8FG (Howard), and board members G2CWL/W8 (Ken), WA6GLF (Will) and WA8TGA (Ernest). W3HQO (Reg) remains editor. The club is for amateurs born in the UK and now living abroad, and those wishing to join should contact their nearest club official or W3HQO (519 Lincoln Av, Hulemevilla, Pa, 19047, USA).

Keith Hollow, 9L1KH (ex-ZD7KH, MP4BJS, A9XP), has written to say that amateur licensing in Sierra Leone was re-introduced on 1 January. This excellent news came about very largely as a result of good work by the recently-formed Sierra Leone Amateur Radio Society who presented the case of the amateur radio service to the government and helped in formulating licence conditions.

Jim Smith (VS1BQ, G3HSR, DL2TH, HZ1AB, MP4BER, 9V1PS) is at present active from Port Moresby as P29JS. He will be there until next year and says that there are some good openings into Europe around 1200. Jim's QSL policy is 100 per cent via bureaux, or direct on receipt of three IRCs. He expects to be on from the Solomon Is as VR4BJ for a period during the next few months.

Dxpeditions

FL8OM, possibly accompanied by another FL8 operator, is hoping to be on the air from the Red Sea Islands for about one week during the Easter period. He plans to charter a boat for the outward journey and return via the lighthouse maintenance vessel when it calls for its routine business. It is believed the responsibility for maintaining the lights has now passed to the FL8 authorities from the Ethiopians.

The K5QHS trip to Bajo Nuevo (HK0) may now be postponed until the July-September period.

The North Florida DX Group is planning to be on the Turks and Caicos Is (VP5) during the CQ WPX contest in late March.

It is reported that VE1ASJ will operate from St Paul and Sable Islands during April. No further details are available yet.

Long Skip reports that VE3s EGS, BGX and GUJ have received permission to operate from St Paul Is from 28 May to 3 June and have a full-scale operation in mind. They have applied for the callsign VY0B.

Awards

The Cairns Centenary Award

This celebrates the centenary of Cairns, Queensland. Log details of contacts with two stations in Cairns (VK4s AE, AMO, CI, HK, HM, KV, NF, NU, RY, SU, TL, VI, VT, YG, YT and ZY) made during 1976 should be sent to Cairns ARC, Box 1426, Cairns, 4870, Qd, Australia. Enclose IRCs for direct postage, otherwise the award will be sent via the bureau.

USA Bicentennial prefixes

Special prefixes are currently being used by USA stations. Their normal prefixes may be established by reference to the following list:

AA=WA	AG1=WW6	AH1=WH6	AH7=KM6	AJ7=KJ6
AB=WB	AG2=KB6 AG3=WB6	AH2=WM6	AI0=KP6	AJ8=WP4
AC=W	(KB6)	AH3=KS6	AJ1=WJ6	AK=WN
AD=K	AG5=WG6 (Guam)	AH4=KS4	AJ2=WV4	AL1=WL7
AE=WD	AG6=KG6 (Guam)	AH5=WS6	AJ3=KV4	AL4=KC4 (Navassa)
AF=WR	AG7=KW6	AH6=KH6	AJ4=KP4	AL7=KL7

There is no mention of changes for KC6, KG4, KC6 (Saipan), KZ5 or KC4 (Antarctica).

Special prefixes, 1975

It has been suggested by G5HD that a summary of some of the strange prefixes which appeared on the bands during 1975 may be useful. A multiplicity of calls in the series WA-WZ and KA-KZ were used in the USA for special event stations and it would be impossible to list them all. Where prefixes are used for contest purposes only, the normal prefix is listed:

CG3 = Centenary of Listowel, Ont. CQ6 = CR6.
CH1 = Centenary of Truro, NS. CQ7 = CR7.
CY6 = Centenary of Calgary. CT6 = CT1.
CZ3 = Centenary of Wilno, Ont. CV, CW = CX.
DM30 = 30th Anniversary of liberation from Nazis.
H3 = HP. HD1 = HC.
HU1 = YS (Miss Universe Contest).
HA30 = 30th Anniversary of liberation from Nazis.
HA104 = Lenin's 104th Birthday.
LC1 = Norwegian Scout Jamboree.
LZ30 = 30th Anniversary of liberation from Nazis.
OC = OA.
PA7 = 700th Anniversary of Amsterdam. PU, PS, PT = PY.
SP30 = 30th Anniversary of liberation from Nazis.
T75 = Centenary of Guatemalan Independence.
TK = 50th Anniversary of REF.
U4 = Places of heroic defence in Stalingrad.
UA30, UB30, UC30, UD30, UF30, UG30, UH30, UI30, UJ30, UL30, UM30, UN30, UO30, UP30, UQ30, UR30,—all celebrate 30th Anniversary of liberation from Nazis.
VC1 = Centenary of New Glasgow, NS.
VX9 = Sable Is. VY0 = St Paul Is.
XK3 = 150th Anniversary of Peterborough, Ont. XJ = Canadian Olympics (VE).
XL3 = Centenary of Thunder Bay, NS.
XN = Canadian Olympics (VO).

XO3 = Centenary of North Bay, Ont. XQ9 = CE. XX6 = CR6.
YR = YO. YZ = 30th Anniversary of Yugoslav People's Rep.
4J2 = UP. 4J3 = UA3. 4K2 = UP2.
6DI, 6D2 = Pan American Games (Mexico). 6F8 = XE.
7SJ, 7SK, 7SL, 7SM, 8SJ, 8SK, 8SL, 8SM = 50th Anniversary of SSA (Sweden).
9G18 = 18th Anniversary of Independence of Ghana.

Contests

The CQ WW WPX/SSB Contest

0000 27 March to 2400 28 March.

Only 30 hours of the 48 may be operated by single-operator entrants, and the 18 hours of non-operating may be taken in up to five breaks which must be clearly marked in the log. All bands 1·8 to 28MHz may be used, two-way ssb only. There are single-operator (a) all band, and (b) single band, and multi-operator all-band—single transmitter or multi-transmitter (one signal per band allowed). Exchanges consist of RS plus serial QSO number from 001. Multi-transmitters use separate numbers on each band. Contacts between stations in the same continent (but not in the same country) count one point on 14, 21 and 28MHz, and two points on 1·8, 3·5 and 7MHz. Between stations in different continents points values are three and six respectively. Contacts with one's own country are allowed for prefix multiplier only—not QSO points. The multiplier is the total number of different prefixes worked—each may be counted only once. During this special 1976 contest a double multiplier may be counted for each special prefix in the USA bicentennial year series—eg AA1, AB2, AC8 etc. Stations may be worked on each band for credit. Each entry must be accompanied by a summary sheet listing all scoring information, the category of entry, and name and address in block letters. A signed declaration that all rules and regulations for amateur radio in the entrant's country have been observed must be enclosed. All entries must be postmarked no later than 10 May and sent to: CQ WPX SSB Contest Committee, 14 Vanderventer Av, Port Washington, NY, 11050, USA. Log forms and summary sheets are available from this address.

The crew of FY7AK during the 1975 CQ WW DX Contest (cw section). From l to r: KP4TIN, FY0BHI and F2QQ

QTH Corner

A2CED	via G3VKJ.
A2CGD	via SM3CXS, Berghemsv. 11, 86021 Sundsbruk, Sweden.
A9XCON	PO Box 472, Awali, Bahrain.
A9XBB	PO Box 116, Bahrain.
CT4AT	via W1YRC, 30 Rocky Crest Rd, Cumberland, RI, 02864, USA.
F5VU	J. Brunner, Savigne, F 86400 Civray, France.
FL8PE	E. Ermiz, SP 85014, Djibouti, TFAI.
ON5TO	Boterbekeweg 8, 8200 Brugge, Belgium.
PA5GIG-A	via PI1ARS, PO Box 200, Den Helder 1800, Netherlands.
P29AZ	Box 6666, Boroko, Papua New Guinea.
P29CC	via W2HNZ, or PO Box 195, Mt Hagen, Papua New Guinea.
P29CD	via ZL2FA, 46 Winter St, Gisborne, New Zealand.
P29JS	J. B. Smith, PO Box 2053, Konedobu, Papua New Guinea.
TY7ABM	via DL7JK, Am Goldbergfeld 5, 8018 Hesselfurt, P/Grafing, W Germany.
G3RHD/P/VE3	Capt. W. Booth, 30 Melfa Av, CFB Petawawa, Petawawa, Ont, Canada.
VP2EEF	via 8P6GG, Box 141, Bridgetown, Barbados.
VP2EEG	via W3HNK, Box 14, Norwood, Pa, 19074, USA.
ZD9GF	via ZS5SH, PO Box 12, Pennington, Natal, Rep of South Africa.
5N2AAX	HB9AAX, R. Matter, Waldheimstr, CH 6314 Unteraegeri, ZG, Switzerland.
9L1NP	N. Price, PO Box 12, Freetown, Sierra Leone.
9L1BH	Bertil Hall, QSL via SM3CXS.
9L1KH	K. Hollow, Cable & Wireless Ltd, c/o SLET, PO Box 80, Freetown, Sierra Leone.
9L1SL	Sierra Leone ARS, PO Box 16, Freetown, Sierra Leone.

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

The Bermuda Contest

0000 24 April to 0200 25 April (Phone).
0000 8 May to 0200 9 May (CW)..

All bands 3·5 to 28MHz. No cross-band/mode contacts permitted. UK contestants transmit RS/T plus their official county abbreviation (see January *Radio Communication*), and may contact USA, Canadian and VP9 stations only. Any number of transmitters and receivers may be used, but all stations must be single-operator only, and *all contestants must operate from their own private residence or property.* Each contact counts one point, and the multiplier is the total number of different VP9 callsigns worked on each band added together. All dates and times must be in gmt, and all logs must contain a declaration that contest rules and the terms of the entrant's licence have been adhered to. Logs must reach the Contest Committee, Radio Society of Bermuda, PO Box 275, Hamilton 5, Bermuda, no later than 30 June. A trophy will be awarded to the phone and cw winners in N America and the UK. Round trip air transportation plus one week's accommodation at the Sonesta Beach Hotel will be provided to overseas winners to enable them to receive their awards at the Radio Society of Bermuda's annual banquet on 21 October.

Band reports

West Coast DX Bulletin pointed out that the mean sunspot number for December was 7·5—the lowest observed since 1964. *MOTA*'s regular reporters would no doubt agree that this fact was reflected in conditions on the hf bands.

Many thanks to the following for sending information for this section: G2HKU, G4RZ, G6GH, G3s CED, KSH and UOL, GW4BLE, BRSs 17567, 25429 and 35608, and As 7056, 8312, 8428, 8713, 8783, 8946 and 8961, and S. Sharred.

Stations listed in italics were using cw.

1·8MHz. 0000 *VE1s, VP9HP, WA1RFM/VP9, W1-W5, 4X4NJ.* **0100** *HK0BKX, W5SUS, WA5RTG, W8s,* W0AIH. **0200** *KZ5AA, W9NFC,* **0300** *KP4AN, VP2EEG, YN1DW, YV1OB.* **0700** *K8CCV/8.* **0800** K1PBW. W8s JRH, LRL. **1900** *VK3CZ.* **2300** *EA8CR, PA0HIP/LX/P.*

3·5MHz. 0000 VP2ABC, VP9HP, VU2GDG, W7VO, *7P8AG.* **0100** FG7AN, FM7s, K6SEN, VP2DM. **0800** C6ABA, VR8A, ZL3NR/C, ZLs. **1600** JA6BSM, JY5RBM, UK9AAN, ZL3NR/C. **1700** *JA2BK/1,* KH6AQ, VS5DB, ZLs. **1800** CR9AK, G3KHK/OD5, TA2BK/1, OE6DK/YK. **1900** JA1JRK, ZC4PK. **2100** EA8CR/9, FG7AO, FL8BO, VE1XU/

SU, *VU2MG*, 5X5NK. **2200** D4CBS (= CR4BS), JA5CPI, ST2SA, ZE6JL. **2300** AP2KS, *JT0OAQ*, VS5JH, *5B4CD*, 8P6CJ.

7MHz. 0000 *CE8AA, KC4AAC.* **0100** *VU2JN.* **0700** *JAs.* **0800** *KH6CKJ, VKs, W6s, ZLs, 6Y5BF.* **1500** *VU2LD.* **1600** *W7SFA.* **1700** *JAs.* **1900** *EP2SN, 4S7s DA, WP, 7P8s AG, AH.* **2200** *ZB2CP, ZS1s, ZS6s, 9G1LZ.* **2300** *A9XU, CEs, CXs, EPs, FM7AV, HIs, HK0, JAs, LU, OA, ZD7WT, ZD9GF, ZEs, 9J2s, 9K2s, 9U5CM.*

14MHz. 0000 CE3XB. **0800** *FK8KAA* (BP 426, Noumea), ZD8YK. **0900** BV2B, FK8BY, HZ1LZ, KC6AQ, KC6SK, KL7s, UA0s, VKs, VR4DX, ZLs, 9N1MM. **1200** A9XCON, D4CBS, ZL1AXM, 4S7CF. **1400** VS9MB, 9L1BH. **1500** TA1ZB (QSL to W5QPX), W6s, 3B8DH. **1600** W6/W7s. **1800** A2CGD (QSL to SM3CXS), VP9HZ/MM (G8AXB). **1900** *ZS1CTR/MM* (on Cape to Rio race), 3B8AH. **2000** VP8OL, ZD7SD, **2100** *ZD7WT* (ex-ZD8TM). **2200** CXs, LUs, VE6s, VE8, XE.

21MHz. 0900 ETs, ZEs, 5N2, 9L1. **1000** A6, TR8VE, OE6DK/YK. **1300** 3B8CV. **1400** A4, C9M, LUs, ZEs, ZSs. **1500** HCs, HIs, SV0WZ (Rhodes—QSL to OE3NH). **1600** ELs, KZ5s, ZP.

28MHz. A few short skip signals plus the occasional LU and PY.

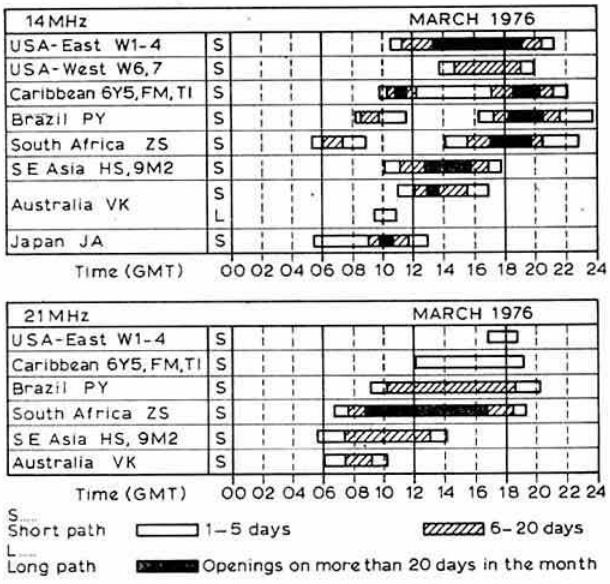
Many thanks to all correspondents, and also to the authors of the following for items obtained from their publications: the **Ex-G Radio Club** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6WA*), the **DXers Magazine** (*W4BPD*), **Long Skip** (*VE1AL/3*), the **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0TO*), and **CQ Magazine** (*W1WY*).

Please send all items for the **April** issue to **reach G3FKM** no later than **10 March,** and for **May** by **5 April.**

Propagation Predictions

During March the MUFs are almost equally divided between the northern and southern hemispheres as the spring equinox approaches. Traffic with the southern hemisphere will therefore improve compared to the winter months. Solar activity is still low, so **28MHz** will be of little importance for dx. Traffic with Africa might be possible in exceptional circumstances between 0900 and 1630gmt, there is an even smaller chance of traffic with South America between 1400 and 1600gmt. As summer approaches, traffic on 28MHz will increase through sporadic-E short-skip contacts over distances of about 700 to 1,800km.

The low sunspot activity and approaching summer mean relatively poor conditions on **21MHz.** This will be noticeable in traffic with North America: the east coast (W1-4) will only be heard during late afternoons of days with above average MUFs; the west coast including Hawaii and Alaska will not be heard. Only traffic with Africa is certain on this band.



Conditions on **14MHz** will improve as nights shorten and the band remains open longer. QSOs will be possible with all continents, but chances of dx via the indirect path will be very small at the time of the equinox. On days with markedly above-average MUFs there will be possibilities of dx with Hawaii between 1640 and 1830 gmt and with Alaska between 0830 and 1200gmt and between 1530 and 1830gmt.

DX will be possible during March on **7MHz** when the longer part of the path lies in darkness. Traffic with South America, Australia and South Africa will improve. QRM permitting, eastern North America will be heard from about 2100gmt. During the latter half of the night there will be interruptions as frequencies fall to low. The F2 MUFs at present are below 7MHz, so this band will frequently be interrupted by the dead zone during daytime.

The **3·5MHz** band will see a slight worsening of dx traffic compared to the previous months as QRM will increase slowly this month and continue throughout the summer months. During the latter half of the night (sometimes even sooner) local traffic will be interrupted by the dead zone.

The provisional sunspot number for January 1976 from the Swiss Federal Observatory was 8·5. Apart from some solar activity during the period 12-20 January the month was very quiet. Reports from ionospheric observatories mention MUFs below normal and low 2,800MHz solar flux values. The trough of the present sunspot cycle is now forecast as August 1976. Predicted smoothed sunspot numbers for May, June and July are 5, 5 and 4 respectively.

SWL NEWS

Continued from page 213

Dave Sharred, our 160m exponent, continues to thrive on good conditions and reports two new ones in the shape of PA0HIP/LX and YN1DW. Also heard was VK0EM but there is obviously some doubt about this one. He heard 18 countries on the band during January. Getaways however included HK0BKX and TI2CF.

Noel Phelps, apart from querying the legality of XZ2AD on 40m, praises 160m cw. Having a score of nil on 160m in December, Noel finished with 23, all on cw, thanks to some dedicated listening which produced KP4, KZ5, KV4, EA8, PJ2, YN1, JA3, and HC.

Andrew Glanville, A8849, has recently had some QSL cards printed and has been busily completing reports to send to distant dx stations. 1976 started well for him, hearing many countries during early January while on holiday from school.

An FRDX400 now graces the shack of Robert Maskill, BRS35454, and this has certainly been producing the goods, especially on 15m. Robert has put forward an idea which could be very beneficial to many SWLs: an "early warning system" by telephone to inform other listeners of dxpeditions and other rarities which may be on the bands. This may be an excellent opportunity for an swl to get the country which has evaded him for so long. Those interested are invited to write to Robert at 107 Swallows Meadow, Shirley, Solihull, West Midlands, B90 4PH, giving their telephone number and, say, their 10 most-wanted countries in which activity is possible. If sufficient listeners are interested, Robert will collate all the information and will no doubt circulate a list to those interested, thus enabling everyone to help someone else.

Finale

Your scribe trusts that all scores for the 1975 table have been included and that scores for the 1976 table plus news and comment will be forthcoming by 29 March for the May issue.

council proceedings

A brief report of the Council meeting held on 24 November 1975

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

Apologies for absence had been received from Messrs W. Green, A. E. Smith and R. Baker.

Raynet frequencies

Mr Balestrini reported that he had taken Council's recommendation on Raynet frequencies to the Raynet Committee and it had decided to use the frequencies 144·80, 144·825 and 144·875MHz.

Mr Parsons read a short note from the VHF Manager to the effect that in accordance with the Warsaw agreements there should be (i) no channelized nets below 145MHz and (ii) that the VHF Committee had recommended five channels for Raynet use between 145·3 and 145·5MHz.

Mr Balestrini explained that he had written to the VHF Manager and to the VHF Committee to the effect that the frequencies suggested by Raynet would only be used for (i) genuine emergency and (ii) emergency exercise, and that the frequencies would not be used at any other time.

Council approved the Raynet frequencies proposed by the Raynet Committee for use in emergencies and for emergency exercises only.

Swansea beacon

Mr Parsons reported that he had been in touch with the Swansea beacon keeper. Because the transmitter and logic were no longer available and the psu and aerial system belonged to Swansea University, the beacon was now off the air and the matter was closed.

Financial report

(i) **1974/75 accounts.** Mr Brown commented that staff costs were up by 40% and that when staff left, their replacements had received higher salaries.

He had no further specific comments on the accounts but invited questions, which he then dealt with.

(ii) **1975/76 (first three months).** Mr Brown said that income was on target, which was up on last year. The actual deficiency of £4,000 was approximately as estimated. The increased income from the new subscription would be felt gradually.

(iii) **Purchase of data processor.** Mr Brown said that the Finance & Staff Committee was considering the purchase of a data processor for handling membership records and orders for books; the machine under consideration being the IBM32. He said that this would, after the purchase of 35 Doughty Street, be the second most important decision the Society had made, and read a letter from IBM which gave great detail on various points. His proposed reply was discussed and, after modifications were agreed, the text was approved. The committee reserved its decision on purchase until after the proposed new subscription had been approved, subject to consideration of the weight of the machine, postage savings, operation and information from other users.

Honoraria for 1975

Council approved the payment of honoraria for services rendered to the QSL Bureau, Intruder Watch, beacon keepers, awards managers, slow morse transmissions, trophies and recorded lecture library.

Ballot for Honorary Member

Dr J. A. Saxton, CBE, President of the Society in 1970 and 1973, was unanimously elected an Honorary Member of the Society.

Membership, affiliation and representation

The General Manager said he considered the membership position was healthy.

It was decided that the whole position of reduced and waived subscriptions would have to be reviewed at the next meeting. A waived subscription was intended only for cases of real distress, and this point must be reinforced.

Three life membership applications were approved.

Affiliation was granted to the SE Kent YMCA Radio Club, UK FM Group (Western), Martlet Contest Group (Sussex), 1st Perthshire (Pitlochry) Scout Group Venture Scout Unit, Pioneer Radio Club, Edinburgh, and St Ives County Secondary School RC.

The appointment of Mr P. J. Sterry, G3CBU, as Area Representative for Basingstoke was accepted.

Licences

Mr Parsons said that the Society had done a lot of work and gone to a lot of trouble to secure a licence which did not include the cw requirement. A lot of work also went into securing the extension to 144MHz for the Class B licensees.

Mr Ward said these facts must be published to remind amateurs of the work the Society has done in this area.

Repeaters

Mr Parsons commented on the repeater meeting at Brunel University in October, which had been fully representative and lasted four hours. It was hard-hitting and promulgated a firm policy. A Repeater Working Group had been formed as a sub-committee of the VHF Committee and this would be a steering committee to make use of the experience built up by many repeater groups. Mr Parsons paid tribute to Mr Stevens' participation at the meeting, which he considered had forestalled a lot of future problems in the area of repeaters.

Mr Parsons went on to say that vhf topics were potentially troublesome and had been aggravated by the absence of the VHF Manager in Brussels.

Committee minutes and recommendations

Council accepted the minutes of the following committee meetings: Technical & Publications (5.8.75), IARU Working Group (4.9.75), Education (6.9.75), VHF (16.10.75), Raynet (13.9.75), Membership & Representation (15.9.75), Mobile & Exhibition (16.9.75, 7.10.75), HF Contests (18.9.75, 6.11.75), VHF Contests (25.9.75), Telecommunications Liaison (25.9.75), Finance & Staff (9.10.75).

Mr Scarr, chairman of the M & R Committee, said that the text of a booklet for young people had been completed but diagrams and photographs were still required. Mr Stevens agreed to get a cost estimate when he received the manuscript. It was agreed that the booklet be sold at a nominal price as a membership service for young persons.

Mr Hutchinson had asked the M & R Committee to clarify the position regarding the inclusion of club news items on GB2RS broadcasts. Some confusion had arisen as the committee had already recommended the procedure for such items in *Radio Communication* but not for the GB2RS news bulletin. It was agreed that only news from affiliated societies and groups should continue to be published in *Radio Communication* but that news from non-affiliated societies and groups could be accepted for the GB2RS news bulletin.

Special Event Stations

GB3MYC, 13-14 March

Nottinghamshire and Derbyshire District Methodist Association of Youth Clubs annual rally at Derby. Two stations active on all bands 80m to 2m ssb. Special QSL cards. Details from G3GQR, QTHR.

GB2US, week ending 3 April

Operational during week preceding University of Stirling Open Day. Visitors welcome on Open Day, Room B3, Pathfoot Building. Special QSL cards. Details from GM4DGT.

Looking ahead

25 April—Northern Radio Societies Association Convention and Exhibition, Belle Vue, Manchester.

8-9 May—International VHF Convention, Brunel University, Uxbridge, Middlesex.

28-30 October—Amateur Radio Retailers Association Exhibition, Granby Halls, Leicester.

raynet

P. Balestrini, G3BPT *

This month the Raynet Committee chairman relieves the resident scribe, and immediately takes the opportunity to thank all Raynet members for their good work, support and continued interest during the past year. The Raynet Committee met on 10 January and considered the following matters:

Frequencies
By agreement with the Council and VHF Committee, frequencies 144·8, 144·825, 144·850 and 144·875 will be classified as emergency channels. New groups are urged to adopt these channels and existing groups to change as and when possible. It is emphasized that these channels are for emergency and exercise purposes only and should NOT be used for ordinary QSOs.

Controllers
The committee formally approved the reappointment of all controllers in office for 1976 providing they hold a current registration card.

Repeaters
Our thanks to all repeater groups who replied to Raynet's request to have consideration given to Raynet being allowed to arrange a limited number of exercises during the year and to have access for genuine emergency use. The possibilities of Raynet and repeaters were amply demonstrated by the South Anglia Group by arranging an exercise via GB3PO. This was followed by a live alert during the gales of 3 January.

Extensive storm damage occurred throughout East Anglia, with a red alert being declared early on Saturday 3 January, followed by a full flood alert at 2200—the first alert of this magnitude since the 1953 floods. A constant net was maintained between 2130 and 0130, and during this period half-hourly information bulletins were transmitted to members and their status checked. The offers of help from non-Raynet members who were listening through GB3PO at this time were much appreciated.

During the same period the Norfolk Group were placed on full alert by the police and set up a link between divisional headquarters and Stalham, operating for some 2½ hours before being stood down. Liaison was maintained with the NE Suffolk Group and through them with South Anglia Group. During this period some 20 stations in south Anglia and some 30 stations in Norfolk were on standby... well done!

Raynet Net
On and after 7 March the Sunday 3·5MHz Raynet Net will be held at 10am on 3,690kHz; new time and frequency to attempt to ease the QRM problem.

Publicity
An appeal is made for any photographic material (B and W, slides or film), tapes of exercises/incidents or newspaper cuttings to enable the committee to produce a tape/slide/film lecture. This would be available on loan to groups for publicity or recruiting purposes. The committee read with interest the report on the recent exercise by the Kennet & Loddon Group. All exercise reports, newsletters etc are welcome, although due to the increased postal charges it is not always possible to acknowledge individual items.

Notice board
Groups looking for extra channel space are urged to take a long cool look at 70MHz, which is an excellent and underpopulated band. Help to preserve our allocations (USE or LOSE).

Have you ever knocked your head on a dark night during an exercise or incident? If not, it could easily happen! An sae to the supplies officer will bring details of an excellent lightweight protective helmet.

An appeal is made for members in the Lincolnshire area, letters to the honorary registrations secretary, please.

A lecture in Swindon is being organized by the Avon controller, details from the Swindon Radio Club.

As a result of requests, information on the organization and running of amateur emergency networks has been sent to Norway and Israel.

Membership cards are being reprinted; renewals will have space on the rear for a passport-size photograph.

The annual Norfolk Rally at Barford will take place on 13 June. Raynet will be featured at HMS Mercury on 20 June.

*"Merrivale", Willow Walk, Culverstone, Gravesend, Kent DA13 0QS.

obituaries

Mr H. G. Collin, G2DQ
Harry Collin, who died recently aged 73, was licensed in 1922 and joined the RSGB in 1930. A keen constructor, he was a winner of several RSGB competitions, an active member of Chelmsford ARS and a well-known personality on vhf.

Mr E. C. Cosh, G2DDD
Eric Cosh, who died on 26 January, was a keen constructor and experimenter and was among the first to build and use a stacked Yagi for uhf work. He was one of the pioneers of the 70cm band, and was interested in the pre-war activities on 5m. In the early 1960s he took part in experiments on 23cm.

Mr W. M. Herron, GI8GAW
Billy Herron died on 7 January at the age of 57. His interest in radio dated back to boyhood, although he had been licensed only a few years.

Mr R. C. Swann, G8BHI
Roger Swann died on 3 January. He had held a pre-war AA licence and was active on vhf/uhf from his QTH in the Southampton area until the day of his death.

Mr J. Weaver, G2FFT
Jack Weaver died on 11 January. He was a popular figure on the 80m band and will be missed by all the G5SN net.

Mobile rallies calendar

28 March—White Rose Rally, Lawnswood School, Leeds 16. Junction of A660/A6110. Talk-in on 2m ssb, G4DXA; 2m fm, G3FCW/A on S22 listening on R3(GB3NA); 80m ssb, G3XEP/A, 3·760MHz; all from 10am. Rally opens noon.
25 April—North Midlands Mobile Rally, Drayton Manor Park, Tamworth. Details from G8DEM, QTHR.
2 May—Spalding Tulip-time Rally, Gleed Boys School, Halmer Gardens, Spalding. All the usual attractions. Talk-in on 2m. Details from G3VPR, QTHR.
15 May—Region 11 Mobile Rally, Royal Lido, Prestatyn, Clwyd. Details later.
23 May—Welsh Mobile Rally, Barry Rugby Football Ground, Barry, S Glamorgan. Trade stands, raffles, club bar. Talk-in on 2m–S20, via GB3BC on R6 and ssb 144·3MHz.
23 May—Northern Mobile Rally, Victoria Park Hall, Keighley, Yorkshire.
30 May—Hull DARS Mobile Rally, College of Agriculture, Bishop Burton, near Beverley. Details from G3AGX, QTHR.
13 June—Elvaston Castle Rally, near Derby. Further details from P. Neal, G3WFU.
20 June—HMS *Mercury* Mobile Rally.
4 July—Upton Mobile Rally. Exhibition space and further details from G3TQD, QTHR.
18 July—Cornish Radio Amateur Club Rally, Cornwall Technical College, Camborne (venue to be confirmed). Details from G3NKE, QTHR.
30 July—1 August—National Mobile Rally, Alexandra Palace, London N22.
15 August—Derby & D ARS Rally, Rykneld Schools, Derby. Details from G3FGY, QTHR.
29 August—Torbay ARS Rally. (Venue to be arranged).
26 Sept—Harlow & D ARS Rally. Venue as last year. Date provisional.

contest news

National Field Day 1976 rules

The rules for NFD have been changed for this year's event. Because of falling support for many years, the double-station section has been dropped from the contest. However, there will still be two sections—an Open Section with few restrictions, and a Restricted Section with, among other things, a limit of only *one* aerial, (eg trapped dipole, long wire or trapped vertical) at a height of not more than 35ft above ground level. Full licensed power may be used in both sections.

The HF Contests Committee believes that the Open Section will appeal to the larger, well-equipped clubs and groups, while the Restricted Section will provide an excellent opportunity for the smaller, less-well-equipped clubs and groups to compete on equal terms.

These new rules were formulated after careful consideration and analysis of recent events by the HF Contests Committee, and have been approved by Council.

1. The general rules for RSGB hf contests, published in the January 1976 issue of *Radio Communication*, will apply. The provisions of General Rule 8 are modified by Rule 13.

2. Applications. Each group intending to compete must send in a properly completed application form to the RSGB HF Contests Committee, c/o D. Thom, G3NKS, 20 Bramble Close, Copthorne, Crawley, Sussex RH10 3QB, not later than 30 April 1976. Application forms are available from RSGB headquarters (ask for Form HFC 10/76); entries made other than on those forms will not be accepted.

The information required on the application form includes the following:

(a) Callsign of station.
(b) Section in which it is intended to compete.
(c) Name and address of the RSGB member responsible for the entry.
(d) Exact site location, ie six-figure National or Irish Grid Reference. In addition, entrants are required to give full site access information to enable a site to be located by station inspectors who may not be familiar with the district. Incorrect or inadequate information may be grounds for disqualification.

3. When. From 1700gmt Saturday 12 June to 1700gmt Sunday 13 June 1976.

4. Eligible entrants. Any group of RSGB members within the prefix zones G, GC, GD, GI, GM and GW. NFD is a multi-operator contest as provided for in General Rule 5(b).

5. Contacts. CW (A1) only in the 1·8, 3·5, 7, 14, 21 and 28MHz bands.

6. Sections. Entrants will compete in the Open or in the Restricted Section and will operate one portable station on one or more of the above six frequency bands.

7. Power. Entrants in each section may use licensed power.

8. Equipment.

(a) **Open Section.** Only one transmitter and a maximum of two receivers may be connected at any one time.
(b) **Restricted Section.** Only one transmitter and one receiver may be connected at any one time.
(c) **Both sections.** A transceiver is regarded as being the equivalent of a transmitter and a receiver.
(d) **Both sections.** The presence on the site of additional amplifiers or modified commercial equipment capable of excess power, may result in the entry being disallowed.

9. Aerials.

(a) **Open Section.** No part of any aerial shall be higher than 60ft above the ground.
(b) **Restricted Section.** Only one aerial is allowed and this is to be of wire as a single element, or a single-element vertical of pipe, tubing or wire. Trapped aerials are permitted. No part of the aerial shall be higher than 35ft above the ground, and have no more than two support points. Examples of permissible aerials are long wires, centre-fed dipoles and trapped verticals.

10. Installation. General Rule 4(b) applies.

11. Scoring. Points will be scored as follows:

(a) Fixed stations in the British Isles .. .. .. 1 point
(b) Fixed stations in the rest of Europe including Eire 2 points
(c) Fixed stations outside Europe .. .. .. 3 points
(d) Fixed stations in the British Commonwealth .. 6 points
(e) Portable and mobile stations in the British Isles 3 points
(f) Portable and mobile stations in the rest of Europe including Eire .. .. 4 points
(g) Portable and mobile stations outside Europe .. 6 points
(h) Portable and mobile stations in the British Commonwealth .. .. 12 points

A multiplier of two will be applied to the **TOTAL CLAIMED SCORE** for contacts on the 1·8 and 28MHz bands only.

12. Group contacts. Points must not be claimed for contacts made by a competing station with members of its own group, whether fixed, mobile or portable.

13. Entries. These are to be in accordance with General Rule 8, with the following exceptions:

(a) The normal cover sheet will not be used. Special cover and summary sheets will be sent to the person responsible for the entry.
(b) Points claimed must be totalled separately for each band.
(c) Entries must be sent to the RSGB HF Contests Committee, c/o D. Thom, G3NKS, 20 Bramble Close, Copthorne, Crawley, Sussex. RH10 3QB.

Entries sent to RSGB headquarters will not be accepted.

14. Trophies.

(a) National Field Day Trophy to the group competing in the Open Section having the highest checked score.
(b) The Bristol Trophy to the group competing in the Restricted Section having the highest checked score.
(c) The Gravesend Trophy to the group having the second highest checked score in the section having the greater number of valid entries.
(d) The Scottish NFD Trophy to the Scottish group having the highest checked score.
(e) The Frank Hoosen Trophy to the group with the highest checked score on the 14MHz band.
(f) Certificates of Merit to the groups having the highest checked scores on the 1·8, 3·5, 7, 21 and 28MHz bands.

15. Check logs. While overseas stations are not eligible to enter NFD, check logs are very welcome. A certificate will be awarded to the overseas station in each continent whose check log shows he has contributed the most points to competitors.

16. Inspections. All stations are subject to inspection by nominated representatives of the HF Contests Committee.

The Inspector's brief will be to ensure that the rules and spirit of the contest are being observed.

VHF NFD 1976 rules

There are three major changes in the rules for VHF NFD 1976, none of which should surprise anyone who read the commentary on last year's event. The date has been changed from September to July, mainly because the September IARU contest is on 2m only, so there is little Continental activity on the other bands. Chances of better weather and conditions in July also affected the decision.

Band multipliers have been reviewed after five years, so that the averages of last year's leading scores on each band become almost equal. Only the 70MHz multiplier has been drastically changed, and that should give more remote stations a better chance against groups who can score well on 1·3GHz. In order to encourage diversification on to other bands, single-station entries on 144MHz will no longer be accepted; single-station entries on other bands will be welcomed. The rules have been rewritten and condensed; references in square brackets [ ] are to the general rules published in the January issue of *Radio Communication*.

1. Duration. From 1600gmt 3 July to 1600gmt 4 July.

2. Bands. Up to four separate stations can be used, operating on the 70, 144, 432 and 1,296MHz bands. Only one station can score or give points on each band. Single-band entries on 144MHz will not be accepted.

3. Operators. Any RSGB member or group of members operating from the British Isles may take part (NB this excludes Eire). Two groups operating from the same site can combine their scores subject to Rules 2 and 4. Each group should send its own summary sheet.

4. Stations. All the stations forming one entry must operate from within a circle of 1km radius centred on the operating position of any of the stations. *Proof of permission to use a site may be required.* All equipment, including aerials, must be installed on the site during the 24 hours preceding the contest or during the contest. The site may not be used for any transmitting activities by the group or member during the five days before this time.

Stations may not use public supply mains. Power for all equipment must be derived from an on-site portable generator or battery.

5. Scoring.
(a) On the 70, 144 and 432MHz bands, contacts will be scored by radial rings [7a].
(b) Contacts on 1·3GHz will be scored at one point per kilometre.
(c) The following multipliers will be applied to the total score on each band: 70MHz—3, 144MHz—1, 432MHz—6, 1·3GHz—1.

6. Contest exchanges.
(a) Contestants must exchange both callsigns, signal report, serial number (starting at 001 on each band), locator and QTH [11]. Only one scoring contact on each band may be made with each station [10a].
(b) The QTH given on 1·3GHz must differ in form from that given on other bands, eg a location given as "10km north of Marlborough" on 432MHz could be given as "8km south-east of Swindon" on 1·3GHz.
The 1·3GHz station may operate on any other band for the purposes of arranging a contact, but the exchange of contest information must take place on 1·3GHz only and may not be interrupted by recourse to another band. CQ calls on another band should clearly be "for 1·3GHz only".

7. Entries
(a) All entries must be postmarked not later than *19 July 1976*.
(b) Separate sets of logsheets and 427 cover sheets are required for each band.
(c) A summary sheet must also be completed. Otherwise the scores on each band will be listed but the total will not appear in the overall results table.
(d) Entries must be addressed to: The Chairman, VHF Contests Committee, 83 Portway, Didcot, Oxon OX11 0BA.

8. Other rules. The following general rules will also apply: [5a, 6a, 9a, 10a, 11-22.]

9. Awards.
The Surrey Trophy will be awarded to the overall winners, and Certificates of Merit will be awarded to the overall runner-up, the leading entry from each country and the highest scoring station on each band. The Tartan Trophy will be awarded to the leading Scottish entry.

Listeners' Contest rules

A listeners' contest will take place at the same time as VHF NFD. Each band will be treated as a separate event. Listeners' contest rules 1-6 (January *Radio Communication*) will apply.

3·5/7MHz low power contest 1976 rules

Stations situated in outlying regions may be tempted to enter this year's low power contest with the inclusion of 7MHz, as might those lacking sufficient space for a good 3·5MHz aerial. The QSO potential should be higher, and note the changes in the scoring system designed to improve the handicap at the 5W end, while the 1W minimum is more in keeping with 40m QRM. Comments will be welcomed.

1. The general rules for RSGB hf contests, published in the January 1976 issue of *Radio Communication*, will apply.

2. When. 0900gmt to 1600gmt on Sunday 11 April 1976.

3. Eligible entrants. Single-operator stations only.

4. Contacts. CW (A1) only in the 3·5MHz and 7MHz bands. County code letters as published in the January issue of *Radio Communication*, or the location, must be sent.

5. Scoring.

Max power	1W	2W	5W
Points	100	50	20

6. Logs. Column 5 must be headed "My power" and column 6 "Location". Separate log sheets should be used for each band.

7. Entries. To RSGB HF Contests Committee, c/o D. S. Booty, G3KKQ, 139 Petersfield Avenue, Staines, Middlesex.

8. Awards. The 1930 Committee Cup will be awarded to the winner and certificates will be sent to the leading three entrants.

70MHz Open Contest rules

0900–1700gmt, 4 April

All entries and checklogs to: VHF Contests Committee, c/o Mr M. T. Deacon, G3XHU, 94 Hermon Hill, South Woodford, London E18.

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

1·3GHz Open Contest rules

1600–0100gmt and 0500–1600gmt, 24–25 April

All entries and checklogs to: VHF Contests Committee, c/o Mr W. J. McClintock, G3VPK, "Maple Leaf", Great Braxted, Witham, Essex CM8 3EJ.

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

432MHz Open Contest rules

1600–1600gmt, 1–2 May

All entries and checklogs to: VHF Contests Committee, c/o Mr F. Mathews, G8ACJ, "Easedale", Woodway, Merrow, Guildford, Surrey GU1 2TF.

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

The 1951 Council Cup will be awarded to the leading station.

432MHz Listeners' Contest rules

Listeners' contest rules 1–6 will apply (January *Radio Communication*).

Grafton Radio Society Top Band Contest

The rules are similar to those for last year's contest.

Phone a.m., 20 March; cw, 27 March; ssb, 3 April.

Logs, postmarked no later than 18 April, to G8FQM, QTHR, from whom further details may be obtained.

In last year's contest, certificates were won by GM3YOR (1st), G3ZJK (2nd and a.m. winner), G3ZYY (ssb winner), and G3XWZ (cw winner).

December 144MHz Fixed Contest results

This end-of-the-year event continues to remain popular, with entries up on last year. Above-average conditions, contrary to some comments, led to much higher scores. At times ducting was in evidence to the south and east.

Signal quality in some cases still leaves something to be desired and much can be said for using a visual means of monitoring to avoid this problem. In a fixed-station environment a simple down-converter and 'scope can ensure freedom from flat-topping.

In the Open Section, certificates go to Martlesham Radio Society and G4DML/A. A certificate of merit is awarded to G8FDK who, in spite of a self-imposed three-hour handicap, had the highest single-operator score and third place overall.

The introduction of a non-ssb section was welcomed, so this may be repeated in other 144MHz events. Modes used were a.m., fm, pm or cw. In the case of the leading station G4BWG, both pm and cw were used, and runner-up G3NHE used cw exclusively: certificates go to both.

G3VPK

OPEN SECTION

Posn	Callsign	Op	Score	QSOs	QRA	DX	ERP Km	ERP dBW
1	G4BPO	M	2,660	282	AM77	DB4OJ	720	37
2	G4DML/A	M	2,550	252	AM18	DC6XL/M	645	38
3	G8FDK	S	2,035	182	XK39	DB3ES	804	36
4	G8PY	M	1,500	268	ZM05	F1BYM	920	29
5	G3KMI	M	1,429	203	ZK04	F1DGD	804	34
6	G4EJM	M	1,346	239	YN80	F1FG	890	28
7	G3PIA	M	1,304	243	ZL34	GM8ILO	—	30
8	G3UKC	M	1,280	176	AL56	DJ7CL	610	32
9	GW4CQT	S	1,184	160	YL25	F1CYO/P	787	32
10	G4DGU	S	1,183	189	ZL24	DJ7JC	585	29
11	G4BEW	S	1,084	120	AM27	DJ7CL	650	28
12	G3JXN	S	1,076	200	ZL39	F1BYM	765	31
13	GW3XJQ/A	M	1,047	121	XL26	PA0BWL	660	31
14	G4CWW	M	1,046	201	YM40	F1BUU	760	27
15	G3DY	S	1,039	171	ZM40	F1DZL	698	29
16	G4CBZ	M	999	200	ZM68	F1AJD/P	665	34
17	G4CDF	S	995	163	ZN37	F1FO	650	31
18	G4CZP	S	979	157	YO77	G8IXN	470	34
19	G3WOH	M	964	168	YN47	G3CHN	365	32
20	G8IQO	M	917	93	AK12	DJ7CL	615	31
21	G8AYN	M	814	166	AL41	DJ7CL	645	27
22	G3GZJ	S	765	77	XK65	G4BPO	480	31
23	G4CTF	M	753	165	ZM41	F1DBB	411	34
24	G8GHZ	S	751	150	ZM66	GM8HXQ	425	27
25	G8FBL	S	748	146	ZM21	G8FDK	293	28
26	G8GXE/A	M	738	152	ZL36	G8JAB	372	26

Posn	Callsign	Op	Score	QSOs	QRA	DX	Km	ERPEP dBW
27	G8CQA	M	702	140	YL10	GI3GXP	355	37
28	G3XFW	S	690	122	YK07	G4DML/A	350	25
29	G3UGF	S	679	130	ZN11	G8BQX	—	30
30	G3ZIG	S	678	92	AM35	DJ0JEA	495	25
31	G4BSP/A	M	676	134	ZN53	G8KPE	311	30
32	G8CSA	M	669	172	AL31	G3PPT	380	25
33	G6UW	M	618	110	AM61	F1FO	454	25
34	G3FPK	S	617	92	ZL60	F1BYM	758	30
35	G3JKB	M	616	165	ZL28	G3PPT	360	22
36	G4ALG	S	614	126	ZL46	F1AJD/P	645	26
37	G3USF	S	610	126	YN79	GC2FZC	395	19
38	G8HQW	S	599	127	YN29	F1AJD/P	900	28
39	GC4CSO	S	595	69	YJ48	G4DML/A	460	28
40	G4DYP	S	594	130	ZM21	PA0VV	460	22
41	G3ERN	M	593	129	AL11	F5ZA	410	23
42	G3HOX	M	584	124	YN40	EI9Q	361	27
43	G8AUN	S	580	82	AM37	DJ7JC	425	26
44	G8DOU	M	553	104	YO77	G8FDK	395	28
45	G8DMU/A	M	527	110	Z073	G8GMW	285	29
46	G3LCH	S	519	147	ZL50	G3BW	406	29
47	G3OHM	M	518	130	ZM41	G3BHW	253	31
48	G4EHW	M	508	105	ZM39	G8FDK	360	26
49	G3ZME	M	501	120	YM28	G3PPT	310	27
50	G3XBF	M	500	132	AL31	G8HVH	380	27
51	GC4EON	S	488	55	YJ48	G4DML/A	480	27
52	G8HHI	S	487	114	ZL56	G8HYF/P	310	23
53	G8KEN	M	476	79	AL76	F1DPC	540	24
54	G8HAF	S	472	92	ZN44	G8FDK	377	31
55	G4APD	M	463	112	ZM55	G3PPT	354	20
56	G2FJA	M	454	104	AL43	G8JYR/P	340	26
57	GC3YIZ	S	436	56	YJ48	G4DML/A	460	30
58	G2BLA	S	433	94	ZL20	F1BYM	785	28
59	GW3UCB	M	432	76	XN70	GM8BDX	299	37
60	G3UER	M	425	94	ZN35	PA0VV	396	31
61	GM8HXQ	M	394	52	YP11	G4DGU	485	38
62	G8CQW	M	385	103	ZM35	GW4DRR	255	31
63	G8IWA	M	382	68	ZN18	PA0VV	373	23
64	G3UHF	M	381	113	YN49	G8HVY	328	27
65	G3BPM	S	376	104	ZL48	ON6NI	380	20
66	GI8EWM	S	371	47	XO21	G8FDK	433	33
67	G3SXY	M	370	70	YL47	G8DMU/A	288	19
68	G8GIY	S	369	98	ZN73	G3JVU	—	29
69	G4CEQ	S	368	107	ZL60	GW3XJQ/A	335	20
70	G8IZU	S	367	90	ZM57	PA0VV	350	20
71	G8HOW	S	363	116	ZL39	F6CJF	470	25
72	G8BQB/A	S	357	59	YK05	G4DML/A	375	18
73	G8IMV	S	336	88	ZL38	G8JYR/P	312	21
74	G8JRW	S	335	63	ZK17	F6CJF	405	28
75	G8IXO	M	325	124	ZL29	PA7PLY	365	19
76	G3RYV	S	324	95	ZL37	G3GZJ	350	29
77	G8KKX	S	296	67	ZM58	F1DBB	382	19
78	G8CUP	S	287	59	ZN06	G3KMI	330	19
79	G8KAX	S	264	73	AL32	F6CJF	485	24
80	G3JFY	S	263	53	ZL73	F5ZA	280	16
81	G3WKS/A	M	260	68	AL71	DJ7CL	560	30
82	G4EKJ	S	222	38	ZN03	G3UKC	340	22
83	G8GHR	M	221	53	ZL09	G4CZP	280	32
84	G8KRT	M	205	57	ZN12	G3BHW	352	31
85	G8JWM	S	175	40	ZN40	PA0VV	340	21
86	G4AVV	S	165	101	ZL50	F1DRR	310	19
87	G8IZY	S	164	62	ZL80	G8PY	216	18
88	GM8CMV	S	138	38	YQ56	G3GZX	325	30
89	GC8JKS	S	107	16	YJ48	G4CWW	325	30
90	G8HQR	S	106	30	YK07	G3OSS	180	23
91	GM8KIE	S	68	25	YQ45	G8HPW	200	20
92	GM8AKB	S	60	26	YP14	G3OHM	385	21
93	GM5BCI	S	37	17	YP19	GI8EWM	170	—

NON-SSB SECTION

Posn	Callsign	Score	QSOs	QRA	DX	Km	ERP dBW
1	G4BWG	498	119	ZL50	G4CZP	380	30
2	G3NHE*	356	56	ZN54	GM3ZSS	405	27
3	G5UM*	332	52	ZM35	GM3ZSS	510	23
4	G4DLB	289	63	ZM74	G4CZP	253	24
5	G8IXG	261	74	ZL46	F1DBB	282	27
6	G5DF*	227	35	ZL45	G3BW	375	27
7	G8IOE/A	161	53	ZL76	F1COL/P	460	30
8	G8FDL/A	127	83	YN28	GW3HGL/M	103	20
9	G2WS*	121	23	YL56	G5YV	285	25
10	G8FKI	112	39	AL13	ON4DW	230	22
11	G8KNW	83	57	ZL50	G8HQY	220	16
12	G4DSP	77	27	ZM20	GW8IDA	195	22
13	G3YXN	72	35	AM51	G8IOE/A	210	25
14	GW8IDA	44	16	YN65	G4DSP	195	19
15	G8KDL	43	37	ZL39	G3ST/A	53	17
16	G8JBH	18	16	ZL29	G8IXG	52	19
17	G3RQJ	15	9	AL51	G8IXG	75	17

* Used cw exclusively

Check logs received from G2HH, G3JFO/P, G4AEZ, G8HYF/P, G8IDP, G8JYR/P, and G8KNL/P.

August 1975 70MHz Portable Contest results

Twenty-four entries were sent in for this contest, and a good number had ssb available—it was reported that there were approximately 40 stations active on this mode. Reports of band conditions varied, with paths being rather erratic, but judging from the best dx worked the N–S path was quite good. The Southgate Radio Club won this contest from a QTH near Whitby, and GW3WRA, operating from Gwent, was a joint effort of G3WRA and G4CNY.

G4CUT

Posn	Callsign	Score	QSOs	Cnty	Best dx	Km	A1	A3	A3J
1	G3SFG	788	79	YSN	G4ADV/P	540	15	—	50
2	GW3WRA	626	86	GWT	G3JYP/P	323	50	—	100
3	G3UKV	620	94	SLP	GM3ZBE	517	50	40	100
4	G4ADV	611	45	CWL	G3SFG/P	540	—	10	—
5	G3NKL	569	71	LNH	G4ADV/P	456	25	—	100
6	G3WOS	496	70	LCS	G4ADV/P	490	20	—	80
7	G4KF	471	71	ESX	G4ADV/P	445	20	—	50
8	G4BOX	440	78	BRK	G3JYP/P	380	50	—	70
9	G3JYP	435	46	NLD	G4DZO/P	455	50	—	100
10	G4ALG	412	78	OFE	G3JYP/P	372	50	—	100
11	G4DZO	374	62	SXE	GD2HDZ	460	20	20	?
12	GC3WMR	372	36	JER	G4AIR	425	25	25	?
13	G3ZKA	297	43	DOR	G3SFG/P	424	15	?	15
14	GW3SNN	287	39	GWT	G3SFG/P	315	50	?	50
15	G3RQZ	243	31	SXE	G4ADV/P	435	50	?	50
16	G3WHL	208	36	YSS	G4ADX/P	467	50	—	90
17	G3WIE	196	26	SOM	G3SFG/P	395	45	45	—
18	G3VPF	189	31	—	G3SFG/P	423	20	—	40
19	G3BTO	162	24	HPH	G3JYP/P	420	10	10	—
20	G3OQT	151	29	—	G3DAH	325	20	—	40
21	G5HD	147	17	—	G3DAH	355	20	—	—
22	G3CDG	142	23	GLR	G3JYP/P	325	25	25	—
23	G3ZXD	140	26	—	G3SFG/P	360	—	25	—
24	G4ALE	31	11	SXE	G3WOS/P	280	10	10	—

Check logs are acknowledged from G3TR and G4CIK.

Contests calendar

6-7 March	ARRL DX (Phone)
6-7 March	144MHz Open & Listeners (Rules in February issue)
6-7 March	ARRL DX (Phone)
13-14 March	Commonwealth (Rules in November issue)
20-21 March	ARRL DX (CW)
20 March	Grafton (a.m. phone)
27 March	Grafton (cw only)
27-28 March	CQ WW WPX SSB
27-29 March	BARTG Spring RTTY
3 April	Grafton (ssb only)
3-4 April	70MHz Open (Rules in March issue)
11 April	3·5MHz LP
24-25 April	1·3GHz Open (Trophy) (Rules in March issue)
24-25 April	PACC
24-25 April	Bermuda Phone
1-2 May	432MHz Open & Listeners (Trophy) (Rules in March issue)
8-9 May	Bermuda CW
29-30 May	144MHz Portable
12-13 June	HF NFD (Rules in March issue)
19-20 June	Microwave
26-27 June	Summer 1·8MHz
3-4 July	VHF NFD & Listeners (Rules in March issue)
18 July	3·5MHz FD
25 July	144MHz QRP
7-8 August	70MHz Portable & Listeners (Trophy)
4-5 September	144MHz Open & Listeners (Trophy)
4-5 September	SSB FD
2-3 October	UHF/SHF
9-10 October	21/28MHz
16-17 October	7MHz CW
24 October	70MHz Fixed
Oct-Nov	432MHz Cumulatives
6-7 November	144MHz CW
6-7 November	7MHz Phone
13-14 November	Second 1·8MHz
5 December	144MHz Fixed

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 27 March for the May issue.

REGION 1—RR B. O'Brien, G2AMV, "Tanglewood", Anthony's Way, Heswall, Wirral, Merseyside, L60 0BP.

Ainsdale (AARC)—Thursdays fortnightly, 8.15pm. 11, 25 Mar, 8, 22 Apr, 6 May. Ainsdale Scout Headquarters. Further details from G2CUZ.

Blackburn (East Lancs ARC)—4 Mar (Surplus equipment sale), 1 Apr (Visit to Shorrocks Security Alarm Systems works at Shadsworth. Names to sec at least one week before the visit. Numbers are limited), 6 May (Visit by RR, G2AMV). First Thursday of each month (excluding August), 7.30pm. YMCA, Blackburn. Visitors welcome. The club is now working on a project for the summer including converting a caravan into a mobile shack and workshop for use on both vhf and hf bands. It is hoped also to include cooking and sleeping accommodation.

Blackburn (North Western Repeater Group)—Third Thursday of each month, 8pm. The Grey Mare, Blackburn. Visitors welcome. Full details from G8HQW. Membership is now 70 and an application for a repeater at Hambledon Hill, near Burnley, has been submitted to the Home Office.

Blackpool (B&DARS)—Mondays, 8pm. Pontins Holiday Camp, Squires Gate. Morse tuition 7.30pm.

Bolton (B&DARS)—Third Wednesday in each month, 8pm. Clarence Hotel, Bradshawgate. Sec G4AQB.

Bury (BRS)—At the AGM in December it was decided to alter the name of the club to the Bury Radio Society. A new committee was formed, headed by the hardworking Mike Horrocks, G8GTP, who was re-elected, and a new sec, the very popular John Clifford, G4BVE. It looks like being a good year for the club. Subs have gone up to £5 a year (under 18 years and over 65 years £2.50). 8 Mar ("Speech processing" by Dr D. A. Tong, G8ENN), 13 Apr (A talk by RR, G2AMV). A new "Feedback newsletter" has been introduced by G4AOS and G4BVE; it is very good indeed and is free to members. Second Tuesday of each month, and informal meetings every Tuesday, also RAE classes and morse tuition. Sec John Clifford, G4BVE, 10 Arley Avenue, Bury, Lancs, tel 061 764 3466.

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 first Tuesday in month. YMCA Chester. Full details from GW8DMR.

Douglas IoM (IoM ARS)—Mondays fortnightly. Highlander Inn, Crosby. Visitors welcome. Sec GD2HDZ, tel Laxey 465.

An area representative, R. J. B. Morgan, GD3KGC, has been nominated for the Isle of Man.

Eccles (E&DARC)—Tuesdays, 8pm. Bridgwater School, Worsley, Manchester. Club 2m net, 11am Sundays on 145·66MHz. All visitors and prospective members welcome. Sec G4AEQ.

Lancaster University (UoLARS)—Wednesdays, 7pm. Furness College. RAE and morse classes. The society is active on the hf bands and 2m using G3ZBY and G8DOU. Skeds and visits welcomed; enquiries please to Colin Pegrum, Department of Physics. Local members are asked to look out for the Lancaster net on 3·71 MHz at 1900gmt every Friday. Further details may be obtained from G2FAS.

Leyland (LHARG)—Second Monday in each month, 7.30pm. "Rose & Crown", Ulnes Walton, Leyland. Net nights Saturdays 2000gmt on 145·8MHz. Details from G3XII.

Liverpool (L&DARS)—Tuesdays, 8pm. Conservative Association Rooms, Church Road, Wavertree. Sec G3WCS.

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

Liverpool University (UoLARS)—Details of meetings from J. M. Pagett, G8IAV, c/o The Students Union.

Manchester (M&DARS)—3 Mar ("Valves" by Barrie Langfield, G3IOA), 10 Mar ("Power distribution" by Peter Smith, G8ARI), 17 Mar ("Steam versus diesel" by G. Kennedy), 24 Mar ("Oscilloscopes" by Eric Horne, G8IYX), 31 Mar (Junk sale). Wednesdays, 7.30pm. 203 Droylesden Road, Newton Heath, Manchester 10. Sec G8IYX.

Manchester (South Manchester RC)—5 Mar (Visit to the Civil Aviation Authority), 12 Mar ("Space communications" by P. Hughes, G8IPT), 19 Mar (Visit to Madewel Products Ltd, fire alarms), 26 Mar ("TVI" by S. Torkington), 2 Apr ("VK6" by M. Ware, G4BJT/VK6MW), 9 Apr ("Vacuum" by A. Errock, G3HCO), 16 Apr (Natter-nite), 23 Apr (NRSA quiz, qualifying round), 30 Apr (Home-built equipment contest). Fridays, 8pm. Sale Moor Community Centre, Norris Road, Sale, Cheshire. Morse practice precedes the lectures. Visitors are welcome. Hon sec G8GDM.

Manchester University (MUARS—G3VUM). Interested parties should contact G4AOS, 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 G8GOS.

Preston (PARS)—11, 25 Mar, 8, 22 Apr, 6 May. Morse practice 7.30pm, main meeting 8pm. "Windsor Castle" (private room), St Paul's Square, Preston.

Salford (Dial House RS)—Wednesdays, 5.30–9.30pm. Dial House, W45, 55 Portland Street, Manchester M60 1BA. Net channel 145·25MHz a.m.—most members are now mobile on this channel, and the club station G3WDH now monitors this frequency every club night for calls from any other station. Sec G8JCN.

Stockport (SRS)—Second and fourth Wednesdays in each month, 8pm. Blossoms Hotel, Buxton Road, Stockport. Sec G3FYE.

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 "Gardener's Arms"), Thornton. Details from sec G8OY.

UK FM Group (Western)—Monday 15 Mar, 8pm, "The Legh Arms" (private room), Chelford Road, Knutsford, Cheshire. Monday 12 Apr, 8pm, "The White Lion Inn", Pen-y-mynydd, Nr Mold, North Wales. Saturday 24 Apr, 9am, the University of Aston in Birmingham (Byng Kendrick Suite), Gosta Green, Birmingham 4—national meeting for fm enthusiasts. Further details from G3LEQ.

Warrington (W&DARS)—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall. Sec J. Weaver, c/o Grappenhall Community Centre.

Wigan (W&DARS)—First and third Wednesdays of each month—meetings are no longer held on Tuesdays. Poolstock Cricket Club, Keats Avenue, Poolstock. New sec A. Cunliffe, G4EII, 50 Langholm Road, Garswood, Wigan.

Winsford (Mid-Cheshire ARC)—Wednesdays. Technical Activities Centre, rear of Verdin Buildings, 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.

Wirral (Wirral DXA)—Members or visitors, who will be welcome, should contact sec G3VZM for details of meetings.

Merseyside members meet for lunch on the first Monday in every month. Please obtain details and book beforehand with G3VQT or G2AMV.

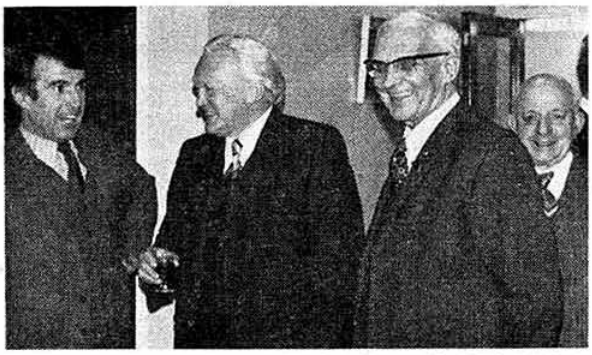
The Belle Vue Convention is being held on 25 April.

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

Barnsley (B&DARS)—Fourth Friday in each month, 7.30pm. King George Hotel, Peel Street, Barnsley. Hon sec G3LRP.

Doncaster (D&DARS)—Mondays, 7.30pm. Doncaster Technical College Refectory, Watergate, Doncaster, Chairman G3KBU.

Halifax (Northern Heights ARS)—7.45pm. Peat Pitts Inn, Ogden, Halifax (four miles north of Halifax Town Hall). Hon sec G3MDW.



Some leading members of the Scarborough ARS at their annual dinner. Left to right: Ted Fletcher, G4EGB, chairman; John Cutter, G3VAN, secretary; Cyril Ginders, G3XHA, president; Charles Whitaker, pro

Hull (H & D ARS)—Fridays, 7.30pm. 592 Hessle Road, Hull (nr flyover). Our third mobile rally plans are now being finalized. Same venue—College of Agriculture, Bishop Burton, Beverley. Attractions for the whole family. Organizer, G3AGX.
Leeds (White Rose RS)—10 Mar ("Digital frequency meters" by G8EFF), date to be arranged ("GB3NA, its construction and function"). Preparations are now in hand for a rally to be held at Lawnswood High School on 28 Mar. Wednesdays, 7.30pm (lectures start 8pm). 83 Town Street, Armley, Leeds. There is a current programme of operating activity sessions. New members and visitors welcome. Hon sec G3VTY.
Scarborough (SARS)—Fridays, 7.30pm. Scarborough Technical College, Corby Road, Scarborough. Hon sec Charles Whitaker, 1 Rye Field Close, Eastfield, Scarborough.
York (YARS)—Fridays, 7.30pm (except for the third Friday in the month). United Services Clubroom, 61 Micklegate. During the AGM the following officers were elected: president, G3TMN; chairman, G3WQM; vice-chairman, G3FTS; sec, G3WVO; committee, G3XFM, G8BOK, G3WHH, G4ELR. An interesting programme is being worked out for the coming year including visits, exhibition stations, talks, annual dinner. Special QSL cards are still available free for any callers, or send an sae to hon sec G3WVO.

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

Birmingham (Midland ARS)—16 Mar, 13 Apr ("History of the amateur licence" by Fred Ward, G2CVV). 8pm. Please check venue of meeting with G3ZKQ, tel 021-427 3088.
Birmingham (Slade R&SS)—5, 19 Mar, 2, 16, 30 Apr. 8pm. The Committee Room, Church House, Erdington, Birmingham. G8GRC.
Birmingham (South Birmingham RS)—First Wednesday in each month, 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. G8GDZ.
Birmingham (Birmingham University RS)—Every Tuesday during term, 7.30pm. Students' Union. G3IUB, QTHR. Sec G4BVF.
Bromsgrove (B&DARC)—12 Mar (AGM), 9 Apr (Audio evening). 8pm. Avoncroft Art Centre, Bromsgrove. Sec J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove.
Coventry (CARS)—Fridays, 8pm. Baden Powell House, St Nicholas Street, Radford, Coventry. G8DMI.
Coventry Technical College (CTCARS)—Mondays, 7pm. Morse classes and rtty included in club activities. Winfray Annexe of the College. G8ISJ.
Dudley (DARC)—Second and fourth Tuesdays in each month. 7.45pm. Central Library, Dudley. G4BFT.
Hereford (HARS)—First and third Fridays in each month. Civil Defence HQ, Gaol Street, Hereford. G4CNY.
Lichfield (LARS)—16 Mar (Natter-nite), 5 Apr (AGM—all present and prospective members urged to attend). 8pm. Swan Hotel, Bird Street, Lichfield. Sunday net 12 noon, 21·150MHz. HF and vhf contests planned. G3NLY.
Lichfield (Chad RC)—Meetings fortnightly commencing 11 Mar at Swan Hotel pending return to Lichfield Fire Station. Informal discussions and contest activity. G4ESK/G8FBL.
Mid-Warwickshire (MWARS)—1 Mar (Tape and slide show), 15 Mar (Discussion on Town and Country Festival 1976), 5 Apr. 8pm. 61 Emscote Road, Warwick. G8CXL.
Redditch (RRC)—Second and fourth Thursday in each month. 8pm. The Old People's Centre, Park Road, Redditch. G3EVT.
Solihull (SARS)—16 Mar (Auction sale of surplus equipment), 20 Apr ("Practical demonstrations of eliminating tvi" by Fred Ward, G2CVV). 7.30pm. The Manor House, High Street, Solihull. G4AXW.
Stoke-on-Trent (S-on-TARS)—Thursdays, 7.30pm. 2A Racecourse Road, Oakhill, Stoke-on-Trent. G4CWN.
Stoke-on-Trent (North Staffs ARS)—Mondays, 7.30pm. Lectures, natter-nites, hf and vhf stations. Harold Clowes Community Centre, Bentilee, Stoke-on-Trent. G8KVM.
Stourbridge (S&DARS)—2 Mar, 6 Apr, 4 May (Informals, 9pm, at "Shrubbery Cottage" public house, Heath Lane, Stourbridge), 15 Mar (AGM), 12 Apr (Travel slides). 7.45pm. Longlands School, Brook Street, Stourbridge. G4CLX.
Sutton Coldfield (SCRS)—Second and last Monday in each month. 7.30pm. Central Youth HQ, Clifton Road, Sutton Coldfield. Sec Norman Sanderson, 130 Willmott Road, Sutton Coldfield B75 5NW.
Telford (T&DARS)—3, 10 Mar ("The national grid and local electricity supply distribution" by G4AUZ), 17 Mar (Workshop practice), 24, 31 Mar (AGM), 7 Apr (Natter-nite and club station), 14, 21, 28 Apr. 7.30pm. Phoenix Centre, Dawley. G4AXZ.
Wolverhampton (WARS)—1 Mar ("Short wave listening" by Bill Millerchip), 8 Mar (Natter-nite), 15 Mar (Visit to Goodyear's tyre factory, 7pm), 22 Mar, 5 Apr ("Loudspeakers" by Bob Riding, G3JZG), 12 Apr (Natter-nite), 3 May (Home-built gear competition). 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. G8BSR.
Worcester (W&DARC)—1 Mar (Introduction to amateur radio for new members), 20 Mar, 5 Apr (Construction contest), 17 Apr (Informal gathering at club shack, Droitwich), 3 May ("Interference and the Post Office" by Mr A. Pidgeon, PO Radio Protection Service). 8pm. The Old Pheasant, New Street, Worcester. The club will take part in the CQ WPX Contest, 27 and 28 Mar. G4BXS.

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

Derby (D & DARS)—6 Mar (Surplus sale), 10 Mar ("Radiophone" by C. Burton, G4ELO), 17 Mar (Film night), 24 Mar (AGM), 31 Mar ("Stabilized power supplies" by Si Oxley, G8MW—joint meeting with other members of the East Midlands Radio Group), 21 Apr ("Direction finding, a practical demonstration"), 28 Apr ("My trip to South Africa" by F. C. Ward, G2CVV). 7.30pm. Club headquarters, 119 Green Lane, Derby. G2CVV.
Derby (NHCAARG)—5 Mar (Tape and slide lecture, "Aerials"), 12 Mar ("Data transmission codes" by Paul Northover), 19 Mar ("Some simple circuit ideas"—ideal for beginners), 26 Mar (Construction competition), 2 Apr (Group project—"A two-tone

The president of Coventry Technical College ARS, Mr R. A. Arculus (college principal), visited the special event station GB2CTC on the occasion of the 40th anniversary of the college in December, and is seen here, (second from left) with G8FFN, G4BFP and G8LBI. *Photo: G3WCQ*

oscillator for ssb power measurement" by Alan Roberts, G3VKH), 9 Apr (Surplus sale by auction), 23 Apr ("Ceefax", a lecture and demonstration by Paul Northover), 30 Apr (Rally 76, open forum, progress and planning). 7.45pm. Room 7, Nunsfield House, Bolton Lane, Alvaston, Derby. G4CTZ.

Grimsby (GARS)—Alternate Thursdays. Room 3, Grimsby Community Centre. Further information from G. J. Smith, G4EBK, 6 Fenby Close, Grimsby.

Leicester (LRS)—15 Mar ("FM techniques"), 5 Apr (To be arranged), 3 May (Constructors contest). Mondays, 7.30pm. Gilroes Estate Cottage, Groby Road, Leicester. G3TQF.

Lincoln (LSWC)—Wednesdays, 7.30pm. Lecture Room, Lincoln Astronomical Society, Westcliffe Street, off Burton Road, Lincoln. G4DBS.

Mansfield (MARS)—First Friday in each month, 7.45pm. The New Inn, Westgate, Mansfield. G3XWZ.

Melton Mowbray (MMARS)—19 Mar ("Dxpedition" by members of Nottingham Radio Club), 16 Apr (To be arranged). 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. G3NVK.

Nottingham (ARCoN)—4 Mar (Forum), 11 Mar (Display of equipment by G3YBO), 18 Mar (Activity night), 25 Mar (Debate—"Home brew or commercial", also last date for nominations for committee), 1 Apr (RSGB tape lecture), 8 Apr (Forum), 15 and 22 Apr (Activity nights), 29 Apr (AGM). 7.30pm. Woodthorpe House, Mansfield Road, Nottingham. G4EKW.

Spalding (S&DARS)—5 Mar ("Electronic keyer" by G3KHZ, and "Advanced df techniques" by G3MMS, a great double feature programme), 2 Apr (Constructional contest), 2 May (Tulip time mobile rally, Gleed Boys School, Spalding). The club also holds meetings in the northern area at William Lovell Secondary School, Stickney. Information from G3VPR.

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

Bedford (B&DARC)—Thursdays, 8pm. United Services Club, The Broadway. Sec G8FMG.

Cambridge (C&DARC)—5 Mar (AGM). 7.30pm, Fridays. Corporation Yard, Victoria Road. Sec G3YRZ.

Dunstable (DDRC)—5 Mar (Clubhouse QRM), 12 Mar (New electronics), 19 Mar (Bring a friend), 26 Mar (Communications 39–46), 2 Apr (Natter-nite), 9 Apr (Films), 23 Apr (Scope demo), 30 Apr (QSL cards). 8pm. Chews House, 77 High Street South. Sec G3XWS.

March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.

Northampton (NRC)—25 Mar (Astronomical Society lecture), 22 Apr ("HF aerials" by Cory Webster of HyQ). Thursdays, 8pm. Spencer Dallington Community Centre. Sec G8GHZ, tel 61794.

Peterborough (GPARC)—25 Mar ("VHF aerials" by G8COB, all amateurs welcome), 22 Apr (Scope and power supply demo by G8KCE and G4DJZ). Fourth Thursday of each month, 7.30pm. Southfields Infants School, Stanground. Details from G4BBA, tel 65213.

Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Sec G3TAZ.

REGION 6—RR D. C. Andrews, G4CWB, 63 Bulmershe Rd, Reading, Berks RG1 5RH.

Banbury (BARS)—Fridays, 7.30pm. 43 North Bar, Banbury. New members and visitors welcome. Details from sec G3LTN, tel Banbury 710623.

Bracknell (BARC)—First and third Mondays in each month (other Mondays morse evenings). Cooper's Hill Centre, near railway station. Sec G3YMC.

Maidenhead (M&DARC)—4 Mar ("BBC outside broadcast equipment" by Dave Grant), 16 Mar (AGM), 1 Apr ("Logic systems" by Ted Swann), 13 Apr ("VHF propagation" by G3LTP). 7.30pm. The British Red Cross Hall, The Crescent, Maidenhead. Sec G3FVC.

Newbury (N&DARS)—First Monday in each month, 7.30pm. Newbury College of Further Education, Oxford Road, Newbury. Everyone most welcome. Sec G4EFE, tel 0635 45747.

Reading (RARC)—2 Mar ("Workings of RSGB contest committee" by G3SEK), 16 Mar (Provisional talk on "Microwaves—latest developments on the amateur scene"), 6 Apr ("Logic for beginners" by Paul Holder). First and third Tuesdays in each month, 8pm. "White Horse", Emmer Green, Caversham, Reading. Sec G4CCC.

REGION 7—RR R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.

Addiscombe (AARC)—Tuesdays, 9pm. "Spread Eagle", Portland Road, South Norwood. Sec G4CZB.

Ashford, Middlesex (Echelford ARS)—8 Mar (Surplus equipment sale), 25 Mar (AGM), 12, 29 Apr (To be announced). 7.30pm for 8pm. St Martin's Court, Kingston Crescent, Ashford. Visitors welcome. Sec G2FNK, tel Staines 54828.

Bexley Heath (North Kent RS)—Second and fourth Thursdays in each month. St Mary's Institute, 2 North Cray Road, Bexley. 8pm. Sec G4ARQ.

Coulsdon (CATS)—First Thursday in each month, 8pm. 10th Purley Scout HQ (opposite Rickman Hill), Chipstead Valley Road Coulsdon, Surrey. Sec G8KMJ.

Cray Valley (CVRS)—4 Mar, 7pm for 7.30pm (Surplus sale), 18 Mar (Natter-nite), 1 Apr (AGM), 15 Apr (Natter-nite). 8pm. Eltham United Reformed Church Hall, 1 Court Road, London SE9. Sec G3YWO.

Croydon (Surrey Radio Contact Club)—16 Mar (Surplus sale), 20 Apr (AGM). 7.30pm for 8pm. The Ship Inn, Croydon, Surrey. Sec G3FWR, tel 01-657 3258.

Crystal Palace (CP&DRC)—20 Mar, 17 Apr (To be announced). 8pm. Emmanuel Church Hall, Barry Road, London SE22. Sec G3FZL, tel 01-699 6940.

Esher (Thames Valley ARTS)—2 Mar ("Integrated circuits"), 6 Apr (Caernarvon trophy—constructional contest). 8pm. Giggs Hill Green Library, Watts Road (nr Milk Marketing Board), Thames Ditton, Surrey. Sec G3ZNW.

Guildford (G&DRS)—Second and fourth Fridays in each month, 8pm. Model Engineering HQ, Stoke Park, Guildford, Surrey. Sec G3SYM.

Kingston (K&DARS)—10 Mar ("Television" by Andy Martin, G3ZYS), 14 Mar (To be announced). 8pm. Tolworth Scout Hut, Stirling Walk, Raeburn Avenue, Surbiton, Surrey. PRO G8HVW.

New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE19. Details from sec R. A. Hinton, 58 Camilla Road, Bermondsey SE16.

Reigate (RATS)—2 Mar, 6 Apr (Natter-nites). "Marquis of Granby", Hooley Lane, Redhill. 16 Mar, 20 Apr (To be announced). St Mark's Church Hall, Alma Road, Reigate. Sec G3RIN, tel Reigate 47659.

Sutton & Cheam (SCRS)—The society's 27th annual dinner and ladies' festival is being held on 6 Mar at the Woodstock, Morden, Surrey, at 6pm for 6.30pm. Tickets are available from Mr A. V. Tillin, G3MES, QTHR, at £4.50 for seniors and £3.50 for juniors. It is hoped that Dr John Allaway will be present. 16 Mar (To be arranged), 27 Mar (AGM). 7.30pm. Sutton College of Liberal Arts, Cheam Road, Sutton. Sec G4BOX.

Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ. 124 Kingston Road, Wimbledon SW19. Sec G3XTC, tel 01-664 3698.

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

Burgess Hill (Mid-Sussex ARS)—Meetings held at Marle Place, Burgess Hill. Details from G3RXJ.

Canterbury (East Kent RS)—4 March ("Developments in colour television" by G8GHH and G4CZU), 18 March (Informal), 1 April (Lecture demonstration by Thanet Electronics). Further details of meetings from G8GHH.

Chichester (C&DARC)—First Tuesday and third Thursday in each month. Lancastrian School, Basin Road, Chichester. Details from G8EPJ, Tel 0234 88069.

Crawley (CARC)—United Reform Church Hall, Ifield, Crawley. Further details from G3MGL.

Dartford (DHDFC)—Details of meetings from G4CVC.

Dover (South-east Kent YMCAARC)—First and third Wednesdays in each month. All meetings in three parts: (1) morse tuition; (2) talk/demo; (3) practical. The shack is open to all members any evening 7-10pm. Further details from G8DRS.

Eastbourne (Southdown ARS)—1 March ("Interference" by J. Houliham of the Brighton GPO), 5 April (Junk sale). Victoria Hotel, Latimer Road, Eastbourne. Further details from G3LFZ.

Horsham (HARC)—First Wednesday in each month. Civil Defence HQ, Moons Lane, Brighton. Further details from G3NPF.

Maidstone (MYMCAARS)—"Y" Sports Centre, Maidstone. First and third Fridays devoted to the beginner.

Medway (MARTS)—Fridays, 7.30pm. "Aurora Hotel", Gillingham, Details from G3XZS.

Worthing (W&DARC)—Meetings held at Adult Education Centre, Union Place, Worthing. Details from G3LQI.

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

Camborne (Cornish RAC)—4 Mar ("Slow scan" by G3LPB), 1 Apr (AGM, followed by "On the air for the first time" by G3VWK). First Thursday in each month, 7.30pm. SWEB Clubroom, Pool, Camborne. Details from G3NKE, tel Camborne 2419.

Newquay (N&DARC)—3 Mar ("Photo etching"), 17 Mar ("RTTY"), 31 Mar (Junk sale and natter-nite). Alternate Wednesdays, 7.45pm. Treviglas School, Newquay. Full details from G8GOR, tel Newquay 4168.

Plymouth (PRC)—First and third Tuesdays in each month, 7.30pm. Virginia House, Bretonside, Plymouth. Visitors always welcome. Sec G8JES, 36 Higher Mowles, Higher Compton, Plymouth PL3 6NE.

Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. G4DHA.

Torbay (TARS)—6 Mar (Annual dinner at Templestowe Hotel), 27 Mar ("Coastguard service"), 24 Apr (AGM). Tuesdays (RAE night), Fridays (General club night) and special meeting on last Saturday in each month, 7.30pm. Rear of 94 Belgrave Road, Torquay. Visitors most welcome. G3UIQ.

North Devon (NDRC)—Second and fourth Wednesdays in each month. Meetings held alternately at G4CG and G2FKO. Full details from G4CG.

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 GW3VPB.

Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, Nr Blackwood. Details from sec GW3KYA.

Bridgend (Glamorgan VHF/UHF Group)—Third Tuesday in each month, 7.30pm. NCB Social Club, Tondu, nr Bridgend. Details from sec GW8HEZ.

Cardiff (CRSGBG)—Second Monday in each month, 7.30pm. BBC Llandaff Club. Details from GW3GHC.

Pembroke (PRSGBG)—26 Mar ("Marine radio" by GW3LXI). Last Friday in each month. Defensible Barracks, Pembroke Dock. Details from GW3XJQ.

Pontypool (PRSGBG)—Tuesdays, 7pm. Educational 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 GW3ACF.

Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employers Club, Porth. Details from GW3PHH.

Sully (S&DSWC)—Tuesdays, 7pm. Sully Bowls & Social Club, 59 South Road, Sully. Details from GW4CJC.

Swansea (SARC)—Tuesdays fortnightly, 7.30pm. The Commercial Inn, Killay. Details from sec GW4AYS.

REGION 11—RR P. H. Hudson, GW3IEQ, Silhill, Dinas Dinlle, Llandrog, Caernarvon.

It is proposed to hold a Region 11 ORM in conjunction with a mobile rally on 15 May at the Royal Lido, Prestatyn, Clwyd. Details to be announced.

Area representatives are still required for the Llandudno/Colwyn Bay and Rhyl/Prestatyn areas. Any member willing to take up one of these appointments please contact GW3IEQ.

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

Aberdeen (ARS)—Friday evenings. Club rooms, 91 Crown Street, Aberdeen. Sec GM4BKV.

Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Kingsway Technical College. The club sec has received a large quantity of QSL cards from the Tayside Publicity Department. The cards are available free of charge to licensed amateurs who are resident in Tayside region, who work in the region or who are members of any radio club within the region. A small handling charge to cover postage and packing will be made where applicable. Sec Robert Officer, 23 Sherbrook Place, Dundee.

Inverness (Queens Own Cameron Highlanders Memorial Youth Club, Radio Section)—Sec W. M. Begg, 68 Tomnahurich Street, Inverness.

Lerwick (RC)—Wednesday evenings. Annsbrae House, Lerwick. Sec GM3HTH.

As a result of the appeal in the January "*Club News*," GM3ZDH has offered to act as area representative for the Highland area. A representative is still required for the Islands area. Any offers to regional representative GM8BZX.

REGION 13—RR Rev S. J. Smith, GM4DNM, St Ninian's, 6 Derran Drive, Cardenden, Fife KY5 OJG.

Berwick (BARS)—Last Sunday in each month, 3pm. Tweed View Hotel. Further details from GM8IIO.

Dunfermline (DRS)—Second Wednesday in each month, 7pm. CCTV Studios, Pittencrief School, Maitland Street, Dunfermline. Further details from GM8HEY.

Edinburgh (Lothians RS)—11 Mar (Talk by GM8BKE), 25 Mar (Construction competition and calibration night), 8 Apr (Demonstration night). Second and fourth Wednesdays in each month. Adult Education Centre, Riddle's Court, High Street. Sec GM8BJF.

Glenrothes (G&DARC)—7 Mar (Film, "How tv works"), 4 Apr (Visit to CCTV Studios, Dunfermline). First Sunday in each month and every Wednesday, 7.30pm. Old Nursery Buildings, Leslie, Fife. Sec GM3YOR.

St Andrews University (UStAARS)—Details from GM4BGA, Dept of Physics, North Haugh, St Andrews.

REGION 14—RR A. J. Mitchell, GM3UDL, 7 Limetree Crescent, Newton Mearns, Glasgow G77 5BJ.

Glasgow (West of Scotland ARS)—Friday evenings. 7.30pm. 22 Robertson Street. Sec G. Milne, GM4BLO.

Motherwell (Mid-Lanark ARS)—14 Mar (Central Scotland Convention, fm group meeting, GB3CSC talk-in on 2m fm/ssb. 2pm). Main meetings 5, 19 Mar, 2, 30 Apr. Wrangholm Hall Community Centre, Jerviston Street. Details from hon sec GM3KMG, tel Hamilton 28759.

REGION 15—RR H. J. Campbell, GI8FOK, 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.

Bangor (B&DARS)—5 Mar ("Stabilized power supplies" by GI3HXV). First Friday in each month, 8pm. Redcliff Hotel, Seacliff Road, Bangor. Visitors welcome. Hon sec D. Steele, GI4EMS, 59 Donaghadee Road, Millisle, Co Down.

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

Belfast (CoBYMCARC)—Tuesdays, 7pm. Saturdays, 2.30pm. 7 Brunswick Street, Belfast. All welcome. Hon sec D. Kane, c/o above QTH.

Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. New members and visitors especially welcome. Refreshments available. For further information contact GI8FOK.

Mid-Ulster RSGB Group—First Sunday in each month, 3pm. At QTH of GI4BAC. Full interesting programme arranged. Hon sec M. Anderson, 32 Knockview Drive, Tandragee, Craigavon, Co Armagh.

North Ulster (NURSGBG)—Details from GI8AYZ.

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 B. G. Tew, G3WFF, 334 Gloucester Avenue, Chelmsford.

Colchester (CRA)—Most Wednesdays, 7.30pm. Stanway School, Colchester. Details from E. York, G8HOR, 22 Owen Ward Close, Shrub End, Colchester.

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, Essex. Details from G3WUX.

Ipswich (IRC)—Details from J. Gee, G4BAV, 35 Neath Drive, Stoke Park, Ipswich.

Loughton (L&DRS)—Second and fourth Fridays in each month, 8pm. Loughton Hall, near Debden Station. Sec G4CMD.

Lowestoft (L&DARC)—Twice weekly, 7.30pm. YMCA, Park Road, Lowestoft. Details from G4AJO.
Martlesham (MRS)—Details from G. Murchie, G8AXU, Post Office Research Centre, Martlesham.
Norwich (Norfolk ARC)—3 Mar (Informal and morse practice), 10 Mar ("Oscar 7" by G3IOR), 17 Mar (Informal and morse practice), 24 Mar (Junk sale), 31 Mar (Informal). 7.45pm. Crome Community Centre, Telegraph Lane East, Norwich.
Norwich (U of East Anglia R&EC)—Details from P. Gowen, G3IOR.
Stowmarket (S&DARS)—Details from sec K. J. Bertrard, 35 Curwen Road, Stowmarket.
Vange (VARS)—Thursdays, 8pm. Youth Hall, Barstable Community Centre, South Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon.

Club secretaries are requested to forward their programmes and/or changes in sec, QTH, etc, to the RR in time for publication in accordance with the published dates.

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

Basingstoke (UKFMG—Southern)—First Wednesday in each month, 8pm. Chineham House, Popley, Basingstoke. Sec Mrs J. Payne (xyl of G3ZRM, QTHR), tel Aldershot 26108.
Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Sec G8KUY. PRO G8IMX.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchistoun Hall, Horndean. Sec S. F. Jenkins, G4CHO.
Swindon (SD&ARC)—Alternate Wednesdays, 3 and 17 Mar, 7.45pm. The clubroom above the Coldharbour Public House, Blunsdon, Nr Swindon. Sec Tony Bettley, G8KWC.

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

Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club (3min from A19). CW practice, 80m and 160m operation. Sec G3VSS.
Morpeth (Northumbria EC)—Thursdays, 7.30pm. Old Wheatshea Yard, Morpeth, except first Thursday in each month when a lecture is held (open to public) at Ashington High School Annex, 7.30pm. Sec G8GVN.
Newcastle (Tyne & Wear Repeater Group)—A list of local amateurs who are willing to act as local controllers will be made out as soon as possible and sent to RSGB HQ. Any amateur interested in joining this repeater group should contact the sec John McGee, G8GUP, QTHR, for place and times of meetings.
South Shields (SSD&RS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue, Kings Estate, Wallsend.
Sunderland (SARS)—First and third Tuesdays in each month. Leisure Centre, Stockton St, Sunderland. Sec G4DQA.

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

Acton, Brentford & Chiswick (ABCRC)—16 Mar (Discussion, "Datong speech processor"), 20 Apr ("My SM visit" by G3LBQ). 7.30pm. Chiswick Trade and Social Club, 66 High Road, Chiswick. Sec G3GEH.
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 G8JEG, tel 01-599 1103.
Cheshunt (CDRC)—3 Mar ("Design of vhf transmitters" by G3COJ), 10 Mar (CW practice and informal), 17 Mar ("Audio instrumentation" by G3WUX), 24 Mar (CW practice and informal), 31 Mar (Members forum). 7pm for 8pm. Rosedale Sports Club, Andrews Lane, Cheshunt, Herts.
Chingford (Silverthorn RC)—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Visitors very welcome. Sec G4AJA, tel 01-529 2282.
Edgware (E&DRS)—11 Mar ("Fibre optics" by Tony Trayling, G8EOL), 25 Mar (Demonstration/discussion on speech processing), 8 Apr ("DF principles"), 22 Apr (Constructors contest). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.
Harrow (RSH)—Fridays, 8pm. Sea Cadets HQ, Woodlands Road, Harrow. Sec G3KDL, tel 01-902 2570.
Havering (H&DARC)—3 Mar (Club film night), 17 Mar (Junk sale), 31 Mar (Business meeting), 14 Apr ("Colinear aerials" by G2BCX), 28 Apr (2m df hunt). Wednesdays, 8pm. British Legion Club, Western Road, Romford.
Holloway (Grafton RS)—Fridays, 7.30pm. Archway School Annex, Whittington School, Highgate Hill, N19. Details from John Hitchins, 46 Granville Road, Finchley N12. Tel 01-346 2744.
Islington (Sherbourne RC)—Mondays, 7-9pm (RAE and club activities), Thursdays 7-10pm (CW class, building etc). KW200E available for licensed members. White Lion Youth Centre, White Lion Street, London N1. Sec Freda Young, 5 Old Well House, The Grove, London N6.
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.
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, N21. Sec G4AEZ, tel 01-336 7166.
St Albans (Verulam ARC)—25 Mar ("RTTY", talk and demonstration by G3YYD), 22 Apr ("Raynet" by G8CAC). Fourth Thursday in every month, 8pm. Market Hall, St Albans. Further details from sec G4DUS, tel Rickmansworth 77616.
Stevenage (S&DARS)—First and third Thursday in each month, 8pm. Hawker Siddeley Dynamics Ltd, Gunnels Wood Road. Sec Paul Tewkesbury, 267 York Road.
UK FM Group (London)—Second Tuesday in each month, 7.30pm. Grove Park Hotel, Chiswick. Mtg sec G3TJA, QTHR.

REGION 20—RR G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol.

Bath (B&DRG)—Mondays, 8.30pm. Church of the Ascension, Claude Avenue, Oldfield Park, Bath. Further information from John Noden, Flat 4, 30 Paragon, Bath BA1 5LY.
Bristol (BRSGBG)—29 Mar ("6QW", commemoration by G5KT and G6GU), 26 Apr ("Aerial topics—television and others" by Pat Hawker of the IBA). Mondays, 7pm. Becket Hall, St Thomas Street, Bristol 1. Sec G3ULJ.
Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. Sec G8HAZ.
Bristol (Shirehampton ARC)—Fridays, 7.30pm. Twyford House, Shirehampton. New members most welcome. G4BWB.
Bristol (BUARS)—Most Saturdays during term time, 2.30pm. Dept of Physics, Royal Fort, Tyndall Avenue, Bristol 8. Full details from G3WDG.
Cheltenham (CRSGBG)—First Thursday in each month, 8pm. Royal Crescent Hotel, Clarence St, Cheltenham. Sec G3KII.
Gloucester (GARS)—First Thursday in each month, 8pm. Oddfellows Club, Barton St, Gloucester. Remaining Thursdays informal club night, G4AYM, The Chequers Bridge Centre, Painswick Road, Gloucester 8.
Taunton (T&DARS)—Fridays, 7.30pm. Jelalaband Barracks, The Mount, Taunton. Sec G. Swetman, "Little Copse", Monkton Heathfield, Taunton. Tel West Monkton 298.
Weston-super-Mare (WsMRS)—Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle. G3PQE.
Yeovil (YARS)—4 Mar (RSGB tape "Radio aurora" by G2FKZ), 11 Mar ("Propagation at 2m" by G3MYM), 18 Mar ("Experimental high gain aerials for vhf" by G3MYM), 1 Apr (RSGB tape "Aerials" by G6CJ), 8 Apr ("Direction finding for radio amateurs" by G3MYM), 15 Apr ("The Thevenin generator" by G3MYM). Thursdays, 7.30pm. The Youth Centre, 31 The Park, Yeovil. Sec G3NOF.

OVERSEAS CLUBS

Ex-G Radio Club—This club, for amateurs born in the UK and domiciled abroad, runs an ssb net every Sunday at 1900gmt on 14·346MHz, and a cw net every Saturday at 1800gmt on 14·065MHz. UK amateurs are particularly invited to check in on either or both nets. Sec W3HQO.

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 50p (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, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE.

FOR SALE

AT5 ac psu, TCS-12 mains psu 1·5MHz–12MHz, good 160m set-up, £30. Uhf Pocketphones, 433·2 ni-cads rx and tx, £27. Wide-angle telephoto lens for Kodak 50–100–150, £3.50. *Wanted:* any cameras pro why? 6 × 6, 6 × 7 35mm. G4BXD, QTHR.

Telford TC7 mk2 with G8AEV converter fitted, £48 ono. Park air 2m tx convertible to fm, £40 ono. 4 × 4 Yagi, 6-element Yagi, £8. The lot, £80 ono. Buyer collects. G4EHU, 34 Monmouth Street, Bridgwater, Somerset TA6 5EJ.

Stereo amplifier, fm tuner, speakers, £35 ono. Tape recorder 3-speed, £15 ono. Send for info. H/B Vanguard for spares, £3. Crystals HC6U 8·02666, 8·05555, 8·06388, £1 each. Buyer collects large items. GW8JOJ, 12 Black Barn Lane, Usk, Gwent NP5 1BP.

32ft Heath tower dismantled. Prop-pitch motor, selsyn (radio compass) easily modified for direction indicator. Offers all or separately but must be collected. Also Diamond de-luxe 2m 5/8 whip, gutter mounting, £8 plus carriage. G3YAX, QTHR. Tel Warrington 37138.

HW-7 QRP tx/rx 40–20–15, mint cond, prefer exchange for 14AVQ or similar vertical but would sell for £30. G3MZE, QTHR. Tel Stevenage 57803.

Brand-new rare valves DK91, DF96, DK96, DAF91, UBL21, UL44, GZ30, £1.25 each. FW4/800, DA30, PP5/400, £2.50 each. 20ft 25-core colour-coded screened cable, £2. Two QY3/125 valves, used but in good order, £5, p/p extra. Callers/appointment. G3LTU, QTHR.

Hallicrafters FPM/300 mk2. Safari tx/rx. Save over £100 on list price. 8–10m, built-in p/p (mains and 12V), **nearest £325.** Fan, manual, mobile mounting kit with dc lead. G3PLI, QTHR. Tel Bradford (0274) 29692 daytime, or Bingley (09766) 5218 evenings.

Heathkit GDO, IU, in nice wood case, £10. Eagle signal generator TE188, £10. HB 2m transverter 28–30MHz as per *SWM* Mar/Apr 73, £30, collect. Details sae. G4CTW, QTHR.

Free—Heath rx SW-717, very good cond. Must sell mains plug at same time for £30 ono. G4DOA, QTHR.

Immaculate HW12A, £50. AC psu (HB), £20. DC psu (HB), £20. G3VGO, QTHR. Tel Newquay 2912.

2m fm boot Cambridge, needs repair, offers. Xtals, suit above for S0, S20 to S24, R6 and 144·48, £3 per channel. Spare YL1080 valves (ex equip), 50p each. Buyer collects. G8IUS, QTHR. Tel Bedford 55452 evenings.

B40L manual spares, TWZ (fm) converters 2 and 70cm, TS127U wavemeter (375–725MHz), sundry power units, why? H/held portable 2 or 70cm tone-burst generator, not radio phone equipment. G8BBO, 60 Bude Crescent, Stevenage.

Drake R-4B rx, matching spkr, 10 extra crystals, spare set of new valves, immaculate cond, £250. Codar Multiband Six sw receiver, new, £12. Cameron, "Coombe Cottage", Pitchcombe, Stroud, Glos.

HW12A and psu, £70. HW17A ac and dc, £40. Eddystone 730/4, exc cond, £90. Micro Module 28–30, new, £10. KW160, £10. G3LVX, QTHR.

Atlas 180 tx/rx, top band to 20, mint cond, £260. G3SVH, QTHR. Tel Cheslyn Hay 414524.

Lynx camera, £40. Trio 599, £165. FM Cambridge 6ch, £50. Pye PF1s, £30 pair. P60 post mount Versatower, £200. KW 2000, scruffy, £90. Ford Capri 1600cc L reg, £800. D reg Anglia 1200cc, £90. 2m/70cm tripler, £14. 70cm converter, £15. G4BBS, QTHR.

Codar CR70A mk 2, £30. Codar PR40 preselector, £10. Microwave Modules 2m converter 12–14 i.f., £14. Lowe monitor rx 1420, only 50 hours use, £20. Jaybeam 2m crossed dipole, £5. All items in as new cond. Tel 01-859 0489 pms or any evening.

Powertran T20 stereo amplifier, recently built, sell for cost of parts. Portius Haywood decoder, also quantity of high and medium voltage mains trans to clear shack. Buyer inspects and collects. G3AMF. Tel 01-989 9224.

FT100 80/10 tx/rx, 120W p.e.p. push to talk, xtal cal, 240V ac, 12V dc, ssb, cw, a.m., good order and appearance, £115. G3BKM, QTHR. Tel Huddersfield 54220 after 6pm.

Cash required to begin amateur radio. Exacta RTL 1000 camera with case, £50. Eumig dual speed projector with screen, £30. Zenith enlarger, £15. Carriage extra. C. Hughes, 11 Clwyd Gardens, Kinmel Bay, Rhyl, Clywd.

2-KEF "Cadenza" hi-fi loudspkrs, teak finish, £40 each. G4CGI, QTHR.

Ex aircraft pa/driver, 122MHz, 3 × 3 × 8in, unmodified and complete with QQV06-40A and drivers, circuit, leads and partially completed power pack, £10. Pye ht inverter/a.m. modulator, 12V in 400V out, £2. Racal stabilized power pack, gives −12V at 13A and +12V at 6A, £25. HC6U xtals 8·0667, 8·081, 8·092941, 9·0875, 9·09687, 24·15, 24·172, 24·182, 24·232 (2 off), 24·198MHz, £1 each. New ICs, LM380 (2 only), £1. CA3043 (1 only), £1.50. G8JNI, QTHR. Tel Godalming 22834.

SB400, £75. V–4–6 4 band vertical with 40yd UR67, £35. Jaybeam 8Y/2m, £7. Hansen SWR3, £6. 4 × 250 bases, £2. Chimneys only, 50p. 48 odd *Rad Coms,* 1970–75, offers. Prefer buyer collects. G3JGO, QTHR. Tel 0753 43 596.

Tele-equipment D43R double beam oscilloscope, 25MHz amplifiers, £85. Dumont 304-H oscilloscope, £35. Lab pulsescope, Civvy AN/USM-24c, £50. Signal generator 85kHz–80MHz, a.m., cw, nbfm, £50. LM14 frequency meter, matching power unit, £25. All complete with manuals, probes. Fletcher, Moorbridge Lane, Stapleford, Nottingham. Tel 0602 397446.

Sommerkamp FL200B tx, 80–10m, a.m./cw/ssb, £110 ono. Linear Redifon GA406, 80–15m, 1200W p.e.p., 19in Rackmount, £125 ono. Codar AT5, scruffy but working, £12 ono. Medco lpf, 75Ω, £4. Reesmace marine tx, 1·5–16MHz, a.m./cw/mcw, 40W, handbook, no psu, £10 ono. Hansen swr meter, £3. Jones, G4CMF. Tel 01-764 3881.

Rotator Stolle 2010, little used, with 16m cable approx, £35. G3UQZ, QTHR. Tel 021 373 8806.

FT200 and ac psu, all of 10, mint, boxed, £220. Suzuki T350J motorcycle, many extras, outstanding cond, L reg, £375 ono. G4AJE, QTHR. Tel 0536 72 2789.

Sigmasizer 200, 10W, 200ch, fm tx/rx with additional a.m. rx posn, £100. Liner 2 tx/rx, little used, £110. Both approx 1-year old. Carr extra. G8HMX/G4DRD, QTHR.

SB220 linear, perfect ug, £240 ovno. G4DHX, QTHR. Tel 01-789 5187 after 5pm.

Eddystone 840C, nice cond, £32. 1kVA transformer 200/240V–110V, £5. Low band Murphy Rover, complete, £15. Simon Jennings, 10 Boultbee Road, Sutton Coldfield, West Midlands B72 1DW. Tel 021-373 2956.

Pye ssb tx/rx, ssb 125T, 3–15MHz, four preset frequencies modified to accept external vfo (not available), one rt channel u/s, 125W, nominal c/w ac pu h/b, £90. 12V dc pu to suit voltages +300 +800 −100, c/w h/b, £25. G4BFO, QTHR.

70cm fm transistor/varactor tx, 3W out with one channel 433·27MHz, £12. QQV02/6 70cm transmit converter to G3DAM design, less psu, £6. J. S. Roberts, G8FOJ, Hamme House, Kings Mill Lane, South Nutfield, Surrey RH1 5NB.

KW77 rx with circuit and instruction book, £45. Buyer collects. Roth, 49 Stanchester Way, Curry Rivel, nr Langport, Somerset. Tel Langport 250987.

FT201, still under guarantee, never used on hf bands, **£295.** Buyer collects. G8AJB, QTHR. Tel 061 624 4115.

Trio JR-310 rx with top band, mint, £65. KW Vespa mk2 with ac psu, £95. 18AVT, £35. Johnstone, GM4CGN, 25 Salisbury Terrace, Aberdeen. Tel Aberdeen 22954.

CW filter model CWF-2 by MFJ Enterprises, brand new, instructions, £7, 25p p&p. L. W. Hastings, Headley, Churchfields, West Dartmouth, Devon.

Microwave Modules 5W a.m. tx, inc 5 xtals, £20 ono. RF power/swr bridge, £5. Codar T28 80/160/M rx, £5. 160/80 a.m./cw, tx, £5. Plus postage, or buyer collects. G8JGK. Tel Chelmsford 69034 after 6pm.

Liner 2 with 40673 preamp, £125. Yaesu FF50 lpf, £5. Belling Lee 35A hpf, £3. Copal 222 clock, still in box, £4. Boniface, G3ZXX, QTHR. Tel 01-994 8541, ext 284 (office).

QRP HW7 tx/rx in mint cond, £30. G4AEI, QTHR. Tel Reading 85123, ext 7613, office hours.

IC20 12-channel fitted xtals, S0, S20, S21, S22, R3, R4, R5, R6, R7, 145·2, 145·6, external Catronics, dual frequency, tone-burst generator, a.m./fm switch on receive, £95. G3LCZ, QTHR. Tel Stockton 582738 after 6pm.

TW 2m transverter QQV06/40a final, comp with built-in Sentinel mosfet preamp and including power supply. EI9D, QTHR. Tel (Dublin) 01 860635.

Pye Super Lynx 625 camera, adjustable table stand, f1·5 Dallmeyer focus lens, also matching 625 monitor (manuals), exc wk cond. Offers. G2CST, The Ashes, Glossop, Derbyshire. Tel Glossop 61062.

Weir 2m fet converter, 28–30MHz. i.f. fitted in diecast box, no psu, £11. G4EFJ, QTHR. Tel Crawley 21668.

TH3JNR with KW balun, £45. AR22R with 60ft control cable, £25. GM5AIW, QTHR. Tel Denny 822317.

Ferrograph series 7-tape recorder with vox, as new cond, £80. Buyer collects. G4BCN, QTHR.

Yaesu FR101 ddl digital, 1hr use only, £450 cash. Will exchange for colour vtr and monitor, vintage motorcycle, post vintage Vincent 1000, Manx or international Norton, or modern "Superbike". Peter Clappison, 190 Victoria Avenue, Hull. Tel 0482 43353.

Heathkit 10–12u oscilloscope, perf cond, with comp set of spare valves, manual and low capacitance probe. Three-month guarantee, £35. Williams. Tel 061 794 1783.

FR50B 160–10m rx, vgc, comp with Yaesu instruction manual, also built-in calibrator, must sell, have purchased new hf tx/rx, £65 ovno. P. Valteris, G8KLT, 1 Grove Cottage, Chetnole, nr Sherborne, Dorset. Tel Sturminster Newton 72564 (work).

Liner 2 DX (later version of Liner 2), 28ch, pll synthesizer, different pa-mixer-rx, receiver, +5kHz & +300kHz switch, coverage from 144·05–625, fb cond, comp cct, offers over £130. *Wanted:* JR310, old TR2200 crystals, AR88D spares, why? G8KZN, 245 Stourbridge Road, Halesowen, Birmingham. Tel 021-550 8540.

Clearance sale, vhf mobiles, comp 2m 4m Elan beams on 35ft guyed mast. PSUs, test gear, etc. Send sae for list. G3AAZ, QTHR.

Katsumi cw filter, as new, £5. *Wanted:* Manual for Lafayette HA350, valve data manual for Taylor 45C valve tester. Both to buy or borrow. Saunders. Tel Chieveley (Berks) 620 evenings.

Crystals, 5MHz, £1. HC6U, 8·950MHz, 50p. HC18U. Send 6½p sae with remittance and order to R. Bowell, 16 Margarite Way, Wickford, Essex.

TA audio compressor, exc cond, £20. 3-el 20–10 Dexbeam, £20. Brand-new stereo headphones, £5. Sentinel 4MTR converter, brand new, 28MHz, i.f., £13. 40 + 40 peak watt solid-state stereo amplifier, 6 switchable inputs, teak cabinet, £26. G4DHA, QTHR.

FT200 with psu and FV200 vfo, £160. Europa 2m transverter, £55. Datong rf clipper, £30. Heathkit IO–18U scope, £30. Heathkit ID–101 electronic switch, £12. Oscar power meter, £15. Heathkit RA1 rx, £18. Standard C146A 2m handheld tx/rx with base power supply, £60. Heathkit IM16 solid-state voltmeter, £12. Burns FS2 2m converter, £10. Microwave Modules, 2m converter, £10. 2m 14-element Parabeam, £7.50. G8GMR, QTHR. Tel Luton 35806 before 16 March.

Pye FM10B rf board, £2 (high band). STC 4X 150A, used, £1. 70cm base station tx, solid-state 5W output, £25 ono. Sae details. G8HNN, 55 Vauxhall Street, Rainbow Hill, Worcester WR3 8PA.

SR-C146A 5ch including GB3LO ni-cads and h/b charger, only 4 months old, £115 ono. G4CKN, QTHR. Tel 01-790 3123.

Ten-Tec Argonaut 80–10M QRP, tx/rx, ssb/cw, 5W p.e.p., early rare serial number model, recent factory alignment, exc cond, £150 ono. S. L. Stephens, 158 Ashford Road, Iver Heath, Bucks. Tel Iver 652060.

HW32, as new cond, £55. 200–500V stabilizer psu, will suit above, £10. 2m a.m. tx QQV03/10 pa with xtals, £10. DL6SW 2m converter, 25MHz i.f., £8. HRO with bandspread, £14. Heathkit Mohican transistor rx, £40. G8ASX, QTHR. Tel Bournemouth 47582.

Linear amp 6LQ6X3 in final, made in USA. Sae for details. Sale or exchange. *Wanted:* KW107 2m fm tx/rx, HQ1 or why? G4AOE, QTHR.

Advance 7000 3½ digit dpm, mains powered, adjustable input ranges, brand new, £15. Transformer mains, input output 22–7·5–0–7·5–22V, 12A, buyer collects, £3.50. Creed 25, £10. Creed 92, £5 *Wanted*: Philips LBB5000 pocket radio paging receivers. G3YLQ, QTHR. Tel Luton 25595.

CT381 sweep generator system, 10kHz–33MHz, comprising sweep generator scope, psu, sophisticated laboratory instrument for all rf/i.f. alignment, handbook, leads, spare scope and psu, comp, vgc, £85. Buyer collects. *Wanted:* AC millivoltmeter decade resistance box. G3YLQ, QTHR. Tel Luton 25595.

Hygain 18AVT/WB, new, comp with 44ft 50Ω coaxial, handbook, £40 delivered. GI3GTR, 3 Rhanbuoy Park, Craigavad, Holywood, Co Down, N Ireland. Tel Holywood 3890.

KW2000B ac psu, Shure 201 mic plus pair new 6146s, £185 ono. IC210, £195, or exch for IC22A with cash adjustment. YC355D frequency counter, £110. Sanyo cassette recorder, mains and battery, £16. 8-el 2m Jaybeam, £5. Skywood vom, £5. 18AVT, £20. G8IXR QTHR. Tel 01-407 4342.

Ferranti 24K4 projection tv chassis, optical stillage, 2½in tube mirror screen, circuit diagram, less 25kV transformer. Offers. G4BPW, QTHR. Tel 0283 813395.

Codar CR70A, spkr, £26. PR40, £9. Tech Assoc speech comp, ditto audio filter, £20 each. Stolle 2030, £38. Ditto bearing, £8. BC221s, £22. Late black model, £34. 18AVT, used, £25. Heathkit keyer HD10, £18. Most items as new. G4ERU. Tel 0202 50400.

Trio JR500SE rx with xtal calibrator and top band plus manual and SP5DS matching spkr, £50. Codar preselector, £5. Geloso 2m vfo 144–148MHz, offers. D. Allen, New House, Water Lane, Barnardiston, Haverhill, Suffolk CB9 7TH.

AM25T transistor Vanguard on 2m, good fm, QQV06/40 pa vxo and xtals, comp with control equipment, vgc, £40 ono. Codar PR30 preselector, £7. Heathkit Q-mult, £5. Four-track spool tape recorder, £15. G8IPJ, QTHR. Tel 021-453 4748.

Atlanta, no mic, good order, £190. HW101 psu spkr, newly assembled, perfect cond, no mic, £275. Both surplus to requirements. G4BLB, QTHR. Tel Deal 3538.

Trio TRY200G plus matching vfo, not used mobile hence good cond, £140 ono (£200 new). *Wanted:* Europa 2m transverter, Parabeam or similar. A. Jones, 121 Upper Tennyson Road, Newport, Gwent.

HRO 10–160m bandspread coils, unused, boxed, set valves, power supply, spkr, good cond, £30 ono. Pye bench test unit, capacitance bridge, modulation, rf generator, £10. *Wanted:* modern hf rx 10–160m Heath, Trio, KW, Yaesu, cheap, if poss will deliver—travel 20 miles. G8KJI. Tel Hertford 50274.

Joystick and atu 111, 30ft feeder for swl, £15. Codar CR70A mk2, gen cov rx 540–10m, mint, £35. Codar PR40 rf preselector, 1·5–35MHz, mint, companion to CR70A rx, £10. GM4EGW, 50 Craigentinny Avenue, Edinburgh EH7.

Hy-Gain TH3, six months old, £68. BX1 tower raising geared motor with switch gear, £20. H/B 2m vfo a.m. tx, £20. *Wanted:* HW12A with mobile psu and 80m "G" whip. G4DYR, QTHR. Tel Wolverhampton 763504.

QQV06/40As, as new, gold plated pins, £5. QQV03/20As, ditto, £2.50. New Londex type coaxial relay "N" type sockets, £4. AM10B Cambridge on 2m, with xtal etc, rx varicap tuned, £20. 1MHz B7G xtals, 75p. Stabilized psu, 3 separate outputs at 0·5A, £5. All carriage extra. G8ENI, QTHR. Tel Cheslyn Hay 415374.

4CX250B, two pairs complete with bases and chimneys, good cond. Several QY4–250 with bases. One each new 813, QY3–125, Mullard. Offers. G3UKS, QTHR.

Working rtty station less tx, comprising printer, reperforator, ST5/ST6 modern integrated circuit terminal unit, all mains operated, plus paper, paper tape and spares. Offers. Looker, 91 Station Road, Amersham, Bucks. Tel Amersham 21188.

LG300 a.m. + cw 150W. 80–10m modulator and power supply, operating instructions, circuit diagram, £30. *Wanted:* 70cm transverter, H/B or commercial, with or without power supply. G3SIQ, QTHR. Tel Sandiway (Cheshire) 888330.

Heathkit RA1, £25. KW Valiant, £10. TCS rx int psu, £10. Pye Reporter 250/12V, psu on 4m, £6. Top band a.m. tx, comp, £9. Valves KT66, 5B254M, TT15, 50p each. Visconol 4MF 600V, 25p each. Buyers collect. G3OGP. Tel 01-398 3953.

B29 15–550kHz, very clean, good cond, with manual and spare valves, £10. Buyer collects. Jackson, 29 Edgehill Road, Purley, Surrey. Tel 01-660 8580.

12AVQ vertical, vgc, £15. G3HSC morse record and test, 75p. G4CMU. Tel 01-540 6910.

"1975 Callbooks", USA and dx listings, £5 pair postpaid. G4DJC, QTHR. Tel 0245 69034.

SB101, HP23, best offer. Exchange best vhf gear offered. G4KG, QTHR. Tel 0491 651270.

Yaesu FTDX401 560W hf tx/rx, as new, with cw filter, £250. G3AMO, QTHR. Tel Totton 3820.

B40 rx, 640kHz–30·5MHz, good cond, £25 ono. *Wanted: ARRL Radio Amateur's Handbook,* 1960–62 vintage, why? G3NSJ, 22 Glynde Crescent, Bognor Regis, West Sussex. Tel 02433 23625.

AR88 rx, manual, spkr, spares, £30. DX100 transmitter, £10. CO546 oscillator, £25. VF252 voltmeter, £20. Pair field telephones, £5. Two 40ft masts, £6. 70m vhf coaxial, £5. 150 copies *Short Wave Magazine,* £4. Thomas. Tel Clydach 2735.

2m linear, 200W input, professional finish, with matching power supply, £38. Buyer collect. 70cm varactor tripler, £11. Inverters, 12V dc input, 28V dc output, 4A, £6. 12V dc input, 22V dc output, 3A, £6. Katsumi MC701 compressor, £10. Sherratt, 32 Springfield Way, Cranfield, Beds.

2m transverter, transistorized, QVO 4/60 in output, £20. Wavemeter oscillator, AAMKVI, approx 140–200MHz, £20. GR78 Heath rx. Turner Plus 3 desk mic with internal amp. Valves 572B, 6146. G2MF, QTHR. Tel Sheffield 360210.

Europa B-4M, mint, £60. 2m Europa plus ant, c/o relay and spare QQV06/40A, £60. Datong rf speech clipper, new, £30. G3WYV, QTHR. Tel Rochdale 42821.

Pye boot mount Cambridge rx, tunable on 2m, £30. Radiovision Commander d/shet, £22. Pye base tx QQV03–20A 2m, £15. Vidicon camera less lens, £30. Pye low band base station, working 4m, buyer collects all. G3FRO, QTHR. Tel Empingham 652.

From the effects of a deceased amateur. AR88LF, Heathkit HW100U, B44 single channel, Army 22 set, Class D wavemeter, plus many misc items. Tel Mr A. H. Othen, Byfleet (Surrey) 48307 (after 7pm) for price and further details.

KW Victor with new 6146s, £15. BRT400E rx, £25. BC221 and psu, no chart but book, £10. B2 tx with coils, £9. ZC1 mk1, also one for spares, £11. All ono. Buyers collect. G3ABJ, QTHR. Tel Billingshurst 2201.

Hustler 2m colinear, £10. Ikegami 625 line tv camera, £30. Set boards for Storno 600 less pa, £19. GEC colour tv, £75. 70cm 40W varactor tripler, £15. Philips pocket dictating machine, £10. 50mm enlarging lens, f3·5, £3. G6AFD/T, QTHR. Tel 01-959 6799.

FL-200-B ssb transmitter, mint cond, less than 40hrs logged from new, £95. Buyer collect or pay carriage. G3ODD, QTHR. Tel Hemingborough 515.

Pye Westminster, W15FM, 10ch, on 144MHz, with tone-burst, crystalled 5ch, including ASP 393 mobile antenna, £90. G8AWM, QTHR. Tel Epsom 28229.

PTR161F 2M tx/rx +cd, £8. B44 +cd, £5. B44, £8. |88 set, £3. A510 rx, £6. Garex mobile psu, £2.50. 50 micro switches, £5 ono. *Wanted:* Trio SP5D LS, cheap 2m-4m converters, Codar T28 rx. 27 Bulbridge Road, Wilton, Salisbury, Wilts SP2 0LQ.

RTTY Creed 7E teleprinter, comp with base and silence cover, good order, £23. Carriage or delivery extra by arrangement. G3RDG, QTHR. Tel 01-455 8831.

KW 2000E with ac power supply and Shure mic, as new. G. Brownlow, 138 Lewes Road, Brighton. Tel 688105 (day), 65704 (evening).

80m ssb? Heathkit HW12 with both ac and dc (mobile) PSUs, all in perf wkg order, £88. Tavasu whip, 80m coil, as new, £10. Codar T28 80m/160m solid state rx, £10. G3ZYS, QTHR. Tel 01-330 3047, about 7pm.

BC221 stab p/supply, manual, £20. Heathkit 0–12–U 6in 'scope, manual, £30. Heathkit HM–11U reflected power meter, swr bridge, manual, £8. Labgear E5039/A 5-way coaxial aerial switching unit, £5. Eddystone S688 spkr, £3. Approx 60 assorted meters, most 2½in, £30. G3RWY, QTHR.

Drake 2B, Q mult/ls, 115V xformer, manual, £120. *Wanted:* Small lv selsyn for beam direction indicator. G2BVN, QTHR.

AR88 with manual, good wkg order, no mods, £35. No offers please. G8FGZ, 38 Greys Road, Woodthorpe, Nottingham. Tel 601866.

FT101B, new Mar 75, £300. Trio 2200, £80. Yaesu FP2 power supply, £30. Valves 7360, £2. Woden UM3 transformer, £3. G3LBG, QTHR. Tel Southend (0702) 521561.

Coutant rack, power supply 24V, 20A, brand new, unused, £18. Crosshatch/dot generator, aerial injection, perfect, £15. Weatherston, 111 Salisbury Road, Barnet, Herts. Tel 01-441 2328.

Miniature rotary converters, Hoover type ZA27484, 11W, make good camping psu for shavers or anemometer heads for wind speed indicators, six at £2.80 each inc p/p. G3TJY, QTHR. Tel 020 122 2142.

Pye Cambridge AM10DV6, £25. Pye base h/b, £35. Redifon GR318 high band, £8. Ultra M5B8FB, low band, fm, tx/rx, 15W, £30. Pye high band Ranger, £7.50. Advance sig/gen, 7·5–250MHz, £25. Murphy MR820, high band, a.m., mobile, £8. G8AMZ. Tel Medway 53930.

Super-pro Hammarlund hf rx, exc cond, £50. 2m converters, SSM, 4–6MHz, £10. G8AEV 1·5–3·5MHz, £10, sell or exchange. 2m/70cm tx/rxs, video cameras, rotator, why? Cash adjustment. R1481 vhf rx, 66–86MHz, £5. R1224A rx, 1–9MHz, free for carriage. GM8CJW, QTHR. Tel Falkirk (0324) 27055.

Eddystone 840C rx, £45. HRO 9 coil packs, £17. KW Vanguard tx, £25. Going ssb. G4ELY. Tel Reading 694367.

Marconi sig gen TF390G, 16/150MHz, manual, spares, perfect, £18. *Wanted:* BC221 manual only. G4DID, QTHR. Tel Downland 54130.

QQZ06/40, quick heat, pa valve, new ex equipment (not boxed), £6 + p/p. Hartley, 16 Aynsley Grove, Bradford. Tel 0274 498172.

Trio JR500S, matching spkr, £40 ono. G3KZQ, QTHR.

Woden modulation transformer, UMO multi-ratio, £2. New 7630 valve, £1.50. Heath 'scope, 10–12U, little used, £25. Advance 100MHz divider, TCD100B, £20. Valve voltmeter, similar Heath V7AU, £6. Heath swr meter, HM–11U. G2BUW, QTHR. Tel Romford 43122.

KEN KP202 2m fm tx/rx, six channels, S0, S20, S22, R5, R6, R7, case, base charger, ni-cads, Flexi aerial, mint cond, tone-burst fitted, £95. Schofield, 12 Woodhayes Willow Grove, Chislehurst, Kent. Tel 01-467 8650.

FR100B rx, see *RSGB Bulletin* May 67 for test report. Official "Bandit Bill" top band, mod, 1·5–2·1MHz, also range 10D 29·5–30·1MHz, + TBA120 quadrature fm detector, transceives with FL200B, FLDX400 and 500, perf wkg order, £85. G8ART, QTHR. Tel Guilsborough 633 (Northants).

Electroniques amateur band coil pack, 160–10m, type QP166, £12.50. Storno Viscounts CQM 19, £10.50. Sig gens, type 56, high precision attenuator, motorized Lacher line, tuning 96–160MHz, £60. Frequency meter type LM14 with original charts, £12.50. G8KAP. Tel Raughton Head 389 after 7pm. *Wanted:* KW E-Z match.

23cm wavemeters, brand new, comp with calibration chart, £15. Property of the late G3IUD. J. Norrington, The Holts, Porthallow, St Keverne, Helston, Cornwall.

G8AEV tx and vfo, full coverage of 2m on a.m. and fm, with mic and pa current meter, £18. H/B 12V 2m fm tx (48MHz xtal), BLY36 in final 6W rf out and mic, £10. Pye Ranger tx on 2m with Cambridge modulator and transistor inverter, mic, £3. Low voltage megger ohmmeter and case, £3. G8FPP, QTHR.

Storno CQM13C fm tx/rx, boot mounting, with control box, mic, xtals for 145·0, £16. Cossor a.m./fm, 2m base, tx, 20W input, 3 xtals, £15. GW8IDA, QTHR. Tel Deeside 814693.

Yaesu FV400S remote vfo, boxed with manual, suit 400/500/560 rigs or ideal for h/b rx, £25 ono, or swap for vhf/uhf bits, why? G8BCG, QTHR. Tel 061 370 2974.

JR310, mint, 10m to top band, mech filter, xtal calibrator, £75. CR100, good, £10. Simpson ac vtvm, probes and book, £6. *Rad Com* 1963 to 1975, good cond, £15 ono. Plus many good components and equipment. Kell, 177 Main Street, Seahouses, Northumberland. Tel 463.

Crystal filter, monolithic type in HC-18U, 10·7MHz–15kHz bandwidth at −3dB and 50kHz at −20dB imp 3kΩ, £2. M. Nakane, 2–5–7 Teraya, Tsurumi-ku, Yokohama City 230, Japan.

Pye manuals, Continental BC625, AM10B, AM25B, PTC2701, £1.75 each. Pye spares, desk mic, control cable, 10B hi-band chassis control boxes, 11 115 xtals, 10D boards, S3CR, S22, mod, driver tx, £1.75. Tx/rx tv valves. G3LHA, QTHR. Tel Coventry 414333.

Liner 2, covering 144·300, etc, £125. KW Viceroy mk 9, needs attention (used ssb transverter), £35. G8JDS, 9 Napier Close, Fairstead, Kings Lynn. Tel Terrington St John 401.

Tiger 2m converter, self-powered, £11. Few new 4CX250B and 4X150A, £3 each. Coaxial relay, £1.50. Mains transformer, 1,000V, 500mA, £6. Fixed capacitors for linears. 1,000pF at 2kV, £1. Parker, 133 Station Road, Cropston, Leicester LE7 7HH.

Yaesu FR101DD deluxe digital rx and FL101 matching tx, 2 months old, as new, approx 2hrs use, £740 ono. G3RDW, QTHR. Tel 021 353 7427.

WANTED

Heathkit model HG10 vfo and fm unit for HW17A. G2DRT, QTHR.

Service information for Pye two-way radio, model 7010UFMVW-D-B-O-1G, 12V, Ser No 2044D, made by Pye Telecommunication Ltd for American Aircraft Radio Corp. H. G. Brooks, 26 Alloa Road, Stirling, Scotland.

9R59DS, xtal cal, manual, must be good cond. Details to D. C. Richmond, "Fairfield", 9 Wellpark, Alloway, Ayr KA7 4QD.

Trap dipole for 20, 15 and 10m, overall length 26ft 4in max, or similar small triband aerial. Dave Austin, "Lothlorien", 13 Ridgehill Grove, Intake, Sheffield, Yorks S12 2JG.

Any Storno or Pye mobile or portable equipment, fm or a.m., any cond considered, good price paid, I will collect. Tel 01-733 3995 after 6pm.

FV101 vfo, TH3 beam or similar, 70cm gear. G4DGM, 106 Goldthorn Hill, Wolverhampton.

Drake SPR4, please state cond and price. J. Alis, 7 Hillside Avenue, Wembley, Middx.

Antenna rotor CD44 or Ham type, good wkg order, comp with control box and cable. G3DQL, Post Office, Hatfield Woodhouse, Doncaster. Tel Doncaster 840240.

Tripod with pan and tilt head, suitable for Pye Lynx cctv camera. G3SSZ, 1 Rayleigh Close, Palmers Green, London N13.

VFO for Trio TS510 or similar, must be 5·0–5·5MHz. G4DAW, 479 Wellingborough Road, Northampton. Tel 714821.

Commercial digital frequency counter, must read up to at least 200MHz, YC355D or similar, perf cond essential and Securicor delivery. G6XY, QTHR. Tel Kenilworth 52679.

Wanted urgently, original xtal for BC22ID. Tel Ashford 54835.

Muirhead D649 weather chart recorder, also Racal lf converter RA337 and pan adaptor RA366. Morris, 3 Astley Road, Bradshaw, Nr Bolton, Lancs. Tel Bolton 52384.

KW E-Z match, also low-pass filter, must be commercial, 75Ω. Wylie, 38 Rosedale Avenue, Paisley PA2 0RR.

Operating instructions and technical data including circuit diagram for radio set No 88 (Army infantry lightweight tx/rx). Also 3 sets of accessories—battery leads, headphone-mic, assemblies and rod aerials. Bartle, 105 Mayfield Road, Thornton Heath, Surrey. Tel 01-684 0610 evenings.

Heath HP23 power pack, or transformer for same. GW3JI, Beirut, Albert Drive Gardens, Deganwy, Gwynedd LL31 9RE, North Wales.

Heathkit RA-1, can collect within 50 miles. Must be in good working order. 761 Ashton Road, Bardsley, Oldham, Lancs. Tel 061 665 1288 after 6pm.

Radford audio distortion measuring set. Philips PM5324 hf generator, PM6456 stereo generator, PM6302 LCR bridge. Fm signal generator, transistor tester, any top class test equipment. Toms 70, AVO VCM-163 valve tester. Transistor power supply. Fletcher, Moorbridge Lane, Stapleford, Nottingham. Tel 0602 397446.

Collins S-line 75S3-B rx, 32S3 tx plus psu. Must be mint cond, no mods. G4CGI, QTHR.

Dolby B noise reduction unit, Phonix Vidiosonic PD4 or similar by Teal, JVC, etc. AKG D202EI and Neumann U87 mics, also tape recorder, 10½in reel capacity, must be two track with 15/7½ ips. Please state prices. G8HMF, QTHR.

BTH C2 Magnavox or similar, pre-war valves, components radio sets, early books, magazines wanted by enthusiast collector. C. Sawyer, 210 Gordon Avenue, Camberley, Surrey. Tel 0276 29460.

Yaesu FR50B rx, must be in good clean cond, or good gen cov, rx up to £100. Also cheap 2m rx, working order. J. Lemon, 12E Lewis Trust, Warner Road, Camberwell, London SE5. Tel 01-606 9911, ext 3109 (work), 01-733 7417 (home).

Marconi or other high quality "straight" key. Post Office type considered. G3URU, QTHR. Tel Derby 364680.

Lafayette HA500 or Heath RA1 in good cond. Ledger, 13 Blenheim Gardens, Stanton Street, Quinton, Chippenham, Wilts.

Rack mounting AR88D in any cond bar junk. Will collect. Have MFJ cw filter, part exchange or sell. Mr Handy, 105 Humber Avenue, Coventry. Tel 22201.

Old "Atlanta" for spares, vox and vfo units for above. Also 18AVT/WB and 10XY/2m antennas. Please state lowest prices. Letter to EI9CV or tel Dublin 974203 after 6pm.

Pye a.m. Bantam, high or low band. Also dry battery holders. Rechargeable batteries and battery chargers. GM3ZDG, 55 Cradlehall Park, Inverness IV1 2DA. Tel 0463 791347 after 6pm.

Mini beam HQ-1 or similar. Would consider exchange for Hy-gain AVQ-12 plus cash adjustment. G4DSD, 1 Shirley Gardens, Sunderland SR3 1YD, Tyne and Wear.

SSB tx/transceiver for club station, age not important, but must be in reasonable wkg order. G4AXZ, QTHR. Tel Acton Burnell (Salop) 647.

FT101 or FT200, with or without psu, any cond, will collect. *For sale:* Pye 14in monitor, £12. G3NKL, QTHR. Tel Longridge 2511.

Eddystone EC10 mk2, must be mint cond. *For sale:* Eddystone 940 fb cond, £90. Reason—going portable. G4AYV, QTHR.

Modulation transformer for mobile tx (TW-2), to match pair EL84s to QQV03-10. Size not exceeding 2¾in by 2¾in by 4in. Tel Newcastle on Tyne 810400 after 7pm.

High-resistance lightweight phones, good sensitivity only. Please price to me. All offers with prices answered. G2BXJ, QTHR. Tel Great Yarmouth 4875, 1800 to 2200gmt.

TS520 or FT201, up to £300 paid. G3NAS, QTHR. Tel Aldridge 53718.

FL50B tx, comp with manual, can make small repairs, will collect. *For sale:* R1155 rx, with top band, output, psu, £8. HC6U, 1618·4, 1620·2kHz for half lattice filter, £2.50. Avo 7 meter, £6. Grid dip meter, £4. G4DIB, QTHR. Tel 01-467 9033.

Hudson FM115 and FM208 circuits or manuals for these, buy or loan. G8AEE, QTHR.

435kHz xtal, or channel 34 in FT241A series. G4DIX, QTHR. Tel Sevenoaks 55757.

Telescopic tower and Gem quad. Also 500kHz portable emergency marine tx. G3TJY, QTHR. Tel 020 122 2142.

Murphy Rambler MR965, or Telecomm TRT/2 portable tx/rx. GC3HKV, QTHR. Tel Guernsey (0481) 47278, 6-7pm.

FRDX400 R4B or similar rx, must have top band. G3ZFC, QTHR. Tel 09363 3487.

Urgently wanted: ball-bearing unit for worm drive of HRO-M rx. GM8CH, 12 First Avenue, Netherlee, Glasgow G44 3UB.

Pocketphones, Pye on 70cm, or tx/rx xtals only. Also xtals for FM10D on 2m mobile channels tx/rx. Hartley, 16 Aynsley Grove, Bradford. Tel 0274 498172.

Yaesu FL400 in good cond. Would inspect within 50 miles of Bath. G8CGA, QTHR.

Rotator suitable for 2m beam. 160m ssb tx/rx + cw with side tone. 10W amplified for 1·5W G8AEV tx. Must be small and 12V neg earth. G4DOV, QTHR. Tel Walsall 27738.

Tx/rx type BP5 (Parachute), comp with mains and battery, psu, and unmodified if possible. Also tx/rx type AR11, comp and unmodified. G3UCT, 91 Kings Ride, Camberley. Tel Camberley (0276) 21702 evenings.

Accommodation, Stoke-on-Trent area Stone, for clean respectable student(s) for 1976-77 academic year. N. K. Hingley, A7056, 4 Elmdale, Halesowen, West Midlands B62 9AJ.

Aerial rotator, cond unimportant, rechargeable batteries/cells (Nic-cad etc various), control box and any data for Philips LDL1000 video tape recorder, a.m. filter for Heathkit SB300/1/2 series, ¼in videotapes, multi-channel stereo mic mixer. Hughes, 122 Milton Road, Stoke-on-Trent ST1 6HD.

RAE syllabus occasional refresher help in exchange French coaching, dowsing, medical healing, or alternatively cash. R. E. Espiau, 40 Empire Court, Wembley Park. Tel 01-902 4732.

CR100 manual. J. Penzer, Sea Cot, Canal Foot, Ulverston, Cumbria.

KW2000A or B with psu in good wkg cond. Returning overseas soon. VQ9NLB, 47 Sprules Road, London SE4. Tel 01-732 0690.

TH33 jnr, HQ-1 Mustang 3el beam or why? Also Shure 444 mic, rotator unit for hf beam. David Crompton, G4DXX, "Hilltop", North Road, Carnforth, Lancashire. Tel Carnforth 4274.

Pneumatic operated mast, any height. Any large airspaced vacuum tx v/cs, large roller coasters, prefer the ceramic former type. SWR/power meter, any solid-state designs for high performance gc rx 0·5–30MHz. Good prices paid. G4DQY, 98a West Green Road, Tottenham, London N15 5NS.

Tri-band beam, 10–15–20m, 2/3 element, also matching separate vfo for national NCX5. G4CBM, 20 Chadsfield Road, Rugeley, Staffs. Tel 08894 4915.

Manual/info wanted on: Hudson FM208 Pye, rx AP100 339 circa 1955, 16kHz–31MHz, GEC 20W base cat no 203, Pye Bantam batts, ref AT25928/1 cassette, 25929/1. Cooke, GM8ETR, 25 Sunbank Place, Lossiemouth, Moray. Tel 2309.

Microwave Modules, 2m and 4m converters. G3PIX, QTHR.

1–30MHz 100W 50Ω, insert for Bird Thruline wattmeter type 43. Will purchase or swap for my 95–150MHz 2·5W insert. G3UFZ, QTHR. Tel Bishop's Stortford 723088.

Rotator suitable for 2m 14el Parabeam. Anything considered. GM8HSY, QTHR. Tel Falkirk 23860.

SB-400, SB-401 or Drake T-4X/, T-4XB. Also after SB-300. Cond of units irrelevant. Coull, Canterbury Road, Elham, Kent. Tel Elham 244 evenings.

Original pair of H. W. Sullivan's headphones, 1920–30 era, high or low "Z", any cond, to complete part of vintage equipment. G6RF, QTHR. Tel Perranporth, Cornwall, 2149.

Collins 51J3, 51J4, R390A, 51S1, good cond only. G3VXZ, QTHR. Tel Maidenhead 27350.

Electroniques transistorized quoilpack, hamband HB166T and i.f. amp module, 1·6MHz only. IFA 1·6 ssb mk1 or 2 with gen. G3KRH, QTHR. Tel 01-455 5039.

KW 160m atu. G3TQX, 50 Rembrandt Way, Bury St Edmunds, Suffolk. Tel Bury St Edmunds 4847.

Surplus high band fm walkie talkie (Pye Bantam or similar), good cond. Creed 7B governor. Surplus (professional or govt) ssb tx 28/30MHz. Teletype Corp fork strobe. Copy of US Army manual TM11-487, RAF manuals AP-1186, AP-2276, AP-2563C. G8AVJ, QTHR.

American /M bumper mount. "G" whip. Gen on Gonset G76 tx/rx. 70cm converter 2m i.f. *For sale:* Pye Westminster W15AM dash on 2m, £45. Yaesu YD-844 desk mic, as new, £15. G4AFY, QTHR. Tel Kidderminster 63358.

BC342, BC312 or BC348, good price for rx in good cond. Will collect 30 miles radius. G3CPM, QTHR. Tel Broadway (Worcs) 2753, evenings.

"RSGB Bulletin", April 1959, buy or borrow. *Radio and TV servicing*, any year. Valves type 6BA6, 6BE6, 6BZ6, ECL86. Advise price and postage. F. J. Crisp, Rame Barton, Rame, Penryn, Cornwall TR10 9DY.

CRT type 26 for Cossor 339 'scope, unused one preferred. Would pay £5. G3FNJ, QTHR.

Marine tx/rx, ssb, 2MHz xtallized. 14AVQ. Good G2DAF tx/rx. PSU for Pye marine ships tx. EC10 or similar. All in good order. Verrinder, Woolland, Blandford, Dorset.

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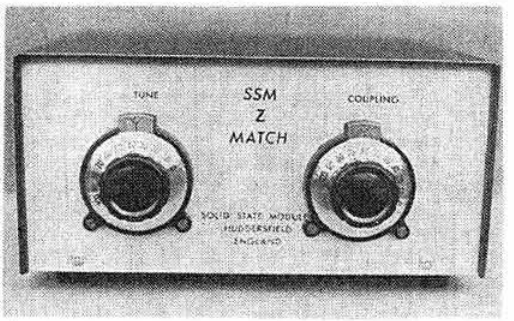

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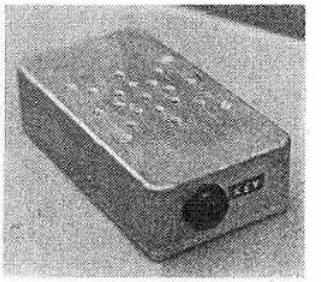

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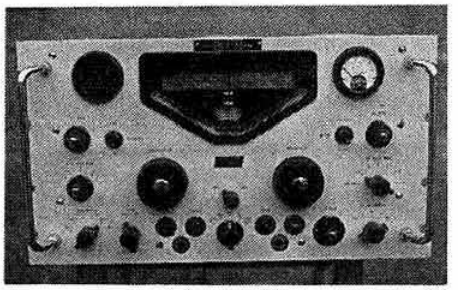

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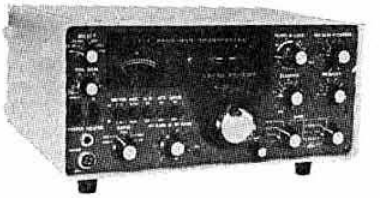

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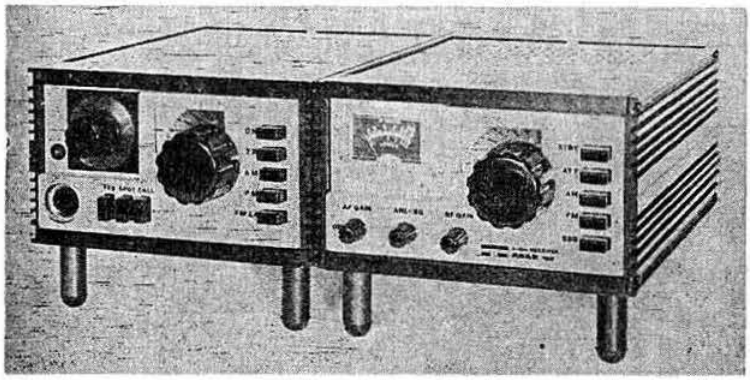

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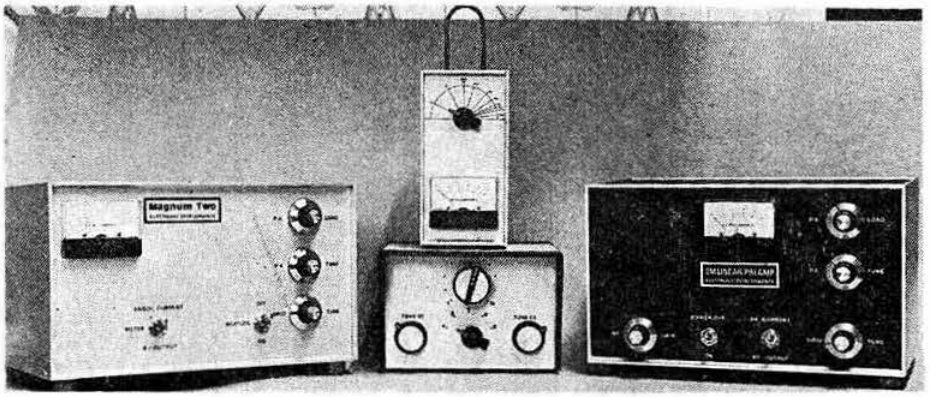

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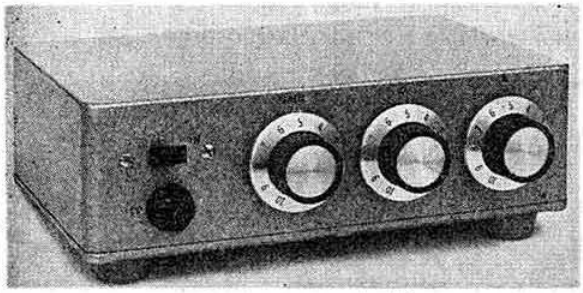

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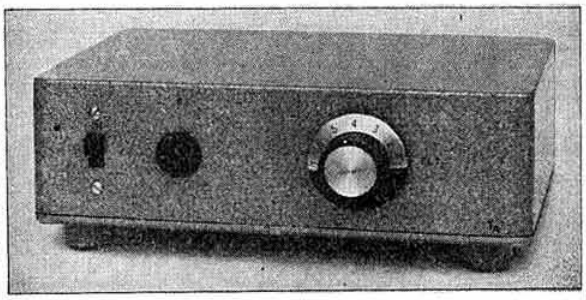

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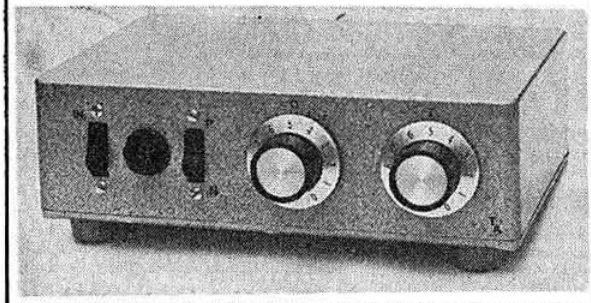

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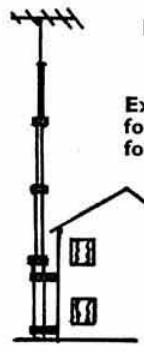

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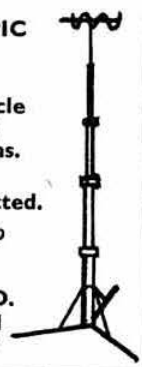

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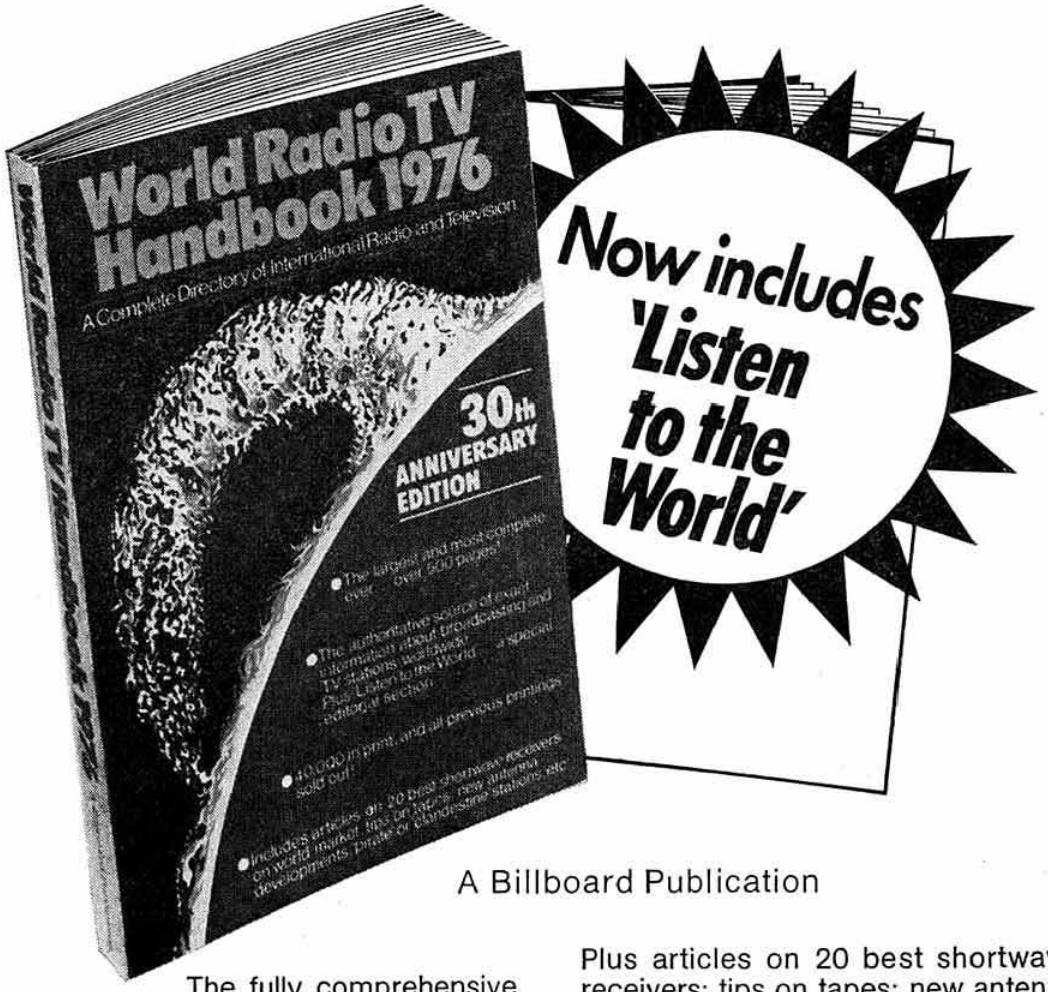

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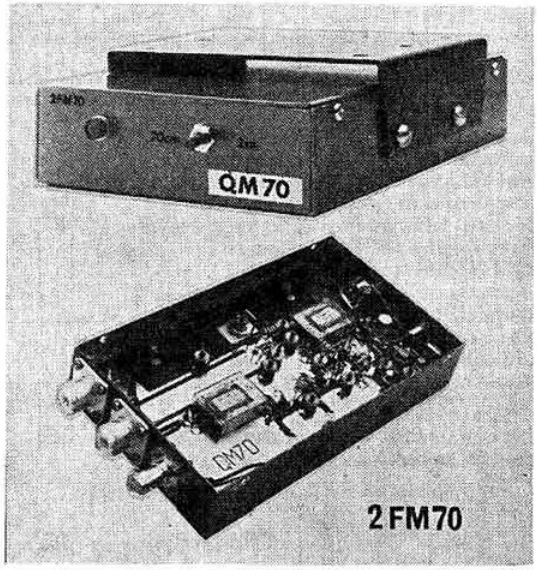

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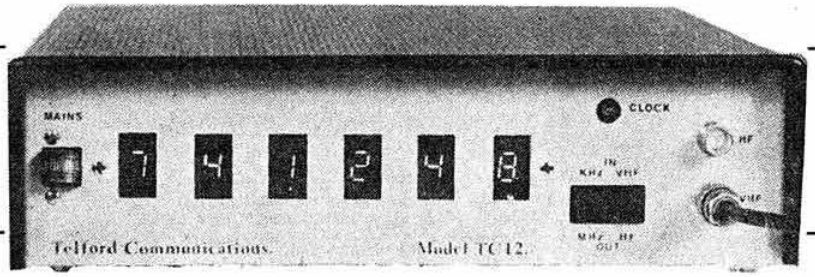

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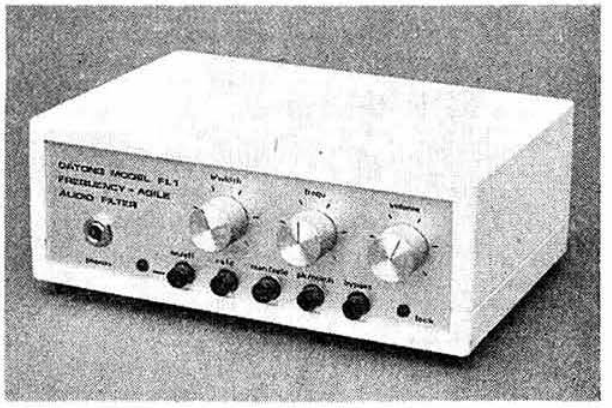

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FEEDTHROUGH CAPACITORS 22pF Nut Fixing @ 2½p 1000pF Solder in (small) @ 1p. **TRIMMERS** tubular ceramic solder in 2pF@ 1½p, Oxley air spaced trimmers 10mm sq, max cap = 14·5pF @ 5p. **ELECTROLYTIC CAPACITORS** 2·5µF 16V, 4µF 40V, 4µF 64V, 8µF 4V, 32µF 4V, 32µF 6V3, 100µF 4V, 100µF 6V4, 125µF 4V @ 3p, 64µF 40V, 125µF 16V, 330µF 63V, 400µF 4V. 1000µF 4V @ 4½p **PAPER CAPS** 40µF 150V @ 15p, **MONOLITHIC CERAMIC PLATE CAPACITORS** 4·7, 5·6, 22, 39, 47pF and 1500pF @ 1½p. **PHILIPS BEEHIVE TRIMMERS,** 8pF @ 5p. 50Ω. **TEN TURN POTS** 5kΩ @ 80p (new) also 100Ω @ 40p (ex equip) **DIN SOCKETS** 5 pin (180°) @ 5p **DIODES** OA81 10 for 20p BAX13 10 for 25p **LEADLESS CERAMIC DISC CAPS** 390pF, 25 for 10p. **JACKSON** C803 50pF and 100pF Trimmers pre-set @ 20p. **VARACTOR DIODES** vsc 65D 5W i/p at 2GHz for ≃ 2·7W at 4GHz @ 75p.

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INDEX TO ADVERTISERS

MEMBERS' AD ORDER FORM

FOR SALE ☐ WANTED ☐ (Tick as appropriate)

- **See Members' Ads page for conditions of acceptance.**
- **Not more than 40 words, including name, address, etc.**
- **Do not forget 50p remittance plus wrapper.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current call book is correct. BRS and A members will, of course, have to provide their name and address.

I enclose cheque/PO for **50p** to cover the cost of this advertisement.

Signed .....

Date .....

INTERNATIONAL VHF CONVENTION

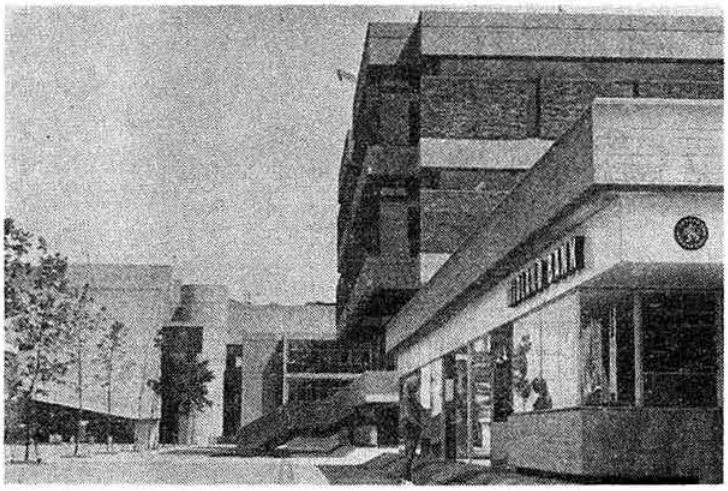
Organized by the RSGB

Brunel University
Uxbridge

8-9 May 1976

Exhibition opening times

11am—6pm Saturday
1030am—3pm Sunday

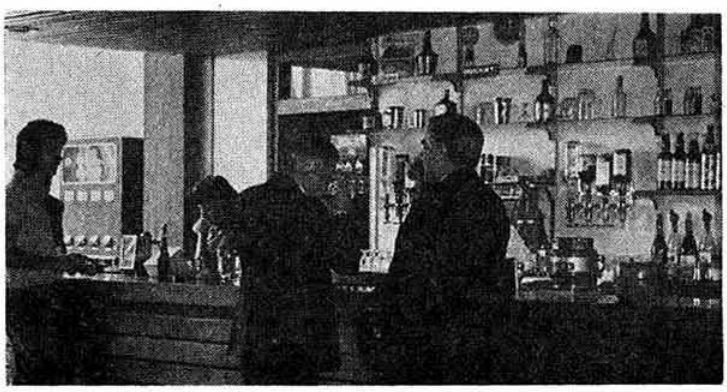


The university refectory' lecture centre and library

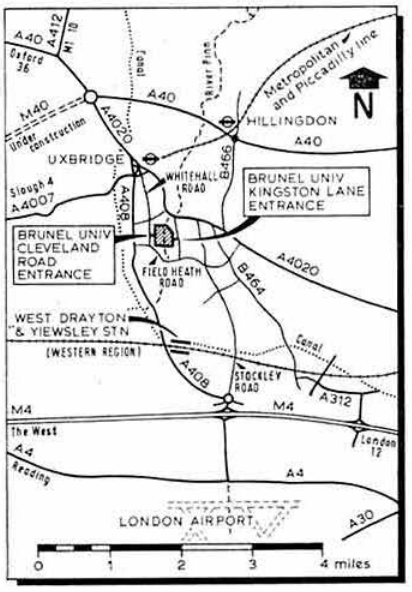
- **Two-day exhibition and lecture programme**
- **Saturday evening dinner and dance**

- **Large trade exhibition**
- **Ladies programme (visit to Windsor Castle, Saturday afternoon)**
- **Lecture programme (see provisional details overleaf)**
- **Ample car parking facilities**
- **Talk-in station on 70·26MHz (a.m.), 144·28MHz (ssb), 145·500MHz (fm), 433·2MHz (fm)**
- **Overnight accommodation on campus**

● **TICKETS. For details see application form overleaf. Dinner and dance tickets must be obtained in advance. Convention only tickets may also be obtained at the door.**



One of the bars



How to get there

APPLICATION FOR TICKETS
INTERNATIONAL VHF CONVENTION
8-9 MAY 1976

		Cost each	Number required	Total cost
Convention only	Saturday only	75p		
	Sunday only	50p		
	Saturday & Sunday	£1		
Ladies' programme (visit to Windsor Castle)		85p		
Saturday evening dinner & dance		£3.80		
Saturday/Sunday overnight accommodation (single room) including breakfast		£3.50		

I enclose cheque/postal order for £ .....

Name .....

Address .....

.....

.....

Post completed application form and remittance to:
Dept DAE-9, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE.

PROVISIONAL LECTURE PROGRAMME

(Full programme details will be despatched with tickets)

SATURDAY 8 MAY

Stream A

★ *The GB3SN Project*
by the GB3SN group

★ *Moonbounce (eme)*
by Peter Blair, G3LTF

Stream B

★ *Introduction to Oscar*
by Pat Gowen, G3IOR

★ *Oscar 7, Mode B*
by Brian Bower, G3COJ

Stream C

★ *1·3GHz ssb*
by C. W. Suckling, G3WDG, and K. S. Hutchinson, G4ALN

★ *Getting going on 10GHz*
by G. D. Lean, G3WJG, and P. M. Tunbridge, G8DEK

SUNDAY 9 MAY

Stream A

★ *Audio distortion in transmission and reception*
by Angus McKenzie, G3OSS

★ *Open forum*
by VHF Contests Committee and VHF Committee

Stream B

★ *Simple methods of Oscar tracking*
by David Walland

★ *Oscar command station at the University of Surrey*
by Martin Sweeting, G3YJO

★ *Future Oscars*
by a representative of AMSAT (possibly Joe Kasser, G3ZCZ/W3 from AMSAT HQ USA)

★ *Oscar seminar*

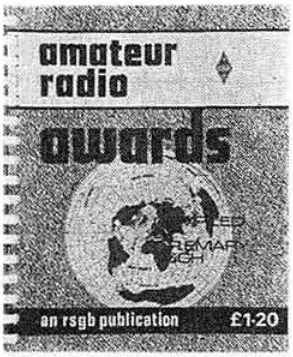
Stream C

★ *Microwave Yagis*
by Mike Walters, G3JVL

★ *Microwave dishes*
by Dain Evans, G3RPE

SPECIAL OFFERS BY POST

(until the end of March)



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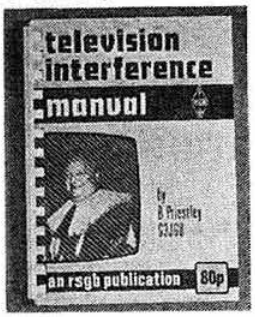
Special Price 90p



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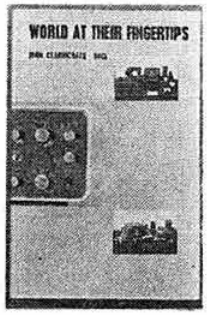
Special Price 60p



World at their Fingertips

A history of the first fifty years of amateur radio

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