January 1976

radio communication

journal of the Radio Society of Great Britain

AGM PRESENTATIONS

The President, GW8NP, presenting awards at the RSGB AGM on 5 December

Top, l to r: the Braaten Trophy to G3MXJ, who also received the G2QT Cup Winner's Cup; the Courtney Price Trophy to GM3OXX; and a certificate to a representative of the Glenrothes and District ARC, who received the Scottish NFD Trophy and Gravesend Trophy.

Centre, l to r: the Rotab Trophy to G2FYT; the Maitland Trophy to GM3OLK, who also received the Victor Desmond Trophy and the Somerset Trophy; and the RAEN Trophy to a representative of the Cornish Raynet Group.

Bottom, left: the NFD Shield to the Channel Contest Group, which was also awarded the Frank Hoosen Trophy; right: the Edgware Trophy to the Surrey Contest Group

(*More photographs and report on page 59*)

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

January 1976 Volume 52 No1

CONTENTS

Radio Communication **is published by The Radio Society of Great Britain as its official journal on the first Tuesday of each month and is sent free and post paid to all members of the Society**

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

17,816 copies per issue average circulation in 1974

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 01-837 8688 (or 01-686 5839, advertising only).

TR-3200 –
a step forward to 70cm FM

TR-3200 The number of 2m radio amateur stations is constantly increasing. The resultant popularity of 2m, however welcome, does have its disadvantages: the few simplex channels are often overcrowded and the repeaters permanently occupied.

Trio's new 70cm portable FM transceiver helps to solve this problem. It leads you into the wide open spaces of 70cm which at the moment are hardly used and offer opportunity for interference-free contacts.

The TR3200 has all the virtues and technical refinements of the world famous TR2200G 2m transceiver: compact design, low weight, rugged construction, supreme performance, stability and reliability plus latest state-of-the art circuitry adapted to the UHF range. Outstanding transmitter and receiver performance.

The transmitter section of the TR3200 features the latest semiconductor devices to give a high power output of 2 watts, with switched reduction to 0·4 watts for local contacts. The audio section has a tailored speech response and an integrated circuit limiting amplifier which together with a new style microphone, give that first class Trio speech quality.

The sensitive (less than 1μV for 20dB quieting) double conversion receiver provides an audio output of more than 0·7 watts into either the built in speaker, or an external earphone or loudspeaker. Multiple filtering at 10·7 MHz and 455KHz together with no less than five 455KHz limiters guarantee noise free reception, even on 70cm.

Noise detection squelch system gives optimum sensitivity so that you do not miss those weak signals.

Multi function meter serves as S meter in the receive mode, as an RF output meter in the transmit mode and as a battery check meter at any time.

Power supply from either eight dry cells or ten rechargeable Nicad batteries (option) or external 12V supply using the power cord supplied.

Built in 1750Hz tuning fork access tone generator for repeater operation.

Removable high gain $\frac{5}{8}$ whip antenna.

Built in loudspeaker.

Supplied complete with Nicad charger, carrying case with shoulder strap, press to talk microphone and all the usual accessories.

If you want to change from crowded 2m to the hardly used, jamming-free 70cm band, the TR3200 is the best way to start. Trio quality combined with advanced techniques give value for money at all times.

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

TRIO

LOWE ELECTRONICS

In our more recent advertising, we have been concentrating on showing you the superior qualities which make Trio equipment the finest available today. We would not like you to forget that we stock everything else that the SWL or amateur operator may need for his station. Starting at the top:

THE AERIALS

For HF operation we have the Hygain range, from the 3 band 12 AVQ to the mighty (expensive) TH6 DXX. For the lower frequencies, how about the RAK range of wire antennas—everything from the Listener—3 for the SWL to a full size array of 5 band dipoles. 2m and 70cm—certainly the J Beam range has to be incredible value for money. VHF mobile operators will find our selection of $\frac{5}{8}$ and $\frac{1}{4}$ wave whips outstanding. HF mobile operators all compliment the G-whips which we are happy to stock and recommend.
Now—joining antenna to rig will need feeder. Low loss UR67 and UR43 coax, twin line 75 ohm and 300 ohm ribbon are all available ex stock at competitive prices.
Rotating the VHF antenna will require something from the CDE range of motors and controllers, together with our large stocks of multicore control cable.
Checking out the aerial is best done by an SWR bridge. We stock both single and twin meter versions and also the super-duper REACE impedance bridge if you really want to be classy.
And all pluggery and socketry for terminating your shiny new coax at lower prices than anywhere else.
The CW man will need a key. We have all sorts, from the simple straight hand key to the all digital singing and dancing EK108A. Mind you, judging by what one hears on the bottom end of each HF band, the main function of an electronic key is to send beautifully spaced incorrect Morse code!
After your wrist is tired, we may sell you a microphone from a range of high quality dynamics. The Teisco DM501 is best value at £6.95 including VAT and the Trio MC50 dual impedance hand/stand mic. is the finest quality product around.
We sell station clocks, digital or analogue; loudspeakers; filters; baluns; everything for the radio amateur or SWL.
The most important thing you get from us, however, does not appear in our price lists. I'm talking about service; our return of post despatch of small items is unequalled for speed. Our technical advice is honest and based on the widest accumulated experience of professional and amateur equipment available from any dealer in Europe. Our technical service and repair facilities are, of course, the model which others attempt, unsuccessfully, to copy. No one knows more about current amateur radio equipment than Lowe Electronics.
Remember this when you make your next equipment purchase. We are at *your* service.

SALE

Those of you have recently visited us at Matlock will be aware of our building expansion.
In turning out our stock rooms to allow the builders in, all sorts of goodies have surfaced which will have to be sold off at low prices so that we can avoid having to hump them back into our shiny new store.
If you care to send a stamped addressed envelope to us, we will send you the sale list which contains details of bargains in crystals, aerials, cable, HF and VHF transceivers, microphones and many other desirable station accessories.
This is a once-only opportunity, so don't delay.

HEAD OFFICE — **119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m. to 9 p.m.**
BRANCH OFFICES — 39 Pound Street, Carshalton, Surrey. Tel. 01-669 6822
Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708
AGENTS — Alan GW3YSA. 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809
John G3JYG. 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071
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After, of course, your equipment has been thoroughly tested in our fully equipped Service Department.

NEW! TWO METRE TRANSVERTER

The FTV-250 styled to match the FT101 etc. Sensitive receiver converter with good image rejection and RF gain control on front panel. 10W P.I.P. (A3j and A1) 4W. (A3 and F3) metered power output and drive level. (3V. RMS at 29MHz.) 13lb, 11¼" × 8¼" × 6".

FTV-250

FT221

TWO METRE FT221

The FT221, THE multimode USB, LSB, AM, 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 11¾" (14") × 5" × 11¾", 22lb rigid package.

THE RECEIVER FR101D

The FR101D (deluxe) wide coverage (23 (from 1·5MHz) 500kHz bands + 4 and 2 metres) receiver. Analysis of the signal path shows: 0–20dB switchable attenuator, two section permeability tuned input filter, Mosfet R.F. stage and mixer (crystal controlled), 3 section top coupled bandpass filter, no gain at first I.F., IC balanced mixer, 20kHz wide crystal filter, shunt diode noise blanker, single FET buffer stage, AM, CW or SSB (RTTY) filter, appropriate detector and audio stage. Add to this, two excellent VHF converters, squelch, FM detector, 1kHz readout, excellent stability, Tx monitor control, crystal control facility, switchable AGC, transceive capability (FT or FL, 101) and that digital readout options are available of this (deluxe), or the standard (less the plug-in optionals), converters, broadcast band crystals, filters etc.) version truly an "apparatus communication sine filis" extraordinary.

FT101E (E/EE/EX/B)

HF TRANSCEIVER FT101 (E)

FR101 (SD/DD/S/D)

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 AM, 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 VFO is 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, AM, and 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.

Access

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

Terms: Cash with order, or credit card holders just 'phone in for, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £150.00. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared, or normal H.P. at competitive rates is available.

BARCLAYCARD

Communications Ltd

YEARS OF PROFESSIONAL EXPERIENCE

YAESU

YC601

NEW!

DIGITAL DISPLAY

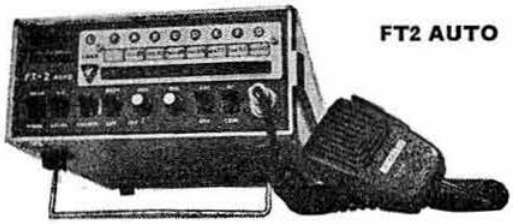
The YC601 digital display unit (for 101 and 401 series (3·18MHz IF) indicates transmit and receive frequencies to 100Hz on six bright green, 9 segment gas discharge tubes. Built-in mains P.S.U. (consumes only 10W), gate time of 100mS., size 3" × 8½" × 9" (10½") and weight 5½lb. Supplied complete with connecting cables, etc.

YP150

NEW!

POWER METER/DUMMY LOAD

The YP150 is a fan cooled 50 ohm dummy load (V.S.W.R. less than 1·2:1 at 145MHz) and power meter, for 1.8 to 200MHz. Calibrated 6, 30 and 150W FSD, on a large 3½" × 2" meter with maximum error of 10% FSD. Size 4½" × 6" (7") × 11" (12"). Weight 6lb.



FT2 AUTO

AUTO-TUNING TRANSCEIVER FT2 AUTO

The FT2 Auto is a unique concept in 2 metres FM transceivers. The "Auto scan" circuit monitors, in turn, each of the 8 channels every ½ second, automatically locking upon receipt of a signal. Push buttons, enable elimination of undesired or occupied channels, on Auto mode, or selection of that frequency on manual mode. A priority circuit may be activated to check your local net or RAEN frequency every two seconds. To transmit on a channel being received a momentary pressing of the P.T.T. locks the transmitter to the receiver.

THE VERSATILE ONE—SIGMASIZER 80R

The Sigmasizer 80R offers 80 (25 kHz increments) channels on 2m. The received frequency is always indicated on the dial, either transceive (simplex) or for repeaters, the transmitter is automatically shifted down 600kHz. When the receiver is tuned to repeater input channel, the transmitter is automatically shifted upwards thus offering full, simplex, normal repeater or inverse repeater. The built-in tone burst functions only in repeater mode. A further channel may be programmed for instant selection of a local net or RAEN frequency. Automatic final protection, 10W of RF and a generous 2W of audio are available from the unit which draws only 2·2A on 12V DC.

SIG. 80R

YAESU PRICES

H.F. TRANSCEIVERS		**H.F. RECEIVERS**		**VHF TRANSCEIVERS**		**ACCESSORIES**	
FT75B 120W P.I.P. VXO	£165.00	FR-101S single filter	£270.00	FT2 AUTO FM autotune	£215.00	SP*01 speakers	£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 digital standard	£345.00	FT-224 FM 24 channel	£135.00	XF30A AM filter	£18.00
FT-101B 230 AC/12V DC	£360.00	FR-101DD De-luxe digital	£425.00	FT-620B 6m CW/AM/SSB	£220.00	XF30C CW filter	£18.00
FT-101EX Economy "101"	£325.00			FTC212 70MHz FM	£190.00	XF30D FM filter	£18.00
FT-101EE "E" less Clipper	£360.00	**REMOTE VFO's**		Sigmasizer 80R 80 ch. (600kHz)	£225.00	XF103 CW filter	£22.00
FT-101E De-luxe	£395.00	FV50C VFO for FT-75 (B)	£39.00	Sigmasizer 200 200 channel	£180.00	XF90C CW filter	£18.00
FT200B 10-80m	£205.00	FV101B for 101B	£52.00	FP2AC AC PSU 12V out	£37.00	XF90B AM filter	£18.00
FP200B AC/PSU/speaker	£50.00	FV200 VFO for FT200 (B)	£45.00			MMB101 mobile mount	£11.00
FT-401B CW/AM/SSB	£330.00			**VHF TRANSVERTERS**		MMBAuto mobile mount	£7.50
FT-401 QRO base station	£310.00	**TEST EQUIPMENT**		FTV250B 144MHz	£115.00	VC75 VOX unit	£18.00
FT-501 digital readout	£375.00	YC355D 220MHz AC/DC	£135.00	FTV650B modified 70MHz	£100.00	Fan FT-101	£11.00
FP-501AC/PSU/speaker	£55.00	YC35535MHz AC/DC	£105.00			Sig MMB Sigmasizer mount	£7.50
		YO-100 monitor scope	£105,00	**LINEAR AMPLIFIERS**		RFP101 RF clip FL101	£28.00
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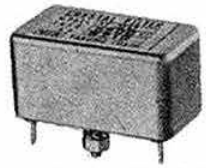
FL-101 10-160m	£275.00	YC-601 digital readout	£95.00	FL2100B 1.2 Kw P.I.P.	£230.00	YD846 hand mic	£7.00

SOUTH MIDLANDS COMMUNICATIONS

SMC

YAESU



LOW PRICE CRYSTALS AND CRYSTAL FILTERS

P & P EXTRA VAT RATE 25%

All "YF" filters individually supplied with ± 6dB, (25dB,) 60dB bandwidths, ripple factor and insertion loss.

3·18MHz		10·7MHz		9MHz	
XF30C 600Hz	£18.00	YF107M600 600Hz	£13.00	YF90M600 600Hz	£13.00
XF30A 6kHz	£18.00	YF107M2·4 2·4kHz	£12.00	YF90F2·4 2·4kHz	£11.00
YF30F12 12kHz	T.O.S.	YF107M12 12kHz	£12.00	YF90F12 12kHz	£13.00
XF30D 20kHz	£18.00	Carrier crystal HC18/U ..	£1.50	Carrier crystal HC18/U ..	£1.50

AT ONLY £3.50 PAIR—FT2F, FT2FB, FT224, AUTO, TR2200, C146A, C826MB etc. (Singles £2 ea.)

FT2FB (14MHz Rx, 18MHz Tx)	FT2F (52MHz Rx, 6MHz Tx)	TR2200 (44MHz Rx, 12MHz Tx)	C146A & C826MB
144 (15R, ·30, ·36, ·40, ·50R, ·60, ·70)	144 (15R, ·25, ·36R, ·48, ·60R, ·70, ·80)	SIMPLEX	SIMPLEX
145 (·09, ·32, ·44T, ·90)	145 (·08, ·09, ·68, ·84, ·90)	S [20, 21, 22, (23) (24)]	S [(20, 21, (22) 23, 24]
ALL Simplex, ALL Duplex and all Inverse Repeater (both T & R)	ALL Simplex, ALL Duplex and all Inverse Repeater (both T & R)	DUPLEX R [3, 5 (6, 7)] [R6 ¼ TOS)	DUPLEX R (5, 6, 7)

Spare Yaesu crystals available at **£2.20** each and any 144MHz (common types) channel crystals to order at **£3.50** pair, 8 weeks delivery

FT200 @ **£2.20** each (T.O.S) 10A, 10C, 10D

Converter crystal **£2** 38·666 (2m), 42 (4m), 50·5 (70cm)

Pye Pocket Phones 433·2 **£4.50** pair

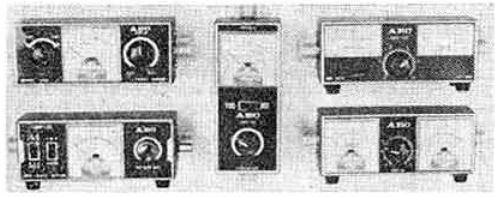
KP202 **£3.50** pair ·48, ·60, S21, R3 etc.

ALL ROTATORS

AR30 Light Duty ..	£25.00	CD44 Medium heavy ..	£60.00
AR40 Medium Duty ..	£30.00	AR22 Medium Duty ..	
AR33 de Luxe AR40 ..	£36.75		
Ham 11 heavy duty ..	£90.00		

CONTROL CABLE

5 core (AR30/40) pr yard	18p
8 core (CD44/Ham11) pr yd	27p



AEC swr/fs/Power Meters. (Calibrated to 160MHz for swr's of 3:1)

SWR10 (T.L.H.), 50/75Ω, SWR(±10%), 1·5MHz up. .. .. **T.O.S.**

SWR20 (B.L.H.), 50Ω, SWR(±10%), 1·5MHz up. F.S., Power 10 and 100W FSD(±10%) **£9.90**

SWR40 (centre) 50/75Ω ,SWR(±10%), 1·5MHz, F.S. **£7.80**

SWR50A (T.R.H.) 50/75Ω, SWR(±5%) 3·5MHz up. Power to 1kW(±20%) **£9.60**

SWR50 (B.R.H.) as SWR50A (300μA) but with 100μA movements **£11.20**

CUSH CRAFT RANGE (+VAT 25% CARRIAGE)

RINGO RANGER 144MHz (illustrated left)—ARX2. 6dB gain over ¼. (uses 3 × ¼ in phase and ¼ stub) ultra low angle radiator (approx 10ft high).		ABW144 2m. Big wheel ..	£13.15
		ABW12S ABW Harness ..	£7.30
		ASQ1 2m. Squalo	£11.20
		ASQ22 2m. stacked squalo	£23.00
AR2 2m. Ringo vert. ..	£10.90	CX1000 10m. Gain vert ..	£22.20
AR25 2m. Q.R.O. ringo ..	£12.90	ARX2 2m. Ringo ranger ..	£17.50

CDE ROTATORS EX STOCK (IN TOTTON) FOR FAST DELIVERY (25% VAT)

Carriage (BRS or Post) Free. Securicor "B" delivery £1 extra.
All Rotators supplied complete with control box and instructions.

AR30 Light Duty	£25.00
AR40 Medium duty	£30.00
AR33 de luxe AR40	£36.75
CD44	£60.00
Ham 11 heavy	£90.00
Control Cable	
5 core (AR30/40 per yard	18p
8 core (CD44/Ham 11) per yard	27p

JAYBEAM (Carriage extra) **FOR 70, 144 or 432MHz** (25% VAT)

FOUR METRES		TWO METRES		TWO METRES		70 CENTIMETRES	
4Y/4M 4 element Yagi ..	£6.80	D5/2M 5 over 5 slot ..	£7.92	5Y/2M 5 element Yagi ..	£4.30	D8/70 8 over 8 slot ..	£9.00
PMH2/4 2 way harness ..	£5.30	D8/2M 8 over 8 slot ..	£10.50	8Y/2M 8 element Yagi ..	£5.60	PBM18/70 18 ele Parabeam	£10.50
PM4/4M 4 way harness	T.B.A.	5XY/2M 5 ele crossed ..	£8.20	10Y/2M 10 ele Long Yagi	£11.00	MBM46/70 46 ele Multibeam	£13.90
BEARINGS		8XY/2M 8 ele crossed ..	£10.20	14Y/2M 14 ele Long Yagi	£14.20	MBM68/70 68 ele Multibeam	£16.10
562 (C.D.E. Manufacture)	£3.50	10XY/2M 10 ele crossed	£14.10	Q4 4 ele quad	£9.60	MBM88/70 88 ele Multibeam	£18.50
RZ 100	£9.17	PMH/2C Circular phasing	£2.85	Q6 6 ele quad	£12.80	12XY/70 12 ele crossed	£19.00
COUPLERS		PMH2/2M 2 way harness	£3.95	PBM10/2M 10 ele Parabeam	£14.95	PMH2/70 2 way Harness	£3.30
JBL15/59 2" Jointing sleeve	£2.50	PMH4/2M 4 way harness	t.b.a.	PBM14/24 14 ele Parabeam	£16.90	PMH4/70 4 way Harness	£7.80

HY-GAIN (Carriage paid) (+ VAT 25%)

HYTOWER 10–80m. vert rad	£132.00	TH2 MK111 10–20m. 3 ele	£69.00	103BA 10m. 3 ele ..	£35.00	DB1015A 10–15m. 3 ele	£76.00
18V 10–80m. Load vert ..	£18.00	TH3 JNR 10–20m. 3 ele	£74.00	153BA 15m. 3 ele ..	£44.00	DB24 B 20m/3e, 40m/2e	£142.00
12AVQ 10–20m. Trap vert	£25.00	TH3 MK111 10–20m. 3 ele	£99.00	203BA 20m. 3 ele ..	£80.00	LA1 Lightning protect ..	£17.50
14AVQ 10–40m. Trap vert	£36.00	TH6DXX 10–20m. 6 ele	£109.00	204BA 20m. 4 ele ..	£96.00	LA2 Lightning protect ..	£3.00
18AVT/WB 10–80m. Trap vert	£52.00	HY QUAD 10–20m. 2 ele	£99.60	402BA 40m. 2 ele ..	£121.00	BN86 1-1 Balun	T.O.S

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

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

GWHIPS, The British Mobile HF Antennas (Carriage 75p) (+ 25% VAT)

Tribander 10, 15, 20 ..	£13.53	LF40, 80 or 160m ..	£4.51	Flexiwhip, 10m with base	£10.45	F15, 20, 40, lor 160 ..	£4.67
Multimobile 10, 15, 20 ..	£15.73	MM40, 80 or 160m ..	£4.51	Basemounts	£1.81	Telescopic whips for coils	£1.22

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

B5 ⅝Wave 144MHz ..	£6.30	**B5U** ⅝Wave 432MHz ..	£5.00	Magnetic Base Mounts	£7.95	Note: deduct 50p from price of aerial if standard base not required.
BGA ⅝Wave 2m s/s	£7.35, f/g £7.95	70½ ⅝Wave 70MHz ..	£4.00	Trunk Lip Mount ..	£5.25	

Plugs, Sockets and Adaptors (P & P extra) (Plus VAT)

PL259—48p. UHF back to back—75p	PL259A—56p. UHF Angle—90p	SO239 35p. Phono/UHF adaptor 55p	Phono plastic 10p. Phono metal 12p
Jack Plug ¼" 2 pole plastic—16p	Jack plug ¼" 2 pole metal—24p	Jack plug ¼" 3 pole plastic—21p	Jack plug ¼" 3 pole metal—29p

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G4ELP

ICOM®

IC-201

The multi-mode rig that sets the pace in luxury and quality

£318 + VAT

REVERSE REPEATER AVAILABLE AT THE FLICK OF A SWITCH WITHOUT RETUNING

ICOM products are renowned for their sheer quality and reliability and the long waited for IC-201 is no exception. It is difficult to point out all the advantages and qualities in such a well engineered piece of electronics by just writing about it. It needs to be seen and handled to be fully appreciated. Those of you who saw it at Leicester will have had the opportunity already, but for those who haven't been so lucky then we invite you to visit us or one of our agents for a demonstration. If you are thinking of a multi-mode then make sure to consider the IC-201 before you choose. If you have any questions please phone us for a chat.

Compare these features with other multi-mode rigs:

Centre-Zero meter on FM
Narrow filter on FM for 25kHz channel spacing
Good, well-limited FM
600kHz shift of either Tx or Rx on the 145MHz range for repeater and reverse repeater operation.
Automatic tone-burst introduced on **Duplex**
4 Crystal positions for net and repeater frequencies
Two-speed gearbox giving easy rapid tuning
Vox. Fully adjustable (works on FM if you really want it)
CW side-tone
Full **break-in** on CW (separate VOX delay controls for CW and SSB)
RF gain control by adjusting the coupling of two helical filters
Excellent noise blanker
R.I.T.
Mic gain control on front panel
Dial-readout to 1kHz—accurate to 2kHz or better
Crystal Calibrator—500kHz

ACCESSORIES: microphone, DC power cord with plug, spare fuses, plug for CW key.

Transistors	53
FET	16
IC	10
Diodes	66
Frequency Range	144-146MHz
Weight	5·4kg

Transmitter

Power Output	A3J 10W pep A1, F3 10W
Carrier Suppression (SSB)	> 40dB
Unwanted sideband suppn.	> 40dB
Spurious radiation	−60dB
Deviation FM set to	4·5kHz
Mic. Impedance	500ohm
Operation	PTT or VOX

Specification

Dial accuracy	(−10°C to 60°C) ± 2kHz
Modes SSB (usb or lsb), CW and FM	
Ant. Impedance	50ohms
Operating Voltage	DC 13·8v ± 15% AC 230v
Size 111mm × 230mm × 260mm deep	

Receiver

I.F. Frequencies A3J, A1	10·7MHz
F3	10·7MHz and 455kHz
Sensitivity A3J, A1	0·5μV for 10dB S + N/N
	FM 0·4 μV for 20dB quieting
Squelch sensitivity (FM)	−8dB (μV) or less
Bandwidth	
SSB, CW	±1·2kHz −6dB points ±2·4kHz −60dB points
FM	±8kHz −6dB ±16kHz −60dB
Audio output	2W
Speaker	8ohms

These details are accurate to the best of our knowledge at the time of going to press, but there could be variations.

NOW SUPPLIED WITH ENGLISH HANDBOOKS

FOR UP-TO-DATE LIST OF AGENTS SEE PAGE 11

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Access

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ICOM is the expression of a unique design principle. As a concise description, ICOM quality is the expression of special talents. ICOM talents and need to concentrate on essentials bear the stamp of special characters: the stamp of the achievers.

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ICOM — it's a pleasure to own it

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ICOM®

IC-22A

The high quality mobile it's a pleasure to own

£141 + VAT

Fitted with £50 of crystals

THE MOBILE WITH THE MOST USEFUL CHANNELS FITTED

**** NOW AVAILABLE WITH CRYSTAL CONTROLLED TONEBURST ON REQUEST**

The IC-22A offers you the high quality and reliability found in all ICOM products in a compact, robust and attractive mobile rig at a price to suit your pocket. This FM transceiver employs up to date techniques to provide the ideal system for mobile use. Consider these points which all contribute to providing optimum contacts either direct or through the ever growing number of repeaters in the UK:

★ Low noise dual-gate mosfet in the front end of the receiver

★ 5 section helical filter after the front end to provide high rejection of unwanted out of band signals.

★ A trimmer for each crystal for accurate tuning which is necessary to keep ignition noise to a minimum.

★ Dual conversion with IFs of 10·7MHz and 455kHz for excellent image rejection and selectivity, with filters at each IF frequency.

★ Narrow filter giving high rejection of adjacent channel signals 25kHz away.

★ Hard IF limiting using an IC.

★ A sensitive, temperature compensated, adjustable squelch circuit with front panel indicator to show when the squelch is open should the gain control be turned back to please the XYL.

★ 1·5 watts of audio from its built-in 3½" speaker giving ample volume for copy on the move.

★ Line voltages are filtered and regulated for reduction of interference from the dynamo or alternator.

★ Excellent clipping and speech tailoring to suit FM requirements.

★ A full 10 watts output from a sturdy PA transistor—switchable to about ¼ watt for local working.

★ A fully automatic tone burst giving an access tone, for operating repeaters, at the beginning of transmissions WHEN SWITCHED TO A REPEATER CHANNEL ONLY. Thus there are no extra buttons to press when driving. Simply switch to the repeater channel you want and the rig does the rest.

★ An additional call button which can be wired as a manual tone switch for providing the very long (≏5 secs) tones required to initially open some continental repeaters.

The accessories include a microphone, dc power cord, spare fuses and the popular ICOM versatile quick release mobile mounting bracket. This makes it a simple job to remove the rig from the car for base station use.

UK Channel	IC-22A Dial No	Use
R3	3	Repeaters in SUFFOLK and YORKSHIRE
R4	4	Repeaters in Central Scotland, Derbyshire, Cornwall and Kent.
R5	5	Repeaters in HAMPSHIRE and Birmingham
R6	6	Repeaters in CAMBRIDGE and S. WALES,
R7	7	Repeaters in LONDON, WORCS, Aberdeen, Lancashire and West Wales
SO(145MHz)	9	A widely used mobile calling channel still used by many mobiles in the UK who only have this frequency
S20	10	THE OFFICIAL mobile CALLING channel
S21	11	A simplex channel to QSY to when others are full
S22	12	A widely used simplex channel
S23	13	Another alternative simplex channel often used.

NOTE: Repeaters shown in capitals are in operation NOW, others hope to be on the air before too long. Be ready now and avoid having to wait for crystals when they come into operation.

NEWS FOR CUSTOMERS IN SCOTLAND

We are pleased to introduce a new agent for Central Scotland. He is **IAN McKECHNIE GM8DOX** at Bridge of Allan which is convenient for both Edinburgh and Glasgow. As with our other four agents he is available **EVENINGS AND WEEKENDS** by telephoned appointment.

There are five other places apart from **HERNE BAY** where you can get the full **THANET** service.

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Penarth, CARDIFF, Glamorgan
Tel: 0222 702982

NORTH
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7 Moorland Crescent,
MAPPLEWELL, Barnsley. Yorks
Tel: DARTON (022678) 2517

LONDON
Terry Barnett, G8BAM,
7 Cochrane Court,
Leyton Grange,
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CRAYFORD, Kent.
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The CQ 110 (300W P.E.P.) and the CQ 301 (3kW P.E.P.) represent highest Communication standard for radio Amateurs today. The CQ 301 using the 7369 beam deflection tube as mixer, guarantees highest cross-modulation for your QSO.

With CQ 301 in combination, you have the most outstanding signal in any place of the world. Only a big Company like NEC with their 85 years of experience in communications can give such features.

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AS REVIEWED IN THIS ISSUE!

ICOM®

THE PERFECT BASE OR MOBILE STATION

IC201 2 METRE FM/SSB/CW TRANSCEIVER

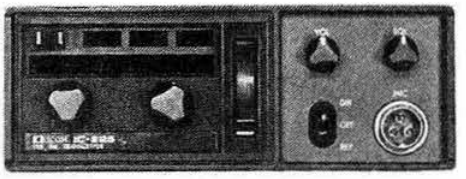
Probably the most sought after transceiver on the market today. Its features are so numerous that you will need a copy of ICOM colour catalogue to learn all about this exciting rig. However, we are listing below brief details of the IC201 specification.

FM/LSB/USB/CW; vfo or xtal control; centre zero meter; 600kHz repeater shift; reverse repeater; tone-burst; two speed tuning to suit both ssb and fm; vox; cw break-in; cw monitor tone; noise blanker; rf gain control; front panel mic gain control; stable vfo; excellent clear readout; swr meter; squelch; xtal calibrator; 12V or 240V AC input. This, the smallest all-mode transceiver makes it the perfect rig for mobile or fixed station use. **£393.75.**

1C21A 2M FM

This is the complete 2m fm base or mobile station rig. Small enough to fit into the car yet large enough to fulfil your complete base station requirements. 10 watts output fully protected with built-in 240V AC psu and a host of features. These include; IRT; infinite power control; S-meter; centre zero meter; aquelch; mic gain; swr/rf meter; narrow/wide deviation switch; xtal calibrator etc—possibly the most under-rated fm rig! Remarkable value at **£262.50.**

SEND SAE TODAY FOR YOUR COPY OF THE ICOM FULL COLOUR CATALOGUE



IC 225 2M FM 80 CHANNELS

The most sophisticated 2 metre mobile rig! 80 channels and not another xtal to buy. Full repeat and (with extra xtal) reverse repeat at the flick of a switch. **£287.50.**

NEC CQ-110

THE MOST ADVANCED AMATEUR RADIO TRANSCEIVER IN EUROPE

160-10m — 300w — 240v/12v — AM/SSB/CW/FSK/RTTY

THESE EXTRAS COST YOU NOTHING:—

1. Digital readout down to 100Hz.
2. Separate USB & LSB filters.
3. 500Hz cw filter installed.
4. 300 watts pep input.
5. Separate AM filter installed.
6. 6BZ5 rf & 7360 rx mixer for wide dynamic range.
7. 160m included.
8. Selectable slow & fast agc.
9. FSK and RTTY modes.
10. Noise blanker.
11. Integral 240v p.s.u.
12. Integral 12v DC p.s.u.

So when you compare the CQ-110 with any other model, remember the extras cost you nothing. Add to this a standard of design and performance that could only be achieved by the vast resources of one of the World's largest electronic companies, and you have Europe's most advanced transceiver . . . the CQ-110.

GET TO KNOW MORE ABOUT THE NEC CQ-110 BY SENDING TODAY FOR A FULL COLOUR BROCHURE. S.A.E. PLEASE.

WATERS & STANTON ELECTRONICS

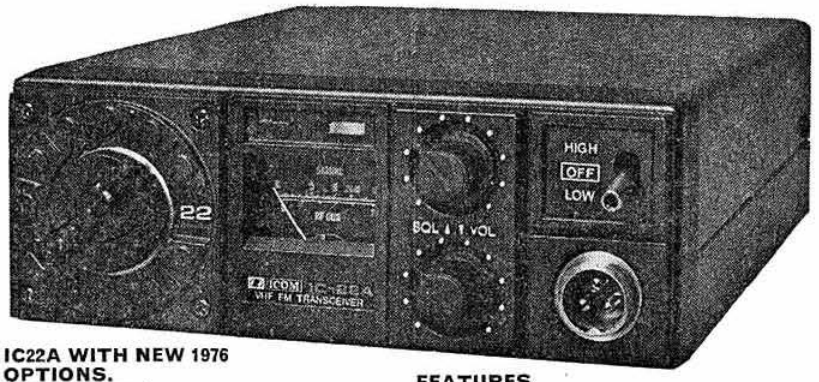
NEW! NORTHERN BRANCH NOW OPEN

BREDHURST ELECTRONICS, WILLOWBROOK, SCHOOL LANE, BUNBURY, CHESHIRE. TEL: BUNBURY 0829 260708

We are pleased to announce the opening of our new northern branch under the directorship of Richard McLachlan, G3OQT. He will be stocking the complete ICOM and NEC range of products including the popular IC22A 2 metre fm transceiver illustrated below with the NEW 1976 options (offered for a limited period at no extra cost).

SPECIAL OFFER

For a special limited period all 1976 IC22A transceivers supplied will be fitted completely free of charge with an automatic tone-burst and automatic time-out warning selected by a front panel control. When working through a repeater the normal access tone is transmitted and then 50 seconds later a further tone (not transmitted) is fed to the transceiver speaker to warn you that you are about to time out.



IC22A WITH NEW 1976 OPTIONS.
£176.25 inc. vat
(fitted 10 channels)

FEATURES

- ★ Automatic tone-burst on any channel at the flick of a new front-panel switch.
- ★ Every UK repeater channel fitted as standard.
- ★ 50 second time-out warning on repeater mode.

ICOM®

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SP101B Speaker	£18.75
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SWR 50 swr/pwr mtr.	11.95
Shure 444 mic	£19.95
Shure 444T mic	£23.95
Shure 201	£8.95
HP3A TVI filter	£2.50
50 ohm balun	£5.95
75 ohm balun	£5.95

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TH3 jr. 20–10m	£92.50	(2.00)

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CDE AR40	£37.50	(1.00)
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Ham M2	£112.50	(1.50)
Stolle 2010	£46.87	(1.50)
Stolle 2030	£53.12	(1.50)
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CABLE

75 ohm low loss	yd	.14p	(1p)
50 ohm UR 43	yd	.18p	(1p)
50 ohm UR 67	yd	.36p	(2p)
300 ohm twin	yd	.08p	(1p)

JAYBEAM

4Y4m 4 el yagi	£9.68	(1.00)
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COMPARISON OF ROTOR BRAKE TORQUE FIGURES (kg./cm.)

CDE model	Torque
AR30	575
AR40	920
CD44	1,152
HAM-2	4,025
Emoto model	
102 LBX	1,500
1100 MXX	10,000

1100MXX £115 + VAT
102LBX £55 + VAT

DOES YOUR ANTENNA TURN IN THE WIND?
DOES YOUR CONTROL UNIT 'CUT-OUT' AFTER ONLY A FEW REVOLUTIONS?
. . . then step-up to a RELIABLE EMOTO ROTOR.

We have been in the business long enough to know your requirements for a first class antenna rotor, and we have gone "over-board" for the EMOTO range! There are many brands of antenna rotors, some of them completely unsuitable for the majority of amateur applications, and for this reason we do not stock them.

Most likely your present antenna rotor will turn your antenna and hold satisfactorily, but it just will not hold it stationary under strong wind conditions; i.e. YOUR ROTOR LACKS SUFFICIENT BRAKE TORQUE, the ability to hold the antenna still whilst a gale is blowing.

HERE IS WHERE THE EMOTO SCORES.

Take a close look at the comparison figures above. Then compare the prices of all the rotors and you will have to agree that the EMOTO 102 LBX and EMOTO 1100 MXX are the best value.

Finally, EMOTO ANTENNA CO., is not a new company. They have been making rotors for many years. Have no fears about this being a new and untried product!

Having obtained samples (all rotors are individually tested by EMOTO before despatch) and had them tested by an independent authority, SOUTHAMPTON UNIVERSITY, we are now confident to recommend them as THE FINEST ROTORS AVAILABLE. The 1100 MXX received the following comment from the University: "Very rigid. NO SLACK, WELL MADE, GOOD DESIGN". NEED WE SAY MORE!

WESTERN FOR TEST EQUIPMENT

SEE OCTOBER'S 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-100MΩ). Decibel: -10dB to +65dB. Power source: 105-125, 220-240V. AC, 50/60Hz. Tube Complement: 12AU7, 6AL5.

RF SIGNAL GENERATOR, TE-20D
*Factory calibrated and tested
*Dual output RF terminals
*Separater Variable Audio Output
Specification: Freq. range: 120kHz-500MHz (7 bands). Freq. accuracy: ±2%. Audio output: to 8 volt. Internal modulation: 400Hz approx. Tube: 12BH7A, 6AR5. Power source: 105-125V, 220-240V, AC, 50/60Hz, 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-205A Tracer	£16.96
SE-360 Tracer/Injector	£19.17
SE-3850 Generator	£46.44
TE-15 G.D.O.	£27.00
TE-20D RF Generator	£27.00
TE-22D AF Generator	£35.64
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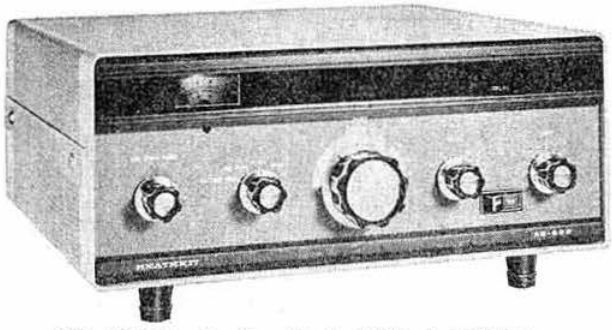
SB–104 80–10M Transceiver.
All solid-state, broad-banded tuned, digital read-out.



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To give you the most advanced approach yet to amateur radio.

Featuring all solid-state design, digital read-out, very high standard of performance and real operating convenience.

The new Heathkit range is also totally broad-banded. So you can say goodbye to time consuming preselector, load and tune controls.

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the choice of professionals

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¼W Unity Gain
108-512MHz

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ASP329	**£6.59**
ASP393	**£15.20**
ASP677	**£12.87**
ASPE667	**£16.10**
ASP749UK	**£24.50**

With the exceptions of the ASP629 and ASP749UK, all the other antennas require a single hole of 0·375" for mounting.

ASPR332 Gutter Mount **£7.00** Complete with 17' of cable and PL259 plug.

Boot Mount £2.55.

Magnetic Mount £7.85 Complete with 17' of cable.

We also stock various bases, whips, springs, transformers, splitters, etc.

Please add 75p. for p & p for each antenna and accessory.

VAT of 25% to be added to above prices.

Please send SAE for further details.

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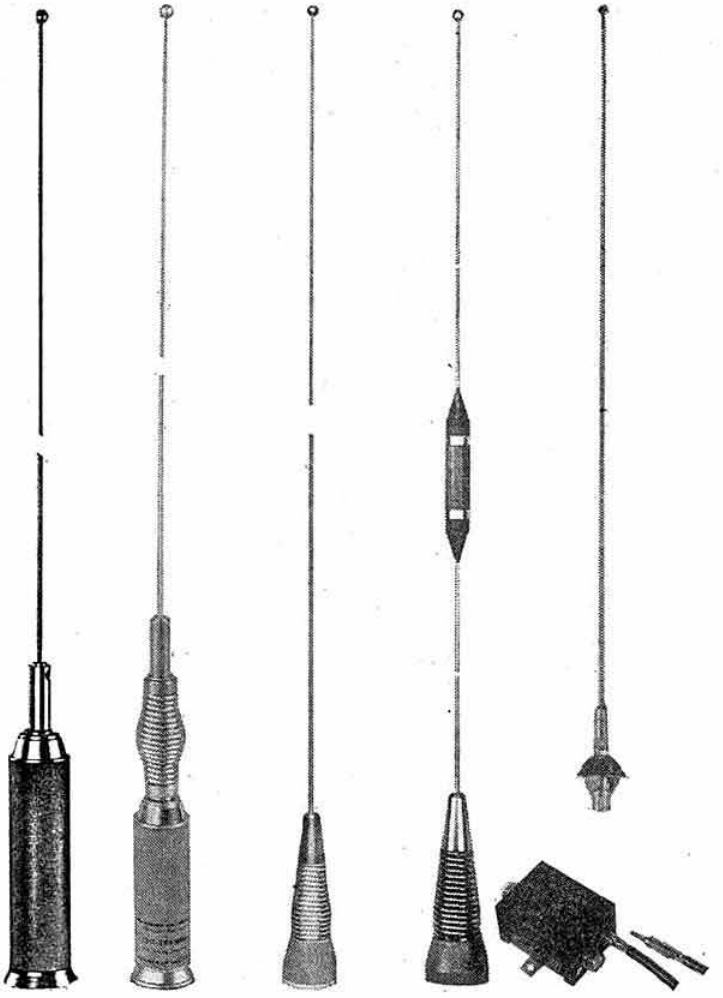

ASP629
¼W 3dB Gain
130-174MHz,
DC Grounded

ASP393

ASP677
¼W 3dB Gain
140-174MHz

ASPE667
5dB Gain
Collinear
425-440MHz
Complete with 17' of RG580 and PL259 plug

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¼W Disguise Ant.
3dB Gain
144-174MHz.
Complete with cables, plug, and splitter for car radio

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RADIO SOCIETY OF GREAT BRITAIN

35 Doughty Street, London WC1N 2AE

Telephone 01-837 8688

Founded 1913
Incorporated 1926

Member society, International 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

CQ de RSGB

Membership and Representation

The Membership & Representation Committee has carried out a detailed investigation of the Scheme of Representation and has come to the conclusion that it does not operate to full potential.

District and county representatives were the only "in the field" connections between headquarters and the membership until 1936 when town (or area) representatives were appointed. In 1947 the scheme was consolidated to include town and county representatives elected by the membership and the appointment by Council of 15 regional representatives. A fundamental change occurred in 1953 when the country was divided into six (now seven) zones, each of which could elect a member to serve on Council. Another and perhaps under-estimated advantage of this system is that each member of the Society has two votes—one for his zone Council member and one for an ordinary Council member. The last and most significant change occurred after a meeting between regional representatives and Council in 1969 at which it was unanimously decided that zone members of Council should be re-named zonal managers, thus providing both a degree of autonomy for each zone and a direct link with Council.

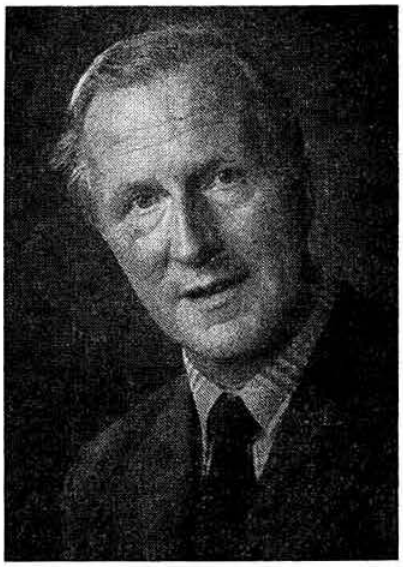
For its investigation, the committee used mainly two criteria. One was an analysis of the large volume of correspondence reaching headquarters, and the other the type of questions asked at various meetings throughout the country on the subject of representation. From this evidence it became apparent that there was a failure in communication and that the membership had not been given sufficient information about the scheme to enable it to become fully effective. As an example, a significant proportion of the correspondence reaching headquarters could and should have been dealt with within the zonal structure where adequate knowledge was available.

In order to rectify this administrative gap, a booklet on the Scheme of Representation has been published and circulated to all Society office holders. It is complementary to the Memorandum and Articles of Association and, taken in conjunction with them, provides a complete description of the administration of the Society.

Finally, we have to remember that no matter how brilliant any scheme of administration may be, it is only "words on paper" until used by people. In a Society such as ours, only the good sense and co-operation of the members can make it effective. So *please* use the channels of communication provided within your zone to the full before writing directly to headquarters, for by so doing you will help the overall efficiency and economy of the Society.

C.H.P.

A message from the RSGB President for 1976



Being chosen as your 42nd President is a very great honour to me, and I am deeply grateful to all those who have supported me through the years and made such an event possible.

This is likely to be a very difficult year for our Society, but I am confident that, with the wholehearted help of each and every member, and also of headquarters staff, we shall find ourselves in a much stronger position at its end. Hopefully the current rate of inflation will have slowed and the present hopeless task of trying to catch up with ever-soaring costs will become easier.

I appeal to every member to try to recruit at least one other new member during 1976—numbers are strength and strong national societies are going to be vital to amateur radio in the period between now and WARC 1979. It is only just that all who benefit from amateur radio privileges should share the cost of their defence. We must also all remember the old saying that "the amateur is a gentleman"—because it is by our behaviour on the air in the next few years that the world is going to judge us.

May I also take this opportunity to thank all those who do so much work for our Society—our representatives throughout the country, those who serve on our committees, and all those who, as members of our Society, do all they can to improve the image of amateur radio.

A very happy and successful 1976 to you all.

John Allaway, G3FKM

QTC

amateur radio news

Repeater news

Since the formation of the Repeater Working Group (RWG) (a sub-group of the VHF Committee) at the October 1975 repeater meeting at Brunel University, it has held two meetings at RSGB HQ. Rapid progress is being made on a countrywide location plan for future 70cm repeaters, which it is hoped may be ready for submission to the Home Office in the early part of this year.

The RWG *urgently* requires information from any group (which is not already on file at RSGB HQ) concerning future plans for 70cm repeaters. The RWG wishes to hear *now* even if plans or ideas are only in the embryo stage at present. Such information is required urgently so that the best factual data may be obtained in order to prepare the future countrywide location plan. Groups are asked to send details to RWG at RSGB HQ.

Any group interested in repeater news is asked to contact the Society, as a new newsletter called *Repeater Report* is currently being produced on a bi-monthly basis. To obtain a free copy of this newsletter the group should send a quantity of, say 10, stamped addressed envelopes suitable for one sheet of A4-size paper to *Repeater Report*, RSGB, 35 Doughty Street, London WC1E 2AE.

The RWG plans to hold an open meeting for all repeater groups during March, probably in Birmingham, and further details of date and venue will be published in *Radio Communication* and the *Repeater Report*. Basic details concerning repeater projects may be obtained from RSGB HQ.

Facts and figures

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

Class A	15,681	Class B/M	2,023
Class B	5,655	Television	297
Class A/M	3,848		

The callsign record received from the Home Office dated 21 November 1975 gives the latest callsigns issued in the G4 and G8 series as G4EOG and G8LBN respectively.

At the end of October 1975 RSGB membership totalled 18,973 made up of 15,902 UK corporate, 1,115 UK associate and 1,956 overseas members.

Regional and area appointments

Mr P. H. Hudson, GW3IEQ, has been reappointed regional representative for Region 11; Mr A. M. Cameron, GM3OGJ, has been appointed area representative for the central area of Region 14; and P. J. Sterry, G3CBU, has been appointed area representative for the Basingstoke area of Region 17.

Affiliated societies list amendment

The Bedford and District Amateur Radio Club was omitted from the 1976 edition of the *RSGB Amateur Radio Call Book* in error. This club is still affiliated and details of its meetings appear under Region 5 in "Club News".

"Ham Radio Magazine"

The subscription rate for *Ham Radio Magazine* has risen to £6 for 12 issues with effect from 1 January 1976. The price for 36 issues has also risen to £12. These price increases will affect both new subscribers and renewals.

COUNCIL ELECTION RESULTS

The results of the ballots to fill the five vacancies on Council from 1 January 1976 were as follows:

Ordinary members

J. Bazley, G3HCT	958
R. Bellerby, G3ZYE	706
T. Darn, G3FGY	1,030
D. S. Evans, G3RPE	1,408
N. A. Smith, G3HFO	545
G. M. C. Stone, G3FZL	2,001
C. J. Thomas, G3PSM	1,192

Zone C member

D. J. Andrews, G3MXJ	266
W. J. McClintock, G3VPK	247
G. P. Packer, G3UUS	133
F. A. E. Porter, G2CDX	74

Zone D member

L. N. G. Hawkyard, G5HD	180
W. A. Scarr, G2WS	250
C. F. H. Young, G4CCC	111

Votes received .. 2,901. Late entries .. 41. Spoilt votes .. 59.

Messrs **D. S. Evans, G. M. C. Stone, C. J. Thomas, D. J. Andrews** and **W. A. Scarr** were accordingly elected to serve on Council for the three years 1976-8.

"Teleprinter Handbook"

This book was a joint BARTG-RSGB production and the sales have necessitated a new binding. The current cover price of £5 will be increased to £6 from 1 January 1976. However, for RSGB members there are a small number of copies at the old price. If you would like to have a copy of this book, which has become a standard teleprinter reference book, do not delay your order. The additional cost of post and packing is 74p per book.

Additional notes on "Stereocode"

A number of queries has been received from constructors of Stereocode, and a few additional notes may help others. The commonest problem arises from difficulty in understanding the difference between *phase difference* and *group delay*, the misnomer "phase delay" contributing to this difficulty. The delay, the time taken for the output end to know there was an input signal, is equal to the rate of change of phase; that is, the slope of the phase/frequency curve, in radians/cycle; which translated into degrees and milliseconds, became the figures given on p680 of the September 1975 issue of *Radio Communication*.

The curves of Fig 11 were measured between the two output terminals (we forgot to say so) and thus give the delay difference between the two channels. If the two channels are measured individually between input and output, the phase curves should lie parallel at about 750Hz, but should diverge elsewhere. It should be noted that the actual degrees of phase are not important, it is the slope of the curve that matters. Also the curves may come either way up, according to how the reference is taken.

The question arises, how to locate a faulty stage? Each second-order stage (IC4-6) produces a phase of 180° at about 1,600Hz, and can be checked in situ with an audio source and an ac voltmeter. Connect the source to an input (eg junction R15-C10 of IC4 Fig 7) and take both input and output to the voltmeter via equal resistors (10 to 22kΩ) and at least 1μF dc blocking. The voltmeter should zero at the 180° phase frequency. If this is ok then the stage is good. The first-order stages, IC1-3, only give 90° at mid-frequency (400Hz) and must be taken two at a time.

Another omission was the total quiescent current. The 741s take only 2 or 3mA each, but the LM380s each take 10 to 25mA, so the total should lie between 30 and 70mA, usually about 50. If rf from the transmitter causes excessive current, connect 1,000pF from terminal 2 to ground on the LM380s. *G6CJ, G3OTK*

Installation of President 1976

Dr E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM, will be installed as the forty-second President of the Radio Society of Great Britain during the course of a social evening on

Friday 23 January 1976

in the

Executive Suite

Warwickshire CC Ground

Edgbaston

7 for 7.30pm — Dress informal

All members, who may bring a friend, are cordially invited to attend this occasion at its new location.

Applications for tickets must be made to RSGB Headquarters, with an sae please, as soon as possible. This will greatly assist with the catering arrangements.

Representation on outside body

To the list of RSGB representatives on outside bodies on page xvi of the annual Report and Accounts published in the November 1975 issue, should be added Mr I. Jackson, G3OHX, who is a member of the BREMA Interference Sub-Committee.

Portsdown Hill Repeater Group—(UHF) GB3PH

The next meeting is to be held at Porchester Community Centre at 8pm on 25 January 1976. Talk-in on S20, all interested parties are invited. Further details from G8HVO, QTHR.

GI RAE course

An RAE course is being held at Larne Technical College every Wednesday commencing at 6.30pm. The lecturers are GI4CPP and GI3UVX.

New subscription rates

Following approval of the special resolution at the AGM on 5 December 1975, the following subscription rates apply from 1 January 1976:

Corporate member (UK)	**£8.00**
Corporate member (Overseas)	**£7.50**
Corporate member (Student)	**£4.50**
Corporate member (Family)	**£3.00**
Associate member	**£3.00**

1·3GHz band ssb

by P. K. BLAIR, G3LTF, and C. W. SUCKLING, G3WDG*

THIS article discusses the generation of single sideband on 1·296GHz, and describes in detail a high-level mixer and filter, a power amplifier capable of 50W output, and a suitable "in-line" rf output indicator.

Introduction

During the last few years there has been a slow but steady increase in the number of stations using 1·3GHz ssb, and it is hoped that this article will encourage others on to the band using this mode. It should be noted that licensing for ssb is by power output rather than power input, and on the higher uhf and shf bands, where there are lower efficiencies in power generation, ssb can show even greater advantages over other modes.

There are several ways of producing ssb on this band. The first of these uses a fairly complex processing technique to produce an ssb signal with the frequencies of its varying components divided by a factor *n*. When it is multiplied (by *n*) to the desired output frequency, this signal is restored to a signal close to true ssb. The advantage of this method is that simple valve or varactor multipliers may be used to reach the final frequency. The system has so far been seldom used on 1·3GHz, but it may prove useful on higher frequencies. More details can be found in [1].

Another potential method involves direct phasing at 1·3GHz. If Schottky barrier diodes and printed-circuit phasing lines are used there is no doubt that this method is feasible, but its main disadvantage, common to all low-level mixing systems, is the low power output. Some 40-50dB of linear amplification would be required to raise the mixer output to a useful level—a daunting prospect on this band!

The most popular system at present is the high-level mixer. Its principal advantage is the high output power (normally several watts), so that only one or two stages of linear amplification are required. Spurious levels can be kept adequately low using simple filters, provided that sensible starting frequencies are chosen. Most current designs use either 1,268 + 28MHz or 1,152 + 144MHz, the choice between them being largely dictated by other interests. In the authors' cases 1·152GHz power was already available for multiplication to the higher bands and, since the use of 144MHz also undoubtedly eases the frequency filtering requirements, the latter combination was selected and is described below. With minor modifications it seems highly likely that the mixer heterodyne circuits described could accept other input frequencies.

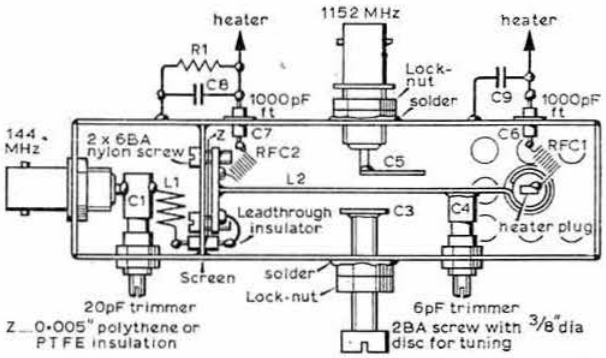


Fig 2. Layout of the cathode circuit

Design of the mixer

The circuit diagram of the mixer is shown in Fig 1. The part of the unit which has not been described before is the cathode input network. At 1·152GHz it behaves as a $\lambda/2$ line, with one end held at zero rf potential by C2, and the other end connected to the cathode of the 2C39. This brings the cathode itself to a low rf potential and minimizes any tendency to oscillation at uhf. The line is tuned by C3(fine) and C4(coarse). At 144MHz the network presents resistance and capacitance components determined by the total shunt capacitance C2, C3, C4 and C_{gk} (grid-cathode capacitance) in parallel with a resistance of approximately $1/g_m$ and the 1·3GHz choke reactance at 144MHz. This can be matched to 50Ω by C1 and L1. The isolation between the two input frequencies is high since the variables C3 and C4 are small compared to the total shunt capacitance.

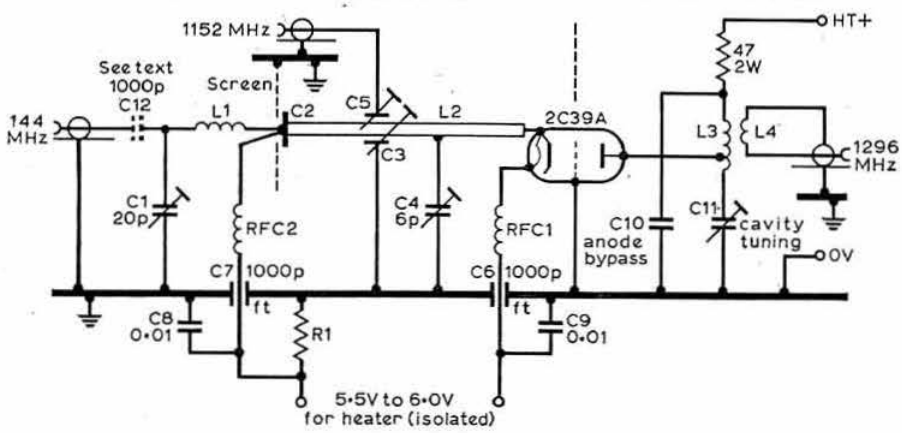


Fig 1. Schematic diagram of the mixer

* 31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

Since the valve is operated in a grounded-grid configuration, bias voltage is developed between cathode and earth across R1. This voltage is present on both the heater supply and the 144MHz input socket, and care must be taken not to short it out. An isolated heater supply must therefore be used, and there must not be a dc short to earth in the output network of the 144MHz exciter. If the latter is not the case, a 1,000pF disc ceramic capacitor with short leads should be connected in series with the 144MHz input.

The anode circuit has been described before [2] and is probably one of the most efficient and easily-built designs available.

Construction of the mixer

The cathode circuitry is shown in Fig 2. It is built into a trough section box, the bending and drilling details of which are shown in Fig 3(a). A tight-fitting lid is recommended to reduce 144MHz radiation. A screen, shown in Fig 3(b), is soldered into the trough and serves as one part of C2. Fig 3(d) shows the 1·152GHz line with the brass disc serving as the other half of C2.

The spring-clip cathode connection used in the prototype was an 807 anode connector, but a similar article can easily

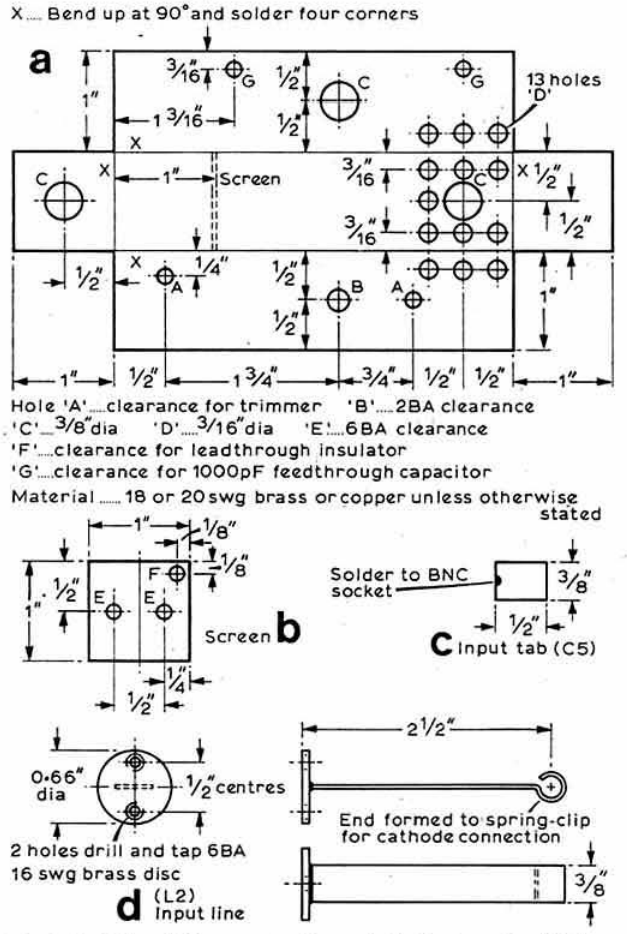


Fig 3. Details of the construction of (a) the trough, (b) the screen, (c) the input tab and (d) the input line

Components list

C1	20pF Mullard ceramic tubular trimmer
C2	20pF homemade capacitor
C3	⅜in dia disc carried by 2BA screw
C4	6pF Mullard ceramic tubular trimmer
C5	Brass tab (see Fig 3(c))
C6, C7	1,000pF feed-through
C8, C9	0·01μF ceramic discs with very short leads (144MHz bypass to reduce radiation)
C10	Anode bypass
C11	Cavity tuning (see Fig 5)
C12	1,000pF disc ceramic (see text)
L1	3t 18swg copper wire 5/16in i.d.
L2	1·152GHz input line
L3	Anode cavity
L4	Output loop
RFC1, RFC2	8t 22swg enam copper close wound on ⅛in mandrel
R1	Chosen to give 20–30mA standing current (typically 100–270Ω with 400V ht)

be made from thin springy brass sheet. A convenient heater connection can be fabricated from an old wander plug insert, cut short and bent outwards to form a good fit. It is important not to leave too large a blob of solder on the plug when soldering on the heater choke, as the solder may melt under fault conditions (particularly if the cathode is not forced-air cooled) and short out the heater supply.

The mounting of the trough assembly above the grid tray of the anode cavity is shown in Fig 4. The bracket is necessary both electrically and mechanically and should not be omitted.

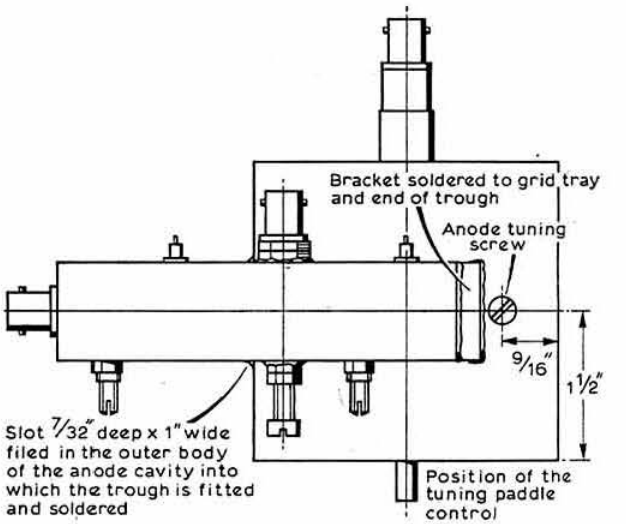


Fig 4. Location of the input circuitry on the anode cavity

A few minor modifications were made to the original anode cavity design. A coaxial tuning capacitor (Fig 5) was added to give a wider tuning range than that obtainable with the paddle alone, and this makes initial setting up much easier. A round BNC socket was fitted to the output probe in place of the recessed Belling-Lee type. Since the grid bypass capacitor was not required, the grid fingering was soldered directly into the grid tray. A 21/32in hole should therefore be punched in the grid tray instead of the ⅞in hole originally shown.

As fingering suitable for the anode and grid connections is difficult to obtain commercially, it is worth describing how it can be made by the amateur.

The construction of a dummy 2C39, as shown in Fig 6(a), is to be recommended. Its value is two-fold. First, it is useful in the manufacture of fingering as a non-solderable former, and second it provides a means of lining up the finished cavity before fitting a real valve. 2C39s are easily broken in two if the anode and grid connections of the cavity are not concentric!

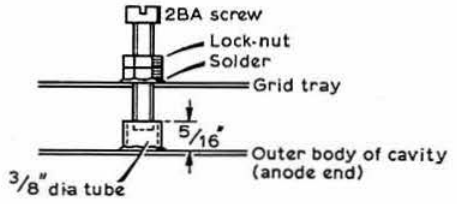


Fig 5. New anode tuning control

The first step in the fingering construction is to cut out a piece of phosphor-bronze strip (which can be purchased as draught-excluder) $\frac{3}{16}$in wide and of sufficient length to go once round the hole. The hole should have been punched and filed so that the valve with the strip wrapped around is a loose fit. Leaving the dummy in place, the strip is soldered to the grid tray using a small flame. Care should be taken not to direct the flame onto the strip, or its springiness may be lost. When cool, the dummy valve is withdrawn and V-cuts made with sharp tinsnips all round the strip as indicated in Fig 6(b). Each separate strip is bent with long-nosed pliers as shown. The dummy valve is then re-inserted to preform the fingering to its correct diameter before fitting a real valve. It should be pointed out that the soldering can be done without a dummy valve, but it is considerably more difficult. If attempted, care should be taken not to leave any solder on the inside of the fingering before the valve is fitted.

It is strongly recommended that the bushing method shown in the original design for securing the anode bypass plate be used. Nylon screws have been employed without insulating bushes, but tend to arc over at high anode voltages

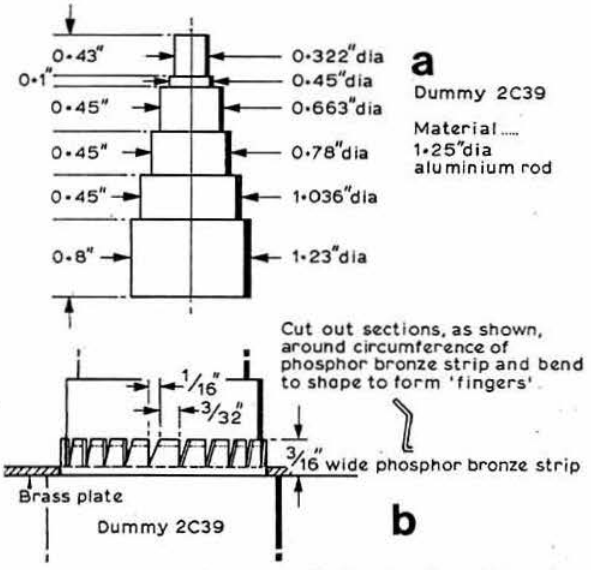


Fig 6. (a) Dummy 2C39 detail. (b) Construction of fingering

—particularly if the unit is running warm. In this respect it is considered safer to use 0·005in ptfe sheet as the insulator instead of polythene.

Tuning and adjustment

Apply 5·5 to 6·0V to the heater and +400V to the anode, and ensure that there is adequate forced-air cooling to the latter. The anode current should be set to approximately 20mA by varying R1. A value of 270Ω should be found suitable for initial tests. Some 2-3W of 1·152GHz drive should then be applied, and the 6pF trimmer adjusted for maximum anode current. Fine tuning may be accomplished by adjusting the 2BA screw. The input matching can be optimized by bending the input tab to vary its spacing from the line and then re-tuning. When the anode current has been maximized it should be around 50-60mA. Leaving the 1·152GHz drive connected, apply 5-8W of 144MHz cw drive and adjust the 20pF trimmer for lowest input vswr. The anode current should then be around 80-100mA.

Some form of power-indicating device (see below), terminated by a dummy load, is then connected to the output socket. A suitable dummy load may be made from 50ft or more of thin ($\frac{1}{4}$in or less) 50 or 75Ω coaxial cable, terminated by a resistor which may be conveniently mounted inside a BNC plug or in-line socket as described in [3]. Bulbs are not generally suitable for dummy loads at 1·3GHz.

The output probe and tuning paddle are rotated so that they are at an angle of 45° to the axis of the valve, and the anode tuning screw adjusted for maximum output. If the cavity does not resonate, the grid tray can be moved as described in the original article. Once resonance is achieved, the output matching may be optimized by altering both the penetration and angle of the output probe. The tuning paddle can then be used for fine tuning, eg to correct for warm-up drift. As a final check, ensure that virtually all output indication disappears when the 1·152GHz drive is removed. If this does not happen it is possible that the anode cavity has been resonated to 1·152GHz by mistake. This should not be possible, however, if the cavity dimensions have been adhered to.

When the unit is operating correctly, the ht voltage may be increased up to about 800V for a used valve, or 1,000V if a new ceramic valve is employed. Since the efficiency of the mixer is only about 10 per cent, adequate cooling is vital to prolong valve life. A cw output of 3-4W should be obtained with 400V ht, and with 1,000V 10W has been achieved.

SSB operation with the mixer is quite straightforward, and the maximum 144MHz drive is about 5-10W p.e.p. Signal-quality reports have been very favourable—there is apparently no audible difference in the quality of the 1·3GHz ssb compared to the 144MHz drive.

1·3GHz bandpass filter

The mixer output circuit contains, as well as 1·296GHz, signals at 1·152 and 1·008GHz. Experimental measurements on the original design showed the 1·152GHz component to be greater than 20dB down on the output. The 1·008GHz component would be expected to be a further 30dB down.

If a pa is used after the mixer, the 1·152GHz signal will receive about another 20-30dB of attenuation which may be considered adequate. In order to be sure, however, and also to allow the mixer to be used on occasion alone, a four-section filter was added to the output giving over 30dB extra attenuation at 1·152GHz.

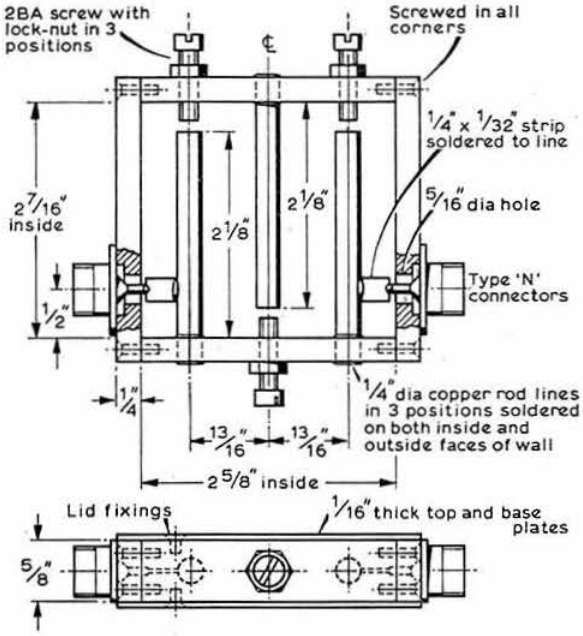


Fig 8. 1·3GHz three-section interdigital filter. Attenuation is 0·5dB at 1·296GHz and 30dB at 1·152GHz

The design is based on one described in *QST* [4] and is shown in Fig 8. The elements are shortened λ/4 lines tuned by capacitors made from screws. Alignment is best carried out using a sweep generator, but in the absence of one (if the filter is built carefully as described), tuning up can be done using the station 1·3GHz band converter and a small-signal source such as that described in [5]. With the source some distance away and the filter connected in the aerial feed to the converter, each resonator is simply peaked in turn. This procedure should be repeated twice. Final adjustment should be made with the filter "isolated" between two pieces of thin coaxial cable approximately 20-50ft long which act as buffer attenuators. If adjustments at, say, two other places in the band can be made, then the filter should be tuned there also to achieve a better bandpass response.

The insertion loss is small (approximately 0·5dB) and so virtually no loss of output power should be seen when the filter is put directly in the output of the mixer described above. Any small residual output resulting from "leak-through" of 1·152GHz will be seen to disappear. A final "tweak" on the mixer output loading and tuning is recommended after the filter is installed to recover any power lost from small loading changes.

This type of filter has also been found useful in situations where "wide-open" receiver mixers or preamplifiers are used, particularly in the vicinity of uhf tv transmitters and L-band radar sites!

1·3GHz power amplifier

A linear amplifier may be constructed for 1·3GHz using an input circuit very similar to that of the mixer. The only differences are that no 144MHz circuitry (C1, L1) or coarse tuning capacitor (C4) is required. The same input line will then resonate on 1·296GHz.

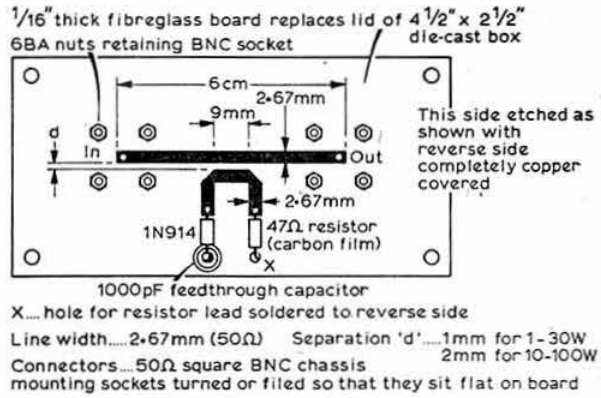


Fig 7. Forward power indicator

The setting up and tuning adjustments are identical to those of the mixer, except that a slightly higher standing current of 40-50mA is used. A cathode resistor of around 100Ω is suitable. With about 8W drive from the mixer described above, and an anode voltage of 800V, a cw power output of 45-50W has been achieved with nearly 50 per cent efficiency.

1·152GHz exciter

A suitable 1·152GHz exciter might well consist of a 384MHz driver delivering 6-7W followed by a 2C39A or varactor tripler. Suitable starting frequencies of the oscillator chains are 42·6667, 48·0 or 96·0MHz, with output stages using a transistor, varactor, or a QQV03-20A or similar valve. There are many 70cm designs which can be modified for 384MHz, but it is not proposed to give detailed designs here as most uhf operators will have the knowledge to do this for themselves.

An alternative design used by one of the authors generates power at 1·152GHz using two cascaded varactor doublers from 288MHz; no doubt others will use alternative methods.

A 2C39A tripler design which has been used as the final stage of one 1·152GHz exciter uses the same type of anode cavity as the mixer and pa, modified for the lower frequency.

The new dimensions are as follows:

Anode cavity 3⅜ by 3⅜in Anode bypass plate 2½ by 2½in
Grid tray 3 11/32 by 3 11/32in Grid bypass plate 2⅝in by 2⅝in

The rest of the circuit was identical to the tripler described in [2] except that an input inductance 3in long was used.

Operation of the exciter initially caused tvi on Channel 58 (767·25MHz), but this was cured by screening the whole unit. It would seem worthwhile to always screen uhf oscillator chains due to the wide variety of frequencies generated and the likelihood of their operation from portable sites close to other services.

In-line rf indicator

A very simple form of rf indicator has been described [6] and is reproduced here since it is very useful for tuning up the mixer and pa described above, and also for continuously monitoring the rf output.

Fig 7 shows the construction of the device. The board was

(Continued on p33)

Some reflections on the four-way phasing method

A. GSCHWINDT, HA5WH*

The development of practical polyphase ssb for amateurs has been described in "Technical Topics" Oct, Dec 1973 and May 1975. Suitable phase-shift filters were initially developed in the UK by M. J. Gingell of STL—Ed

IN this article the author would like to introduce some results of work carried out on the four-way phasing method for ssb generation and reception, and in particular some circuit configurations suited for amateur use.

Principle of operation

The basic idea behind the four-phase system is to lower the tolerance requirements for the circuit components. In practical terms the four-phase system is a double two-phase system, where the signals are shifted by 90° in the audio and rf channels and then the outputs are added.

Fig 1 shows the basic configuration of a generator. A similar one is suitable for ssb reception (Fig 2). Both circuits use the same audio phase shifter, which is the "heart" of the system. For rf phase shifting the well-known digital circuits are suitable.

To get good sideband suppression it is necessary to ensure good amplitude and phase balance in the circuits, but generally the amplitude symmetry is not a great problem. The only real requirement is a good af phase shifter.

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Table 1. Basic data for flow-phase af phase shifter design

	n = 4			n = 5			n = 6		
f_{min}	300	150	100	300	150	100	300	150	100
f_{max}	3,000	4,500	4,500	3,000	4,500	4,500	3,000	4,500	4,500
a	40	29	25	52	39	35	63	47	43
f_1	331	175	120	320	165	113	313	162	108
f_2	625	450	355	500	330	240	435	265	200
f_3	1,440	1,400	1,268	949	822	671	730	555	430
f_4	2,719	3,800	3,750	1,800	2,045	1,875	1,233	1,216	1,047
f_5	—	—	—	2,813	4,091	3,982	2,069	2,547	2,250
f_6	—	—	—	—	—	—	2,875	4,167	4,167

$$f_p = \frac{1}{2\pi RC}$$

where f_p = pole frequency, R = resistance in the af phase shifter and C = capacitance in the af phase shifter

f_{min} = lower edge of the af band (Hz)

f_{max} = higher edge of the af band (Hz)

f_1-f_6 = frequencies of the poles (Hz)

a = minimum sideband attenuation between f_{min} and f_{max} (dB)

n = order of the af phase shifter

Design of the af phase shifter

Table 1 shows the summarized parameters of an af phase shifter appropriate for the four-phase system. The data were calculated by computer.

From the point of view of a radio amateur, 300–3,000Hz is the minimum bandwidth for transmission. All data were calculated for ideal conditions in which the accuracy of the elements of the phase shifter is very good.

In practice it is desirable to use RC components with ±5 per cent or ±10 per cent tolerances. To compensate for the lower tolerances it is necessary to use a higher-order phase shifter, and a fifth-order one would be the minimum for the 300–3,000Hz band to keep the sideband attenuation below 40dB. Fig 3 shows the details of such a phase shifter.

When one tries to use ±10 per cent tolerances the statistically-optimized pole configuration differs a little from the ideal solution. Fig 4 shows the two solutions.

The following sections of the article use the phase-shifter configurations of Figs 3 and 4.

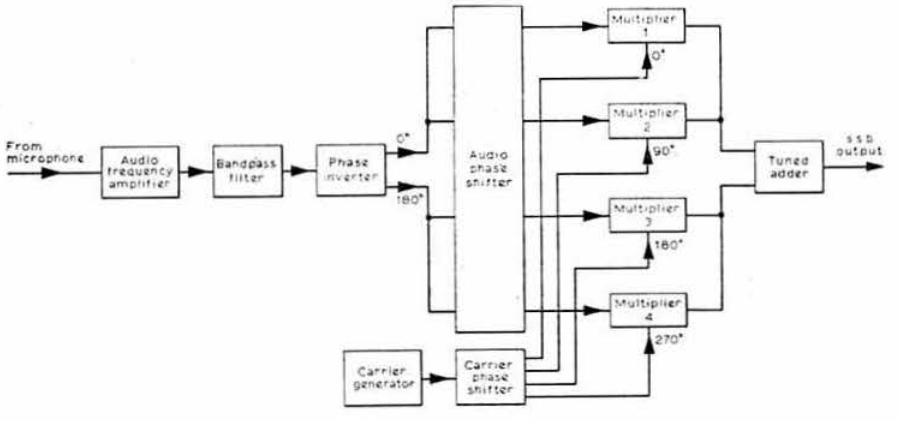


Fig 1. Block diagram of a four-phase ssb generator

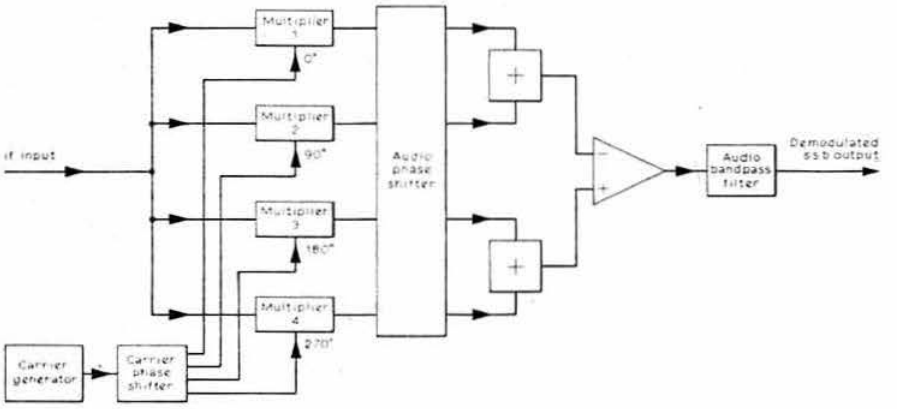


Fig 2. Block diagram of a four-phase demodulator

500kHz ssb generator

One of the simplest circuit configurations for ssb generation is shown in Fig 5. The af section has a phase inverter at the input which could also be a transformer. There is no af limiting as it is supposed that this is done in previous stages.

The modulators consist of four transistors with base modulation, the square-wave carrier being fed to their emitters. The carrier balance is adjusted by trimmer potentiometers RV1 and RV2. The amplitude is balanced out by the potentiometers located in the base circuit of the modulators (RV3, 4 and 5).

The four transistors should be thermally matched for long-term stability, using a common heatsink (an aluminium sheet with four holes). Alternatively, use of an ic transistor array such as the CA3083 will avoid this problem.

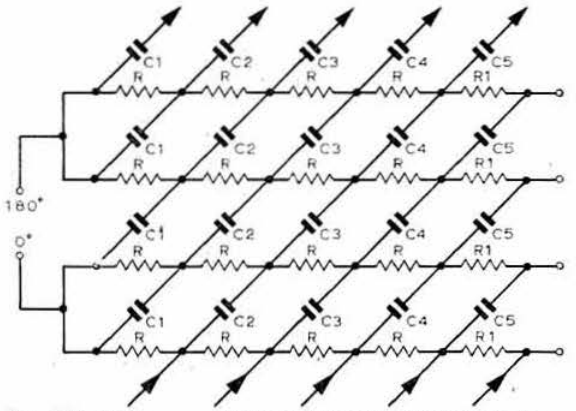


Fig 3. Fifth-order af phase shifter

The carrier generator uses digital ICs. Two gates of the SN7400 are used as a crystal oscillator, while the third gate is a buffer. The digital phase shifter is an SN7474. The output frequency is a 500kHz square wave with suitable phase shift.

The output of the modulators is fed into a tuned circuit, which can conveniently consist of a transistor radio i.f. transformer.

450kHz ssb demodulator

This follows the configuration shown in Fig 2. The complete circuit and measured performance is shown in Fig 6. The af phase shifter is fifth order and the resistors and capacitors have been chosen from the ±5 per cent series. To obtain a better approximation the nominal values are each attained by two capacitors.

During alignment the first step is to connect a signal generator to the input and tune the amplitude at the collectors to the same value by RV1-3, this value being the amplitude at the collector of the modulator with a fixed emitter resistor. The waveform symmetry should then be adjusted using RV4.

The collector resistors and capacitors play an important role from the point of view of phase shifting and ±5 per cent components are necessary.

The adder is a μA741. Its output is terminated by a low-pass filter to reduce the carrier components and to improve the selectivity of the system. Higher af selectivity is preferable if the i.f. selectivity is poor.

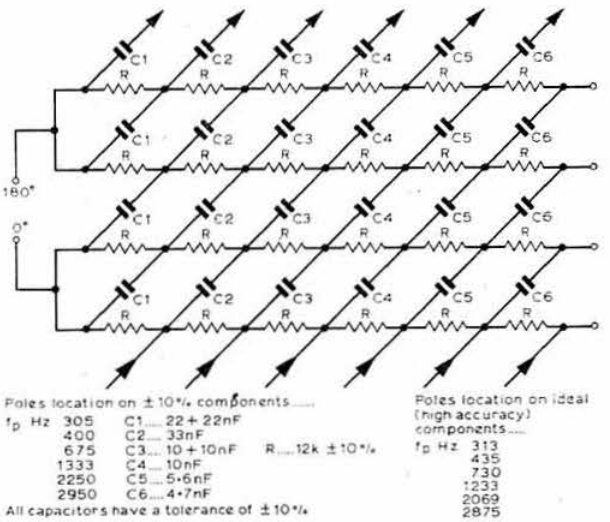


Fig 4. Sixth-order af phase shifter with statistically optimized poles using ±10 per cent components

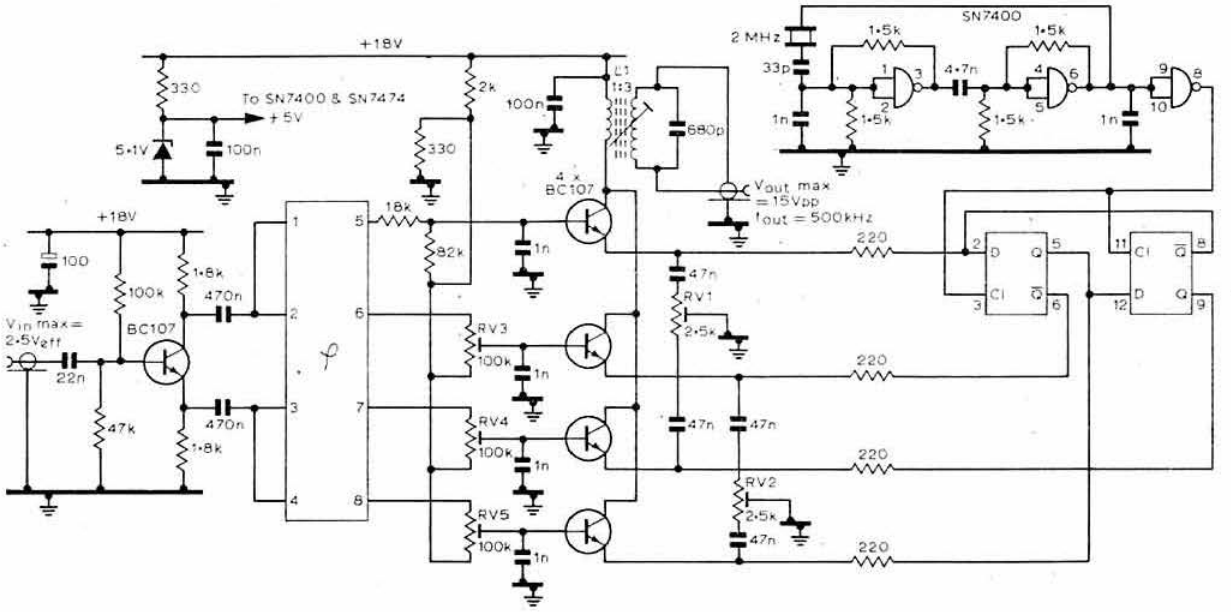
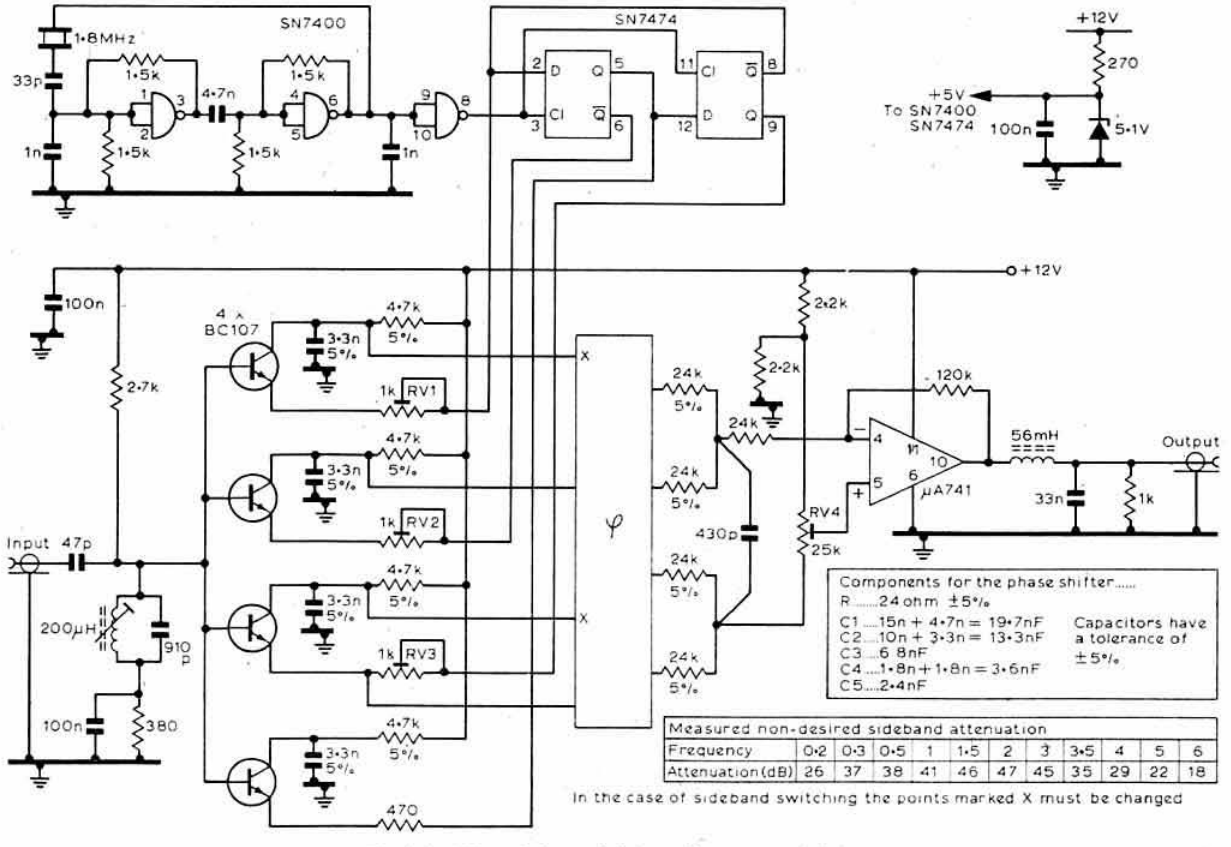


Fig 5. 500kHz ssb generator



Frequency	0·2	0·3	0·5	1	1·5	2	3	3·5	4	5	6
Attenuation (dB)	26	37	38	41	46	47	45	35	29	22	18

Fig 6. 450kHz ssb demodulator with measured data

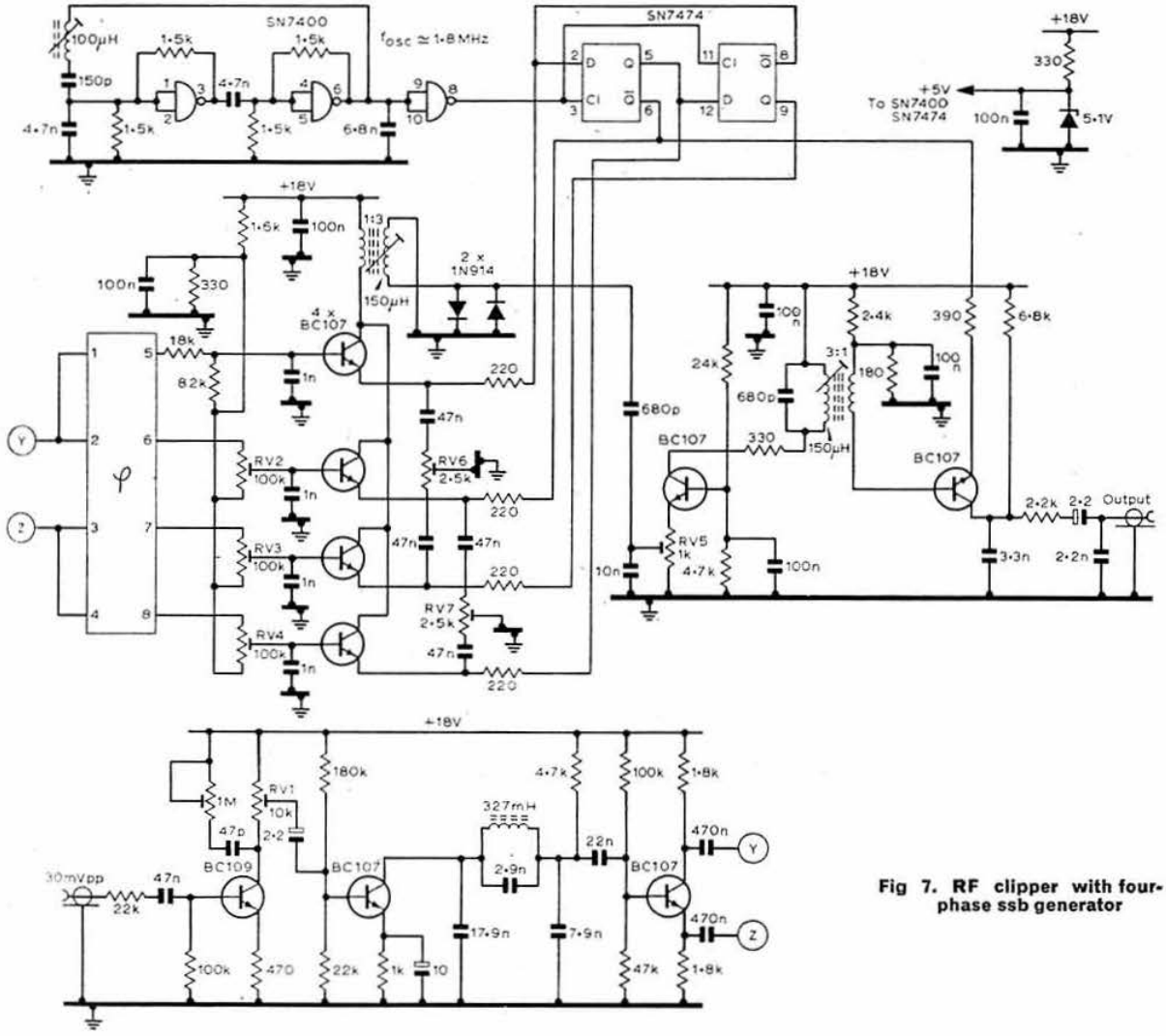


Fig 7. RF clipper with four-phase ssb generator

RF clipper using the four-phase method

By using a high-level four-phase ssb generator it is possible to construct a simple clipper (Fig 7). The audio frequencies are limited by a passive low-pass LC filter, and RV1 is the level control. All inductors in the circuit are i.f. transformers. The carrier generator is an LC oscillator. The two-diode limiter is placed in the collector circuit of the ssb generator.

RV5 varies the af output amplitude of the unit. The demodulator is a single-stage one which uses the carrier from the carrier generator. 15–20dB limiting is possible if a 30mV p-p a.f. signal is fed into the input from the microphone.

The simplest test for the complete unit is as follows. Apply a 30mV p-p sine wave to the af input from an audio generator (frequency 500–800Hz). In this case the clipper is working with about 20dB limiting. Adjust RV4 to obtain an 0·5V p-p af signal output. If the form of the output signal is a sine wave then the circuit is working well. Adjustment of RV1 will give practically the same output level at all settings until the limiters switch off.

3·5-3·8MHz ssb generator

An ssb generator for the 3·5MHz band (Fig 8) can be constructed using the same principle. It is of interest that the vfo has a frequency of 14–15·2MHz. This is the highest frequency at which the use of the normal ttl circuits is recommended.

To get more stable and easily-controllable carrier suppression the carrier balance potentiometers (RV6 and 7) are modified by series resistors. The generator is disabled during reception by a switch inserted on the power line of the SN7474 phase shifter.

An active low-pass filter is used in the audio section. A very effective ssb generator configuration may be obtained by using the hf clipper in conjunction with this circuit.

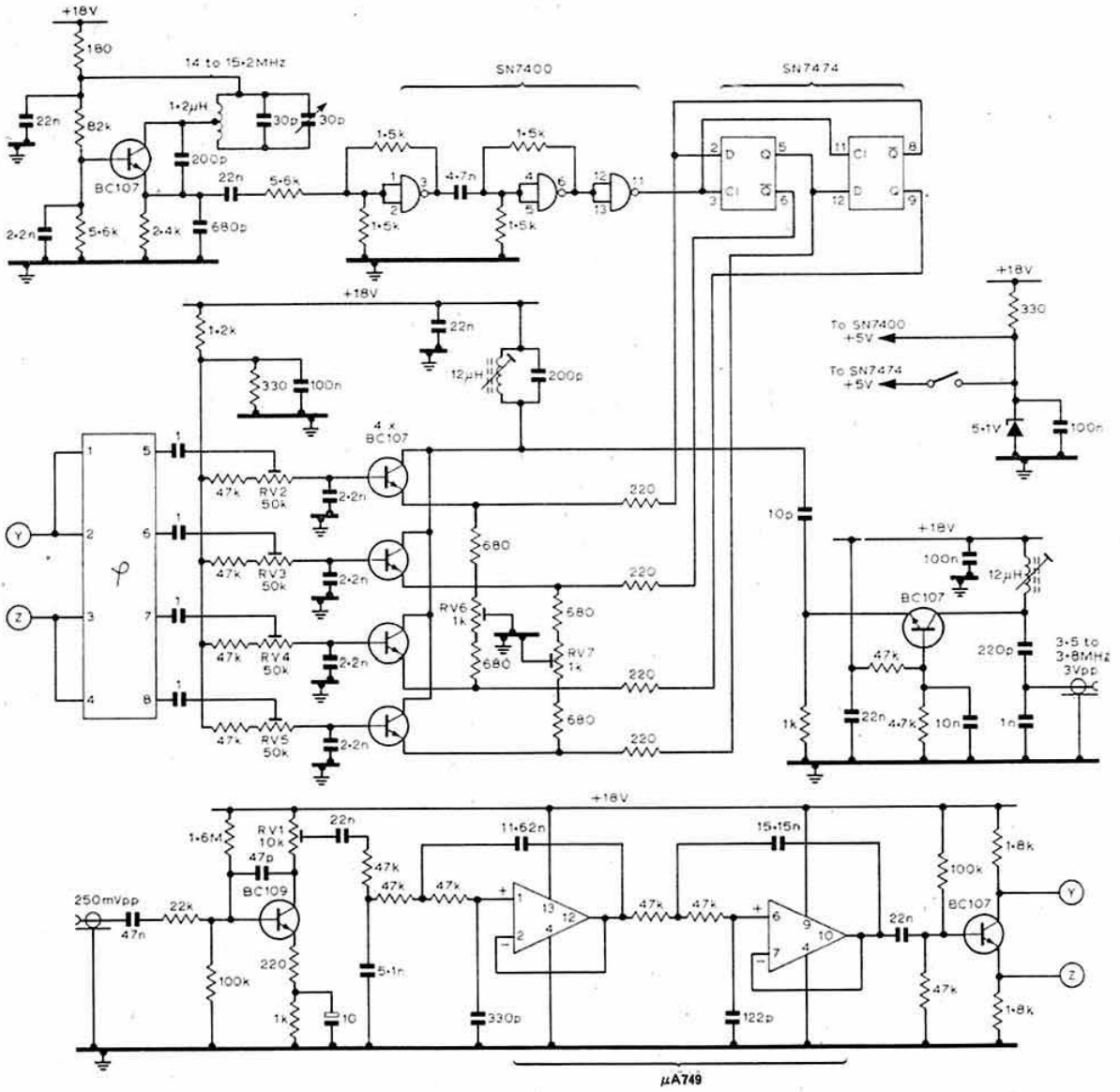


Fig 8. 3·5-3·8MHz ssb generator with active af filter

The LC oscillator is buffered by the 7400 to ensure interface for the ttl input of the 7474. A simple low-power buffer is connected to the output to give an adequate level for further amplification.

9MHz ssb generator

If the previous circuits are used for a 9MHz generator it would be necessary to use a 36MHz carrier oscillator, together with fast ttl or ecl logic in the rf phase shifter.

To avoid this problem a 12MHz carrier is used and the four modulators are driven by a 3MHz square-wave carrier signal (Fig 9). This process is not a simple modulation, but a harmonically related one. The 9MHz signal can, however, in this case be produced without distortion, and the 3MHz components receive adequate attenuation in the 9MHz tuned circuit.

A passive af low-pass filter is utilized in the af section, but an active version could also be used.

Future developments

It would be of interest to generate the ssb signal at high level using high-efficiency switched-mode modulators. The use of six- or eight-phase circuits could give a further decrease in the component tolerances required in the af phase shifter. □

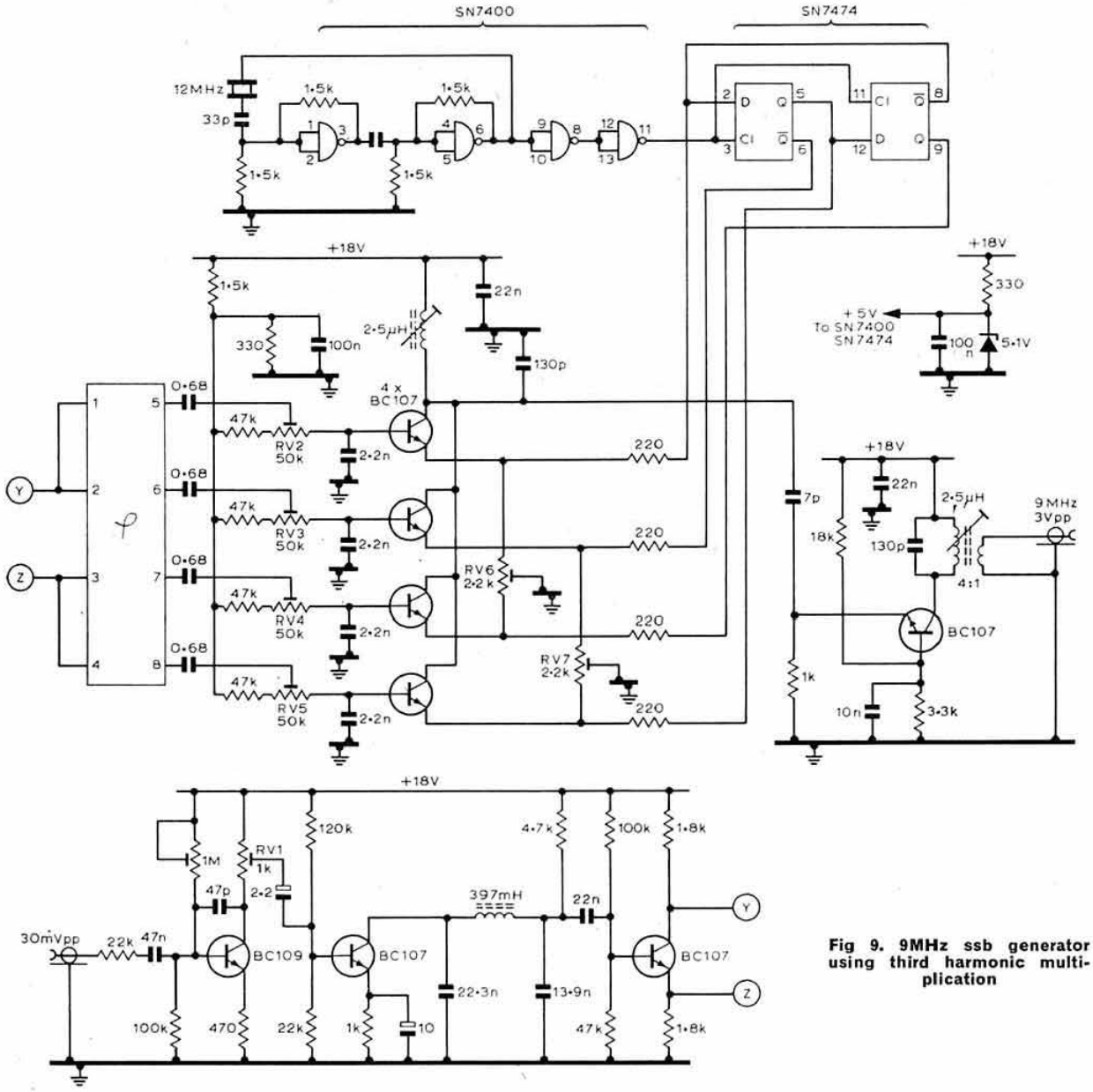


Fig 9. 9MHz ssb generator using third harmonic multiplication

1·3GHz band ssb

(*Continued from page 27*)

etched in ferric chloride in the conventional manner, using good-quality pvc insulating tape to mask the copper. The reverse side was protected with aircraft dope. It is important to use good-quality glass-fibre board, otherwise the insertion loss may be objectionably high from the power-handling point of view. Good-quality board has a translucent dielectric, frequently coloured light blue or green. One version built on poor-quality board went up in smoke after carrying 120W of rf for a few minutes!

The unit may be left in circuit permanently as the insertion loss is only about 0·5dB. A meter is connected between the feed-through capacitor and earth, and indicates relative power. The unit may also be used to estimate vswr by reversing the input and output connections.

References

[1] *QST* October 1970, p32.
[2] *Radio Communication Handbook* p7.46.
[3] *Radio Communication* August 1970, p538.
[4] *QST* March 1968, p32.
[5] *Radio Communication* April 1975, p303.
[6] P. M. Tunbridge, G8DEK, private communication. □

EQUIPMENT REVIEW

The Icom IC-201 transceiver

by J.P. MARTINEZ, G3PLX*

ACTIVITY on the 144MHz band these days seems to be more or less equally divided between the fm and ssb modes, with cw used by an enthusiastic minority and a.m. apparently dying out. As the reviewer has had some experience of home construction to meet the differing requirements of the various modes, it was interesting to have the opportunity of reviewing the latest ssb/fm/cw transceiver from the Japanese Inoue Communication Equipment Corporation.

General description

The IC-201 is a vfo-controlled true transceiver, ie the receiver and transmitter frequencies are determined by the same oscillator. The receiver is a single-conversion superhet with a 10·7MHz i.f., using FETs in the rf section. Separate i.f. filters and i.f. amplifiers are used for fm and ssb, a ratio detector with squelch being used for fm, and a product detector for ssb. Upper or lower sideband selection is made by switching the carrier crystal frequency.

The local oscillator signal is generated by mixing the 11–12MHz permeability-tuned vfo with a crystal-controlled signal in the 120MHz range. The exact frequency of this signal is selected by a front-panel range-selector switch, so that the 144MHz band is covered in two 1MHz sub-bands. Other features of the receiver design are a broadband noise blanker, which operates on the signal before the i.f. filters, and an aerial input attenuator (marked on the front panel as "RF gain") which uses a novel variable-coupling helical resonator arrangement.

The transmitter is also a single-superhet system, generating the ssb or carrier signal at 10·7MHz, and mixing this into the 144MHz band using the same pre-mixed local oscillator as the receiver. On fm and cw one of the carrier crystals is pulled into the centre of the ssb filter passband and the balanced modulator is unbalanced. For frequency modulation, the 15MHz fundamental frequency of the pre-mix crystal chain is phase modulated. For repeater operation this crystal frequency is changed, on transmit only, to one which gives a transmitter output 600kHz below the receiver. The tone-burst oscillator is also activated in this position of the range selector switch. The pa is a 2N6081, operating in Class B both on ssb and fm/cw. Forward and reverse power sensors drive the alc and protection circuits respectively, and also feed the panel meter, which can be switched to read either forward or reverse, and which is calibrated in swr.

Aerial changeover is by p-i-n diodes, and since all the other changeover circuits are electronic, there are no relays. Transmit control is either by a front-panel switch, microphone pressel, or vox control, which also operates as break-in control in the cw mode. All the circuitry is powered from a 13·8V line, and this can be connected directly to a vehicle supply or the plug-in mains psu.

The circuitry is built mostly on a number of printed-circuit boards, some in screened boxes, connected to the cableforms by plug and socket connectors or push-on tags. Preset controls, for vox, sidetone, fixed-channel crystals etc are accessible behind a panel on the top of the equipment, and the speaker is mounted on the bottom.

Bench tests

A complete set of measurements on a unit of this complexity would require a considerable variety of test equipment and a lot of time, and so the choice was made from those tests that could be made with the gear available, with some bias towards some of the more interesting and controversial parameters. As the mains psu supplies the 13·8V for the whole of the equipment, it was used throughout the tests and the equipment was not tested on a separate dc supply.

The receiver

It was thought that the parameter which would best indicate the sensitivity performance would be the noise factor. This was measured by the "3dB increase in noise output" method, using a Rohde and Schwartz SKTU noise generator, with the IC-201 in the ssb mode. The measured result of 7dB can be bettered in a converter measured on its own, but it is an acceptable figure for a complete equipment. The only spurious response found on the receiver was the image, 21·4MHz below the wanted signal at −85dB, which is a remarkably good result for a single superhet.

To measure the dynamic range, the receiver was tuned to a 1μV signal at 144·5MHz and a signal at 145·5MHz was increased in level until the s/n ratio of the wanted signal was degraded by 3dB. This occurred at a level of 8mV emf, which, together with the 7dB noise factor and an assumed bandwidth of 2·5kHz, gives a dynamic range of 97dB. However, a quick calculation showed that the noise output of the signal generator used would give rise to the same result. The true dynamic range could thus be better than this already good result, showing the advantage of the single-conversion approach with few active devices before the main filter.

Two "birdies" were found, at 144·671 and 145·762MHz, at signal levels equivalent to 2μV emf, and a moment's

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work with a pocket calculator showed that these were the 12th harmonics of the vfo frequencies involved. These "birdies" tuned through at 12 times the normal rate, and were therefore quite difficult to find!

With the dial set to line up with the internal 500kHz calibrator at a dial reading of 500, there was a maximum of only 500Hz error over the whole 1MHz range of the dial. Presumably a better result could be obtained if the dial was re-set against the calibrator at each end as well, but the result is a credit to the designer of the vfo. On warm up, the receiver frequency drifted high by 200Hz in the first 5min, followed by another 200Hz in the next half hour, by which time there was no more appreciable drift. Incidentally, the internal calibration oscillator drifted about the same amount in the opposite direction! Other measurements on the receiver are summarized below and need no comment, except to point out the different S-meter sensitivity on the fm and ssb modes.

Squelch threshold (on fm only)		0·8μV max	
		0·3μV min, approx	
Aerial attenuator range ("RF gain")		33dB	
		SSB	**FM**
S-meter sensitivity	"S1"	0·8μV	3·2μV
	"S5"	2·0μV	5·6μV
	"S9"	5·6μV	11·2μV
RIT tuning range	±4kHz each side of the transmitter frequency.		

The transmitter

All tests were made with a 75Ω load, as a 50Ω unit was not available. Operation with the correct load could be expected to give only slightly better figures on some parameters.

On fm and cw the power output measured at 145MHz was 11·5W, dropping to 11 at the band edges, and on ssb, with a loud whistle, the output was 10·5W. On a spectrum analyser the output appeared remarkably clean, only two unwanted products being visible above the 70dB base line. One of these was the second harmonic, at 50dB down, and the other was close to the transmitted frequency, at 60dB down. With no modulation, this rose to 53dB in the ssb mode. Closer investigation showed that this was a third-order product from the pre-mixed local oscillator ($f_{xtal} + 2f_{vfo}$), which moved up the band at twice the rate of the main signal. With the transmitter on 144·22MHz the spurious emission appears on 145·125MHz. This is at a fairly low level, but with today's crowded bands it is as well to be aware of potential sources of trouble if they cannot be eliminated altogether.

With two tones of 1kHz and 2kHz fed into the audio input connections on the accessory socket, and the transmitter adjusted to give 5W output (10W p.e.p.) the third-order products on each side were 18dB below each tone. By commercial standards this is a poor figure, but is typical of a lot of equipment in use on the 144MHz band. Indeed it is difficult to better this while using semiconductors at this frequency without considerably derating the output device below its fm power. The fm deviation, as set up on the transceiver when received, measured exactly 5kHz peak, including the tone burst. The tone-burst frequency was 1·748kHz, indicating that it had been set up to European standards. As a final test on the transmitter, it was operated for a few moments without a load and with a selection of different open-circuit feeder lengths. It survived.

Tests on the air

The transceiver was used on the air at the reviewer's station for about a week, on all three modes. Operation on fm was quite straightforward, tuning being particularly easy with the centre-zero meter built into the dial display. The microphone gain control seemed best set at maximum. One or two stations, on being asked to comment, thought that the audio was "a bit thin". Repeater operation was achieved simply by tuning in the repeater signal on the receiver, and selecting 145 DUPLEX on the range selector switch (which is oddly labelled COURSE), remembering to switch it back again on reverting back to simplex. The provision of the duplex facility on the 144–145MHz range is surprising, as there is no requirement known to the reviewer to transmit 600kHz down in the bottom half of the band. Indeed inadvertent selection of this position of the range switch results in transmission outside the band if the dial is below 600kHz.

All reports were of a good clean signal on ssb. Vox operation, although not a favourite with the reviewer, was good with no sign of clipping. One minor fault here was that if vox was selected in the duplex mode, interaction between the tone burst and the vox resulted in the transmitter locking on transmit. As the usb/lsb switching is done by switching carrier crystals, and the fm and cw signals are generated at the centre of the ssb filter passband, the dial calibration differs slightly as the mode is changed. Although it is possible to re-set the dial on each mode, the writer found it easiest to set the dial on fm, and remember to tune the pointer 1·5kHz high of the desired frequency on usb, and 1·5kHz low on lsb. The dial calibration is then also correct on cw if the beat note is tuned to 1·5kHz.

It is on cw, however, that the IC-201 is really a joy to operate. The built-in sidetone oscillator, which can be preset in loudness, and the break-in facility are luxuries which are not usually found on a 144MHz transmitter. With the preset cw delay turned down to minimum, it is possible to listen between dots, and there were no reports of clicks or keying bias. The advantage of the all-electronic changeover system was most apparent in this mode by its silence. The noise blanker was very effective indeed on ignition noise (on all modes) but seemed to have little effect on more continuous types of noise, eg electric motor brush noise.

Conclusions

The IC-201 seems to meet all the requirements of present-day 144MHz activity. The few snags brought to light in this review should not prevent anyone with £318 plus VAT to spend from enjoying the benefits of operating on all three of the modes currently popular on the band. The IC-201 reviewed was supplied by Thanet Electronics, 34 Cliff Avenue, Herne Bay, Kent.

Postscript

At the same time as the unit was under test, a modification to the COURSE switch was devised by the importers which will prevent duplex operation from resulting in any inadvertent radiation outside the band. This modification also provides a reverse repeater facility whereby the receiver frequency is dropped by 600kHz while the transmitter operates at the frequency shown on the dial. This modification is now made to all IC-201 units imported by Thanet Electronics. □

(For maker's specification see p9—Ed.)

An alignment aid for vhf receivers

by J. R. COMPTON, G4COM*

THE normally recommended technique for aligning the front ends of vhf receivers is to adjust for maximum signal-to-noise ratio, which may be, but usually is not, at the same settings as for maximum gain. This can be done by ear using a low-level cw input from a signal generator or beacon, but it is often difficult for the amateur to obtain the use of a vhf generator with a sufficiently attenuated output, while beacon signals tend to suffer from QSB effects if they are weak enough for the purpose required. The author's ears have not proved sufficiently sensitive instruments for any of these methods to be useful other than for approximate alignments.

Another method makes use of a noise generator which need not be precisely calibrated. This is potentially the most accurate method but it does call for repeated comparative readings in the "generator on" and "generator off" conditions, and can be laborious and confusing where adjustments to one part of the circuit interact with others. Although one reference suggests using a "noise increase that you can remember", some form of indicator must be used for accurate work, although this could be very simple and make use of the station multimeter or vvm. [1]

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The instrument to be described would seem to overcome most of the problems encountered in the previously-mentioned methods by providing a continuous readout of the difference between the audio output of a receiver with no rf input, and the output when a wideband noise generator is connected to the receiver's aerial terminals. The meter indicates the ratio between the outputs under these two conditions, and the reading is not sensitive to variations in the mean level of the af signal over quite wide limits. The meter has a logarithmic response and could be calibrated linearly in decibels, but this is probably not justified where the absolute level of the noise generator is not known. The cost of building this instrument excluding the case and meter is about £7 (October 1975).

Circuit description (Fig 1)

The circuits used in this design are not novel, all of them being taken with only minor modifications from [2] and [3], which are well worth reading by anyone interested in the use of op amps at dc and af.

IC1 is used in a precision rectifier circuit which gives a dc output from ac inputs down to a very low level, unlike the conventional half-wave rectifier which requires some hundreds of millivolts for satisfactory operation. The gain of the circuit is determined by R2/(R1 + RV1), while D2 and R3 prevent the op amp from saturating on negative half cycles of the input. The output from the circuit is partially smoothed by R4 and C1, and is fed to IC2 which is connected as a logarithmic amplifier by the use of TR1 in its feedback loop (the voltage across a silicon transistor, base shorted to collector, is proportional to the logarithm of the current through the transistor).

This circuit is the "heart" of the instrument. It is fed alternately with two voltages corresponding to the receiver noise output and the receiver signal-plus-noise output. The difference (in millivolts) between its output voltages under these two conditions is a function of the ratio between the

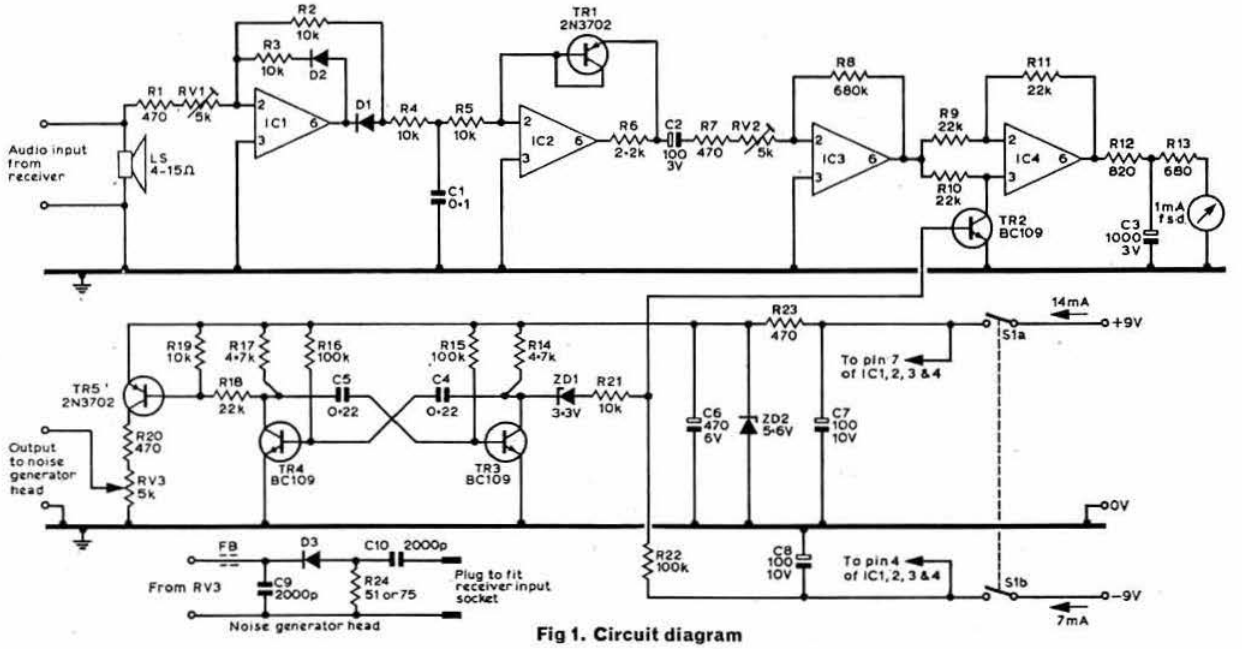

Fig 1. Circuit diagram

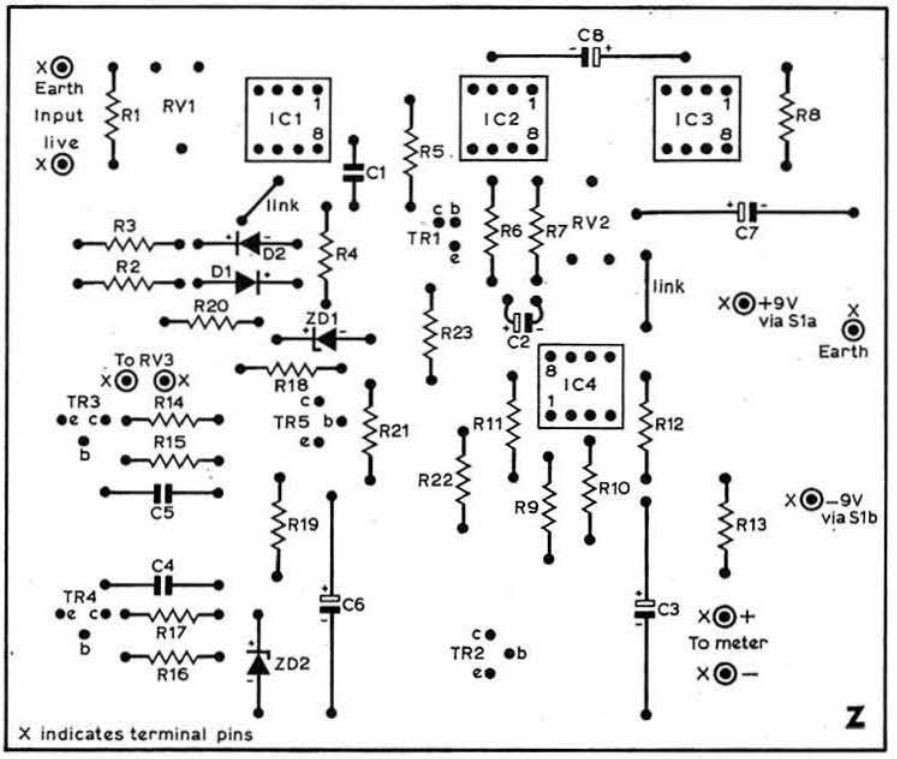

Fig 2. Board layout

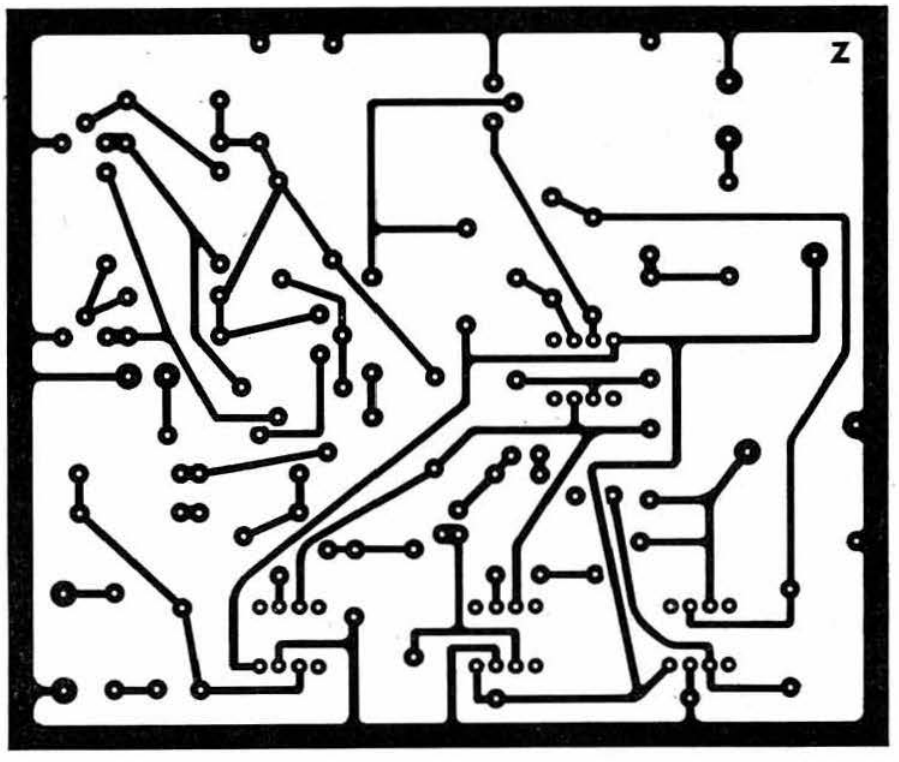

Fig 3. Etching pattern

two input voltages, and this ratio is independent of the average input level. Hence, provided that the various stages of the receiver and the circuit around IC1 are working within their linear range, the ac output from the circuit around IC2 at the pulse frequency employed will be dependent only on the overall s/n ratio. Since the ac output of this circuit is only a small fraction of a volt peak-to-peak, it is amplified by IC3 connected as a voltage amplifier, having a gain R8/(R7 + RV2).

The output of IC3 is fed to IC4, a phase-sensitive detector of unity gain. The reference signal is provided by TR2 from the pulse generator TR3, TR4. A phase-sensitive detector is ideally suited to applications such as this, where an indication is required of the magnitude of an ac signal which has a known frequency and phase but a high accompanying noise level. In the present application, the psd gives a usable output when the signal is accompanied by so much noise that it is undetectable by ear or by examining an oscilloscope trace.

Full-scale deflection in the prototype was about 10dB (s + n)/n, with the scale reading linearly in decibels. IC4 has a low output impedance adequate for driving a 1mA meter. R12, R13 and C3 are chosen to give adequate damping for the meter, which otherwise would have a very erratic response due to the random nature of the noise inputs. The switching device TR2 is a standard general-purpose bipolar transistor. In principle a fet would be more suitable but this would require a larger peak-to-peak switching voltage than is conveniently available, and in practice the simple circuit shown here is quite adequate.

The pulse generator TR3, TR4 is a conventional astable multivibrator operating at about 30Hz. Its output is amplified by TR5 and fed to the noise diode via limiting resistor R20, the diode current being adjusted by RV3. The pulse generator also provides the reference voltage for the psd. The noise generator circuit is conventional and can be built into the body of a uhf plug [1]. The power supply to the pulse generator and noise diode is roughly regulated by ZD1.

Components

Few of the component values are critical and 20 per cent tolerance will suffice. C2, 3, 6, 7 and 8 can be any convenient value not less than the values shown, while C2 only needs to be 2V working. D1 and D2 can be almost any germanium diode such as OA79, OA90 or OA81. The npn transistors can be any low-level audio or switching silicon types of minimum h_{fe} 100. The pnp transistors require a similar specification. Resistors can be rated ¼W.

In the noise generator head the resistor should be of metal film construction for minimum inductance, 51Ω or 75Ω as appropriate, and the capacitors small ceramic. The diode used in the prototype was a CV364 microwave mixer from the spares box. Alternatives are 1N21, 1N25, 1N32, 1N23 or, less suitable, 1N82A and 1N34; failing any of these, it may be worthwhile to try an assortment of signal, rectifier and zener diodes as available, in the hope of finding one having sufficient noise output over a wide frequency band.

Construction (Figs 2 and 3)

Layout is not at all critical; at no time even in the breadboard stage of development was there any hint of instability. The prototype was built on an etched circuit board measuring approximately 75mm by 90mm and built into a box 220mm by 130mm by 130mm.

Components list

R1, 7, 20, 23	470Ω
R2, 3, 4, 5, 19, 21	10kΩ
R6	2·2kΩ
R8	680kΩ
R9, 10, 11, 18	22kΩ
R12	820Ω
R13	680Ω
R14, 17	4·7kΩ
R15, 16, 22	100kΩ
R24	51Ω or 75Ω to suit receiver
RV1, 2	5kΩ skeleton preset 0·1W horizontal
RV3	5kΩ carbon linear
C1	0·1μ polyester
C2	100μ 3V tantalum
C3	1,000μ 3V
C4, 5	0·22μ polyester
C6	470μ 6V
C7, 8	100μ 10V
C9, 10	2,000pF ceramic
FB	Ferrite bead
ZD1	3·3V 400mW zener diode
ZD2	5·6V 400mW zener diode
D1, 2	OA47, OA79, OA90 or similar
D3	See text
TR1, 5	2N3702, 2N3703, 2N4126 or similar
TR2, 3, 4	BC109, 2N2926 or similar
IC1, 2, 3, 4	741 eight-lead dil
LS	Replacement spkr 4-15Ω
S1	Switch dpst

Setting up

The unit requires little alignment, and even this can be done without test equipment. Switch on the receiver, plug in the noise diode and adjust the receiver tuning and audio controls to give an audible noise level. Switch on the alignment unit and adjust the diode current (RV3) to give an audible signal, a rough purring noise.

Connect the audio output of the receiver to the input of the unit. The meter should now give a fairly steady reading which can be varied by adjusting the diode current. Set RV1 so that the meter reading is constant over a wide range of receiver audio gain settings; set RV2 to give fsd on the meter at maximum diode current on the highest frequency band to be required. The unit is now ready for use.

Use

Connect up the unit as above and adjust RV3 for about half-scale deflection on the meter. Any adjustment of the receiver which results in an improved signal gain with no change in the noise figure, or a reduced noise figure with no change in signal gain, or both simultaneously, will result in an increased meter reading. Therefore by noting the meter reading at a given setting of RV3 the effects of various circuit changes in the receiver can be assessed. Although the unit is not especially sensitive to small changes in temperature or battery voltage, it is probably wise to switch on the unit ten minutes before it is required, and to ensure that the ambient temperature is reasonably constant and that the batteries are fresh before using the unit for periodic checks on receiver performance. As mentioned above, the principle of the instrument assumes reasonable linearity of the receiver. It is not suitable for fm alignment. Noise blankers and age should be disabled before using the unit for testing.

(Continued on page 46)

An sstv sync pulse generator for 50Hz mains

D. O. WHITE, G3ZPA*

MANY operators who have either bought or built an sstv monitor will after a while have had the urge to transmit their own video, but will have been discouraged by the sheer expense of buying, or the complications of building, a suitable camera.

A system of video generation that gives results at least as good as a camera is the flying-spot scanner (Fig 1) which can be built into a light-tight box, eg an old metal deed box. The heart of the system is a pulse generator for synchronization purposes, and although there is a wealth of information available on this and other sstv circuits for American 60Hz mains, the corresponding information for 50Hz areas is much more limited. This article therefore describes a sync generator suitable for UK 50Hz mains.

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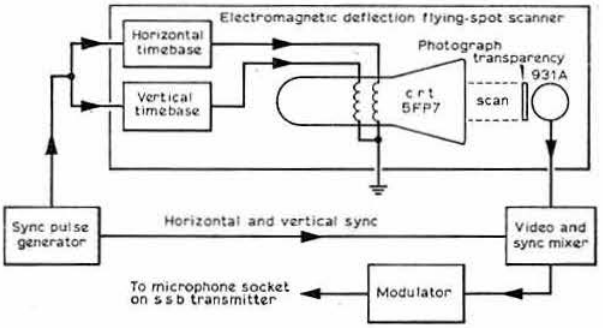

Fig 1. Block diagram of flying-spot scanner system

Circuit description (Fig 2)

The device is required to supply negative-going horizontal pulses of 5ms duration at a frequency of 16·66Hz, and negative pulses for vertical sync information at the very low frequency of 0·139Hz. The peak amplitude of these pulses should be about 3·5 to 4V.

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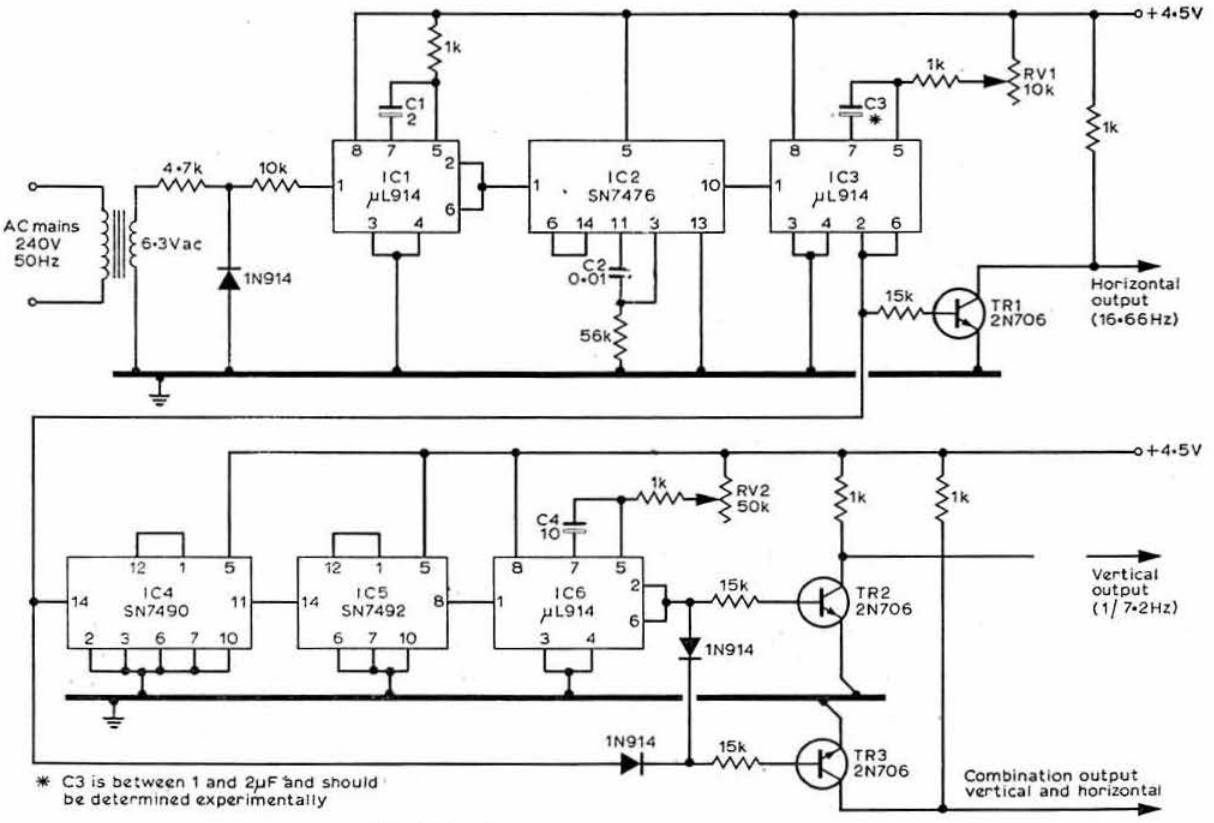


Fig 2. Circuit diagram of sync pulse generator

technical topics

Pat Hawker, G3VA

HOW would you define an experimenter? Surely a perceptive attempt was that of Professor E. V. Appleton in his tribute to Marconi after the pioneer's death in July 1937. In a broadcast he said: "Marconi, a true experimenter, was not to be deterred by theories. No outlook was too unpromising; there was for him no finality in any branch of the subject. For over 40 years he worked as a radio experimenter with unflagging energy and enthusiasm, and great as his own achievements have been he has never been content to rest. For him *we were always at the beginning of things . . .*"

The ability to see things in a new light, to feel no matter how much theory has already been woven around a subject that, at least in some significant ways, we are still at the beginning of things, is what singles out the true experimenter. Most of us, of course, can never achieve that level—but for others there are still many steps to finality.

This month, in presenting an exciting new general theory of multiband resonant aerial elements, Les Moxon, G6XN, demonstrates once again that there are still novel ideas for the amateur experimenter to pursue. The concept would seem to open the way for a whole new family of multiband aerials in many different configurations. So, although G6XN has a more detailed article in course of preparation, it is with considerable pleasure that we can open 1976 with the first glimpse of an aerial idea about which he says, modestly, "I have stumbled on something which could be important".

G6XN multiband elements

Apart from straightforward harmonic resonances, several forms of multiband elements have been described over the years, including several in *TT*. But none has achieved widespread use, and most amateurs continue to put up hf arrays that squander precious decibels of gain by the restriction of "aperture" (ie by not making full use of the total length of the element on the higher frequency bands), by accepting the losses that occur with traps or those that arise from the interaction of "nested" elements as in the conventional two- or three-band quads and some Yagi beams. It is still widely believed that any multiband beam is bound to be a compromise and that for ultimate gain it is necessary to use monobanders.

Now Les Moxon introduces a new concept—though anticipating that it may suffer the same fate as previous multibanding techniques—that has the advantage of offering simpler and probably lower-cost arrays. It has something in common with G6CJ's "stretched dipoles", although again that technique (*Amateur Radio Techniques*) has been much undervalued; but it also exploits novel ideas including the mystery of the disappearing inductance.

Fig 1 shows three elements of different physical lengths but which, as is well known, can be made to resonate at the same frequency: the conventional dipole element; the inductively-loaded short dipole; and the capacitively stretched dipole. Fig 2 shows how a 14MHz element can be resonated at 21MHz (a) or 28MHz (b).

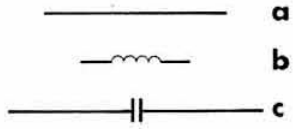


Fig 1. Three aerial elements of physically different length but which may all resonate at the same frequency.

But now, with these basics in mind, let us look at the end product of the new approach: Fig 3, an element that can simultaneously have two resonant frequencies. It looks a bit like a gamma-feed arrangement but the "short-circuited" C has nothing to do with matching. Instead it forms an element which uses all of its length on two frequencies which can include 14MHz and span 21 to 28MHz by adjustment of C. The element is resonated at its higher frequency by the capacitor acting in conjunction with the distributed inductance L represented by the section of the element across which C is connected. Matching to a driven element is no great problem, G6XN reports, since the radiation resistance of the dual-frequency element, when expressed as a resistance in parallel with L, has (or can easily be arranged to have) comparable values at each of the operating frequencies. The feed resistance between any two points along L *tends* to be independent of frequency. The beauty of the system is that the capacitor has virtually no effect on the basic dipole resonance (say 14MHz) except for a slight, and potentially useful, shift in band-centre frequency of the order of 1 per cent when a 14MHz element is being used and C is given the appropriate value for 21MHz. Since the full aperture of the element is used on all frequencies this means that a 14MHz element can itself give up to 2dB gain at 28MHz and up to 1dB at 21MHz. There are, of course, no traps to incur losses or to require supporting in the elements, so simplifying construction. When applied to a quad, as much as 3dB extra gain may be achieved at 28MHz, plus freedom from the interacting effects of "nested" elements. There is the problem of using the same element spacing on different bands, and this will be considered later.

It should be stressed that this novel technique would seem to be equally suitable for many types of arrays or even for simple wire aerials. In fact G6XN puts forward a new general theorem for aerials as follows:

Any aerial may be operated at its fundamental resonance and simultaneously at any frequency within a range from less than half to more than one octave above the fundamental resonance, by connecting capacitance across the central portion of each current loop (or in the case of a monopole from one side to ground). The direction of the main lobes is the same,

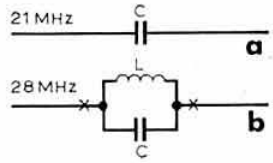


Fig 2. A 14MHz element can be resonated at 21MHz by capacitive loading and at 28MHz by a combination of L and C. To convert (b) into (a) C can be increased so that it tunes out L in addition to the inductive reactance of the dipole. However, the presence of L has considerable effect on the fundamental 14MHz resonance and this must be compensated by series capacitance at points X,X or by shortening the dipole. The new approach results in the mystery of the disappearing inductance L

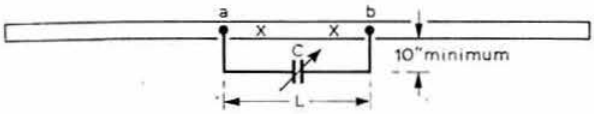


Fig 3. A typical half-wave dipole or driven or parasitic beam element designed for two-frequency operation. C, in conjunction with the inductance L between points (a) and (b) provides a resonance from 0·5 to 1·0 octave above the fundamental frequency without phase change. Connections to C are preferably made from tubing of ¼ to ½in diameter but 12swg wire has been used successfully. For a typical 14MHz beam the distance (a)–(b) is about 7ft (not critical) and C about 90pF

and the full aperture is utilized at each frequency. The added capacitance has, at least to a first order of approximation, no effect at the fundamental resonance.

This approach opens the way, without any major problems, to dual-frequency operation: eg 14 and 21MHz, or 21 and 28MHz, or 14 and 28MHz aerials of many types. But what about triband operation? Here there exists the problem that the value of C has to be changed on the two higher frequency bands. This problem can be solved by a relay or possibly by using various forms of 28MHz traps or phasing stubs as a passive switch, although up to the present G6XN has only fully developed the relay method. But at least it has already been shown that triband operation is practicable.

It will thus be seen that (at least for two-band operation) the key feature of the system is its stunning simplicity which will make readers say to themselves "Why didn't I think of that?", but it is worth mentioning that this arrangement was arrived at by what G6XN terms "a set of curious chances", evolving from what in itself was an ingenious system but using standard theory. It is not possible at this time to present all the fascinating twists to the story, and we have concentrated here on the stage this project has now reached.

His present work is based on what is in fact a standard three-element "plumber's-delight" Yagi designed *a la Handbook*, and it seems likely that most 14MHz monoband beams could be converted for dual-band operation very easily indeed by simply stringing a capacitor on each element as in Fig 3. These capacitors (for legal limit operation) should be rated at least 2kV and 5A with short stubs for fine tuning*. The effect on 14MHz mid-band resonance should not be more than about one per cent. When a monobander is converted in this way no guarantee can be given of achieving low swr at the higher frequency (although by now, perhaps, readers will no longer worry too much about this) and preferably a balanced feed should be used as in Fig 4.

G6XN anticipates that some readers will query whether the fixed element spacing of a monobander is likely to prove equally suitable for use on two or three bands. It is true that for a two-element array with about 8ft spacing there will be a gain penalty of roughly 0·5dB for driven arrays and 1dB for parasitic arrays plus deterioration of back-to-front ratio, but he considers that with three or more elements the wider electrical spacing at the higher frequencies is a positive advantage.

Balanced feed and plumbers-delight construction play a

* G6XN suggests that it may be advisable to start off using small variable capacitors using low power and choosing dry weather. It is then not difficult to replace the variables by combinations of fixed capacitors with a short stub for fine tuning. Problems were experienced in wet weather when attempting to use a 300Ω feeder stub to provide the whole of the capacitance.

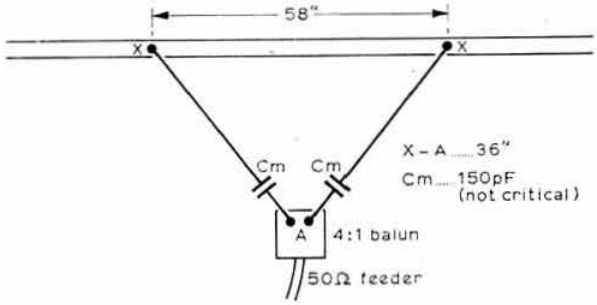


Fig 4. Typical balanced feed system for a G6XN driven element

useful role in avoiding skewing and narrow bandwidth. In his prototype three-element array G6XN achieves less than 2 : 1 swr over a bandwidth of 1MHz centred on 28·5MHz though he points out that bandwidth will be reduced, as might be expected, by tuning for maximum gain.

In selecting from G6XN's notes I hope that I have managed to pick out the salient points, although it is appreciated that there are some features of this new approach that have been rather glossed over. For instance, that the length of aerial that forms L when tuned by C disappears back into its normal function as the middle bit of the aerial when C is removed. But you may be saying C is not removed, it is still there. G6XN explains this by pointing out that C can be considered "removed" when the current in it is small compared with the element current, and this comes about rather rapidly as the frequency is reduced, partly because, at the higher frequency, the value of C is artificially increased by the approach to series resonance. So you have an element that behaves differently when fed with rf at different frequencies. It seems simple when put like this but it took a long time for the full explanation to emerge and a new twist to be given to the search for multiband aerials of high performance. There is indeed *no* finality in any branch of amateur radio experimentation!

The AZ-Special multiband aerial

The wish to make full use of the length of an aerial is not of course confined to beam elements. There is still a demand for simple multiband hf aerials that, unlike the popular W3DZZ aerial, do not depend on traps, such as the end-fed "long wire" or the centre-fed G5RV-type dipole.

A 3·5 to 21MHz aerial with centre-fed configuration requiring only an 88ft top but which should provide some gain on all bands above 3·5MHz (though with different lobe directions) is described by L. W. Aurick, K3AZ, in *CQ* September 1975. It uses $\lambda/4$ phasing sections on 21MHz to form a four-section colinear array; on all other bands, the phasing sections simply form folded portions of the radiating elements, but without being at current maxima on any band, so that the aerial resembles a centre-fed radiator, electrically equivalent to a top of 132ft.

The aerial (Fig 5) works on the various bands as follows:

3·5MHz: Half-wave dipole.

7MHz: Two half-wave dipoles in phase, providing roughly 2dB gain in the broadside lobes.

14MHz: Two-wave centre-fed aerial, resulting in four lobes (at about 54° to wire).

21MHz: Four-section colinear array with broadside gain of about 4dB.

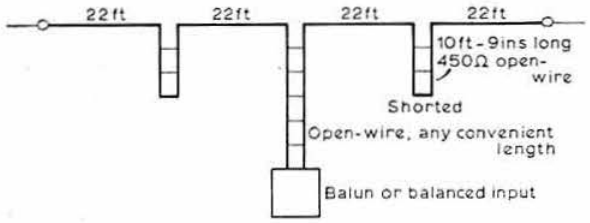


Fig 5. Multiband aerial for 3·5, 7, 14 and 21MHz—the "AZ-Special"

K3AZ makes his phasing sections and also the centre feeder from 450Ω open-wire transmission line, and then at a convenient distance from the feed point uses a balun to transform down to 50Ω coaxial, etc. It would, however, be possible, and in some ways preferable, to extend the balanced feeder through to the transmitter and then to interpose the simple bifilar inductor type of balun suggested some years ago by DJ2ZF: see Fig 6. It will be noted that the aerial is voltage-fed on 14MHz so that in effect one is using the open-wire line with high swr, and some lengths may be found easier to match than others. The aerial should preferably be mounted horizontally rather than in the inverted-V high-centre-point mode if full gain is to be obtained.

How accurate your swr meter?

A question that has been posed on several occasions is how accurate are the conventional amateur types of swr meter? Two amateurs who have attempted to answer this from practical tests are D. E. Williamson, K4HVI, and W. H. Faulkner, W4DO, in *CQ* July 1975, in an article "Accuracy and calibration of swr meters". Their conclusions may not come as any surprise to the more cynical, but for those who proudly claim their swr as 1·005 : 1, read on.

"The conclusion we have reached," say the authors, "is that, at best, an swr reading is only an approximation and that there is a great difference between instruments of different manufacture. Only one thing seems certain: when the meter reading goes up so does the swr, and vice versa. It should be emphasized that at low values of swr a reflected power meter may not give meaningful readings or may give no readings at all. Thus a reading of unity does not necessarily mean that this is the standing wave ratio, and in fact the measurement of swr between 1·0 and 1·2 would be very difficult to accomplish".

The article suggests that over a reasonable range of frequencies the accuracy may not be much better than ±20 per cent in the vicinity of ratios between about two and three. Clearly, like the S-meter on receivers, the average swr meter should be considered a useful guide but not capable of absolute measurements. The authors show that with a good dummy load and good quality capacitor it is possible to obtain a single accurate calibration point on each of the bands of interest.

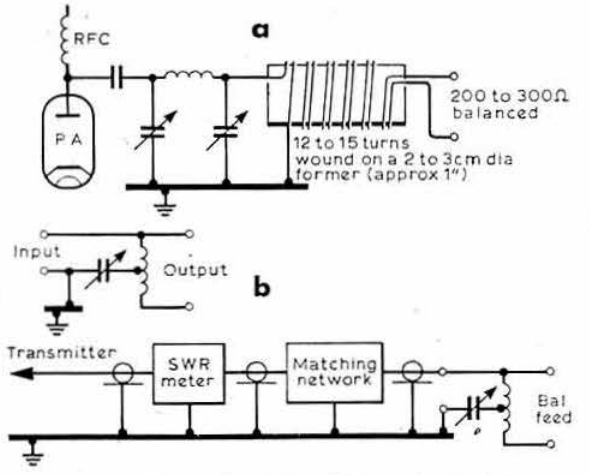


Fig 6. Two methods of providing balanced output from an unbalanced pi-network. (a) aperiodic balun as suggested by DJ2ZF, (b) a resonant balun which must be adjusted when changing band

Squaring the circle

Many amateurs are beginning quite seriously to question the whole range of techniques used in modern stations to transfer power from the final amplifier stage into the radiating element(s), and to point up the advantages of those "primitive" techniques used about 40 years ago.

For example, there is a growing feeling that the losses in many ferrite baluns can be considerably more than their users imagine—and often more than any advantage gained from using them. Again, the fact that many modern transmitters are intended *only* to feed into 50Ω coaxial cable with an swr below two results either in a very high degree of rigidity in aerial design or the use of additional matching units which for the unwary may often be mismatching units! But, despite the snags, there is a lot to be said for using external aerial matching networks to provide greater flexibility. These need usually only consist of just a good inductor and a good capacitor plus one or two pilot bulbs as current indicators. It is perhaps a sign of the times that so many of us often think of ATUs in terms of the quite high-cost commercial units with all their glossy extras. Yet the overall efficiency of many present hf rigs in terms of watts radiated relative to dc input would have profoundly shaken many of those old-timers who used to squeeze the utmost out of 10 and 25W rigs. Admittedly, high efficiency is perhaps much less important today than convenience but it does throw a curious light on "progress".

FET negative resistance oscillator

Back in January 1969 I reported in *TT* on a Japanese wide-range oscillator using no components other than a tank circuit and three FETs. I am rather doubtful whether much use was made of this technique, but in *Electronics* of 30 October 1975, Gregory Hodowanec provides a variation on this theme using two FETs. It could well form the basis of a useful signal source or even of a very-low-power communications or remote-control transmitter.

This time two complementary junction FETs (ie one n-channel and one p-channel) are interconnected to form a negative-resistance two-terminal device rather like one of those tunnel diodes which at one time were being hailed as the sliced-bread of semiconductors.

The fet combination can then be made to oscillate anywhere from af to vhf by connecting it in series with a suitable tank circuit, or even, as in Fig 7, at both af and rf at the same time to produce an A2 modulated-cw signal. It is

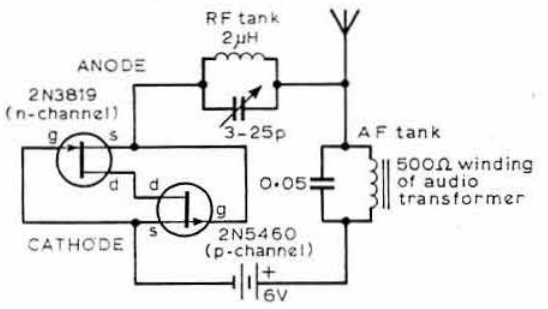


Fig 7. Milliwatt A2 transmitter or signal source using complementary JFETs as negative resistance oscillator (*Electronics*)

claimed that this arrangement provides about 25mW of cleanly-modulated output at about 21MHz. Either rf or af frequency can be varied or either switched out. A current-voltage characteristic curve of the combined JFETs shows that current increases to about 3mA at 2·5V and then decreases again, hitting zero at about 8V and thus providing negative-resistance characteristics between 2·5 and approximatel8 yV.

The cause of LDEs?

Two of the hf propagation mysteries that have most intrigued amateurs in recent years (if one judges by readers' comments) have been long-delay echoes and the arrival of signals well off the correct great circle bearing. Dr Jürgen Röttger, DJ3KR, of the Max-Plank-Institut für Aeronomie, has kindly drawn attention to two recent papers that shed considerable light on both these fascinating but puzzling subjects. The one on deviating paths appeared last month.

The second paper is "Experimental observations and a proposed explanation of very long delayed radio echoes from the ionosphere" by F. W. Crawford and D. M. Sears of Stanford University, California. This was presented last August at a URSI Symposium at Lima, Peru. I have not seen the full text but DJ3KR provides the synopsis, which is as follows:

"For over 40 years, one of the unsolved problems of radio science has been the sporadic observation of echoes of radio signals occurring with delays of the order of tens of seconds. Explanations have ranged from speculations that they are spurious observations, and that the effect does not exist, to the hypothesis that they are coded signals from an extraterrestrial civilization trying to communicate with our own.

"During the past seven years, an ionospheric sounding experiment has been in progress at Stanford, aiming to establish whether or not the phenomenon exists, and if so to determine its mechanism. After several thousand hours of experimentation, a number of records have been obtained which tend to confirm the occurrence of the very long delayed echo effect (a tape recording of some of the specimens will be played).

"Clues to its origin have been obtained by simultaneous measurements at Stanford of the ionospheric density profile by an ionosonde. We advance the explanation that the echoes are due to very low group velocity (1km/s) propagation effects, near the peak of the F-layer. The strong collisional attenuation that such propagation would normally suffer is supposed to be offset by beam-plasma interaction due to fast electrons precipitated into the ionosphere. Calculations will be presented indicating that very weak fluxes of kilovolt energy electrons could readily cause delays of several seconds."

If I have grasped this explanation at all correctly I imagine that the idea that radio waves may occasionally be slowed right down to about 1km/s is going to leave many readers puzzled as to the full implications of this. For so many years most of us have thought of the velocity of electromagnetic waves as one of the few things that we could be pretty sure about. Still, I suppose that slow travelling waves are more credible than the idea of radio signals travelling for several seconds all over space at 299,793km/s, or whatever the latest definition of *c* may be, without suffering terrific attenuation. Maybe some of those wasted calls from G3VA are still sitting up there near the peak of the F-layer trying to pick up enough energy to get moving again!

Got the zener you need?

A very simple way of adjusting the voltage of a zener diode was described by W0YVA/4 in *QST* July 1975 for use where one would like a little more voltage than that for which the zener is designed. Simply it is to put in series with the zener one or more silicon diodes, each of which will increase the zener voltage by between 0·5 and 0·7V: see Fig 8.

Fig 8. Use of power diodes to "adjust" voltage of zener diode regulator (*QST*)

New smoothing technique

Roger C. Arnold, BRS29738, has been experimenting with a novel form of ripple and transient-free smoothing technique for semiconductor power supplies, and has come up with an idea that seems worth considering. He admits that he has not been able to measure accurately the ripple output but is reasonably convinced that in practice the claims made are substantially borne out. It is a system which takes advantage of the very low cost at which silicon power diodes are now often available.

The basic low-voltage high-current power supply is notoriously more difficult to smooth than the ht supplies for valves, and many make use of transistor regulators as part of the smoothing arrangements, typically using a series transistor. BRS29738 lists the following disadvantages:

(1) Transistor usually dissipates substantial amounts of power.
(2) Heat produced by the transistor is reflected in operating temperature of the equipment.
(3) Transistor usually requires good heat sinking.
(4) Transistor ratings set a limit to output current; often such supplies provide insufficient current for more than a few ICs, etc.
(5) The ripple content may result in damage to voltage-sensitive devices.
(6) The regulator usually involves a series resistor which again restricts the regulation to a limited range of load currents.

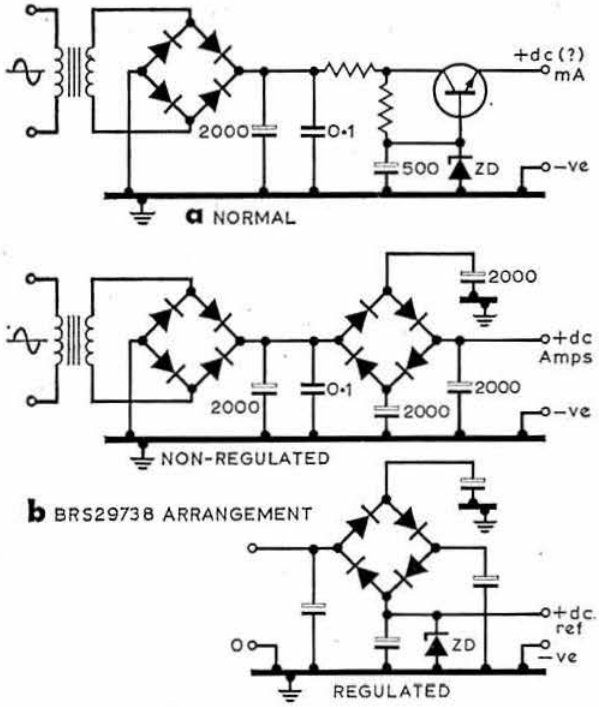


Fig 9. Unusual method of providing ripple-free dc output without the current and other limitations of a series transistor, suggested by Roger Arnold

(7) Such arrangements should ideally be designed for operation over a limited load current.

Roger Arnold believes that most of the conventional smoothing techniques consist in effect of putting a delay pulse on the input pulse and then using this to fill out the pulsating dc. Why not, he feels, do much the same thing with a ring mixer arrangement based on power diodes similar to those used in the main bridge rectifier, but in a series-adding configuration. At each junction in the diode ring, a smoothing capacitor is added. Pulses pass round the ring since each of the capacitor loads is at a different part of its recharge cycle and separated by a diode. While the exact action may be disputed, the operation can be demonstrated by breaking and noting the subsequent deterioration of the ripple content on an oscilloscope trace. He feels that the arrangement shown in Fig 9 offers the following results:

(1) A cheap and effective form of electronic smoothing.
(2) Very little internal consumption of power, which implies either that a smaller transformer may be used or a greater load taken.
(3) Ripple-free dc output with virtually no readily detectable ac content.
(4) No requirement for power transistor or heat sink.
(5) No heat transmitted into the equipment or to transformer.

Extra high-value capacitors and the four extra power diodes are required, but in most cases the maximum current rating of the supply will be raised to the limit represented by the transformer. Voltage regulation can be added where required, as indicated in the diagram.

Since the voltage drop across the first three diodes in the ring is usually sufficient to cater for the increase in rectified voltage compared with that of the "transformer" voltage, then typically the zener regulating diode would have a voltage equal to that of the transformer voltage (eg 12V transformer, 12V zener). The smoothing capacitors should not be lower than 2,000μF if the dc output is to be ripple free. It should be noted that if this form of zener regulation is used with a widely varying load it will need a higher-wattage zener than would be required with a series transistor.

Once again, perhaps, an indication that even the most unexpected areas of circuit design can still be approached in novel ways.

Tape recorder vox

Some ideas for voice-operated switching turned up recently in an "Ideas for Design" item by Michael Roginsky in *Electronic Design*, 20, 27 September 1975, page 100. The circuit arrangement in Fig 10 is intended to provide a low-cost add-on unit for a standard cassette tape recorder so that it automatically turns on the recorder motor when voice signals above a pre-set level are detected. Such devices clearly have insidious applications in the murky world of bugging, but are equally useful for the automatic monitoring of a channel for genuine experimental reasons.

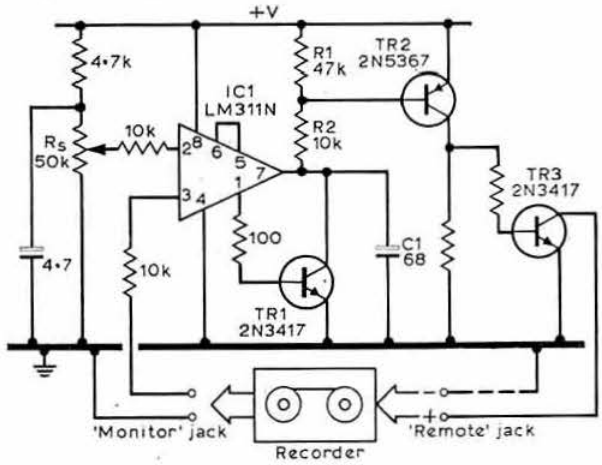


Fig 10. Voice-operated switch for use with tape recorder or for transmitter switching (*Electronics*)

As presented, no modification to the recorder should be necessary where this has "monitor" and "remote" control jacks, and the internal microphone/amplifier provides the audio signals to an LM311N or similar ic comparator. Adjustable bias to the non-inverting input permits threshold setting. The output of the LM311N has an uncommitted output transistor which is connected in Darlington configuration with TR1. R1, R2 and C1 provide time delays as part of the fast-start, slow-stop characteristics. TR2 is an inverting and sharpening stage arranged to control TR3 which forms the motor switch.

So long as sound signals are being detected C1 remains discharged and the motor runs; under "silent" conditions TR1 is cut-off, allowing C1 to charge through R1, R2 and cutting off TR2, TR3. The arrival of a sound signal drives TR1 into a saturated condition, discharging C1 rapidly.

The same order of time constants should be useful for

other vox applications, for example where it is desired to keep the equipment turned "on" during short pauses; other time constants could be easily provided by changing the value of C1.

Maths and the third-method

This month I want to steer clear of the intricacies of third-method ssb but it is only fair to report that recent comments have set many readers digging into the original paper by Weaver (*Proc IRE*, December 1956, pages 1703–1705) and coming to conclusions that range (if one may express it this way) from far to the right of G3PRM to far to the left of G3BY. To my mind the results so far only tend to emphasize the caution which is needed when trying to conclude from purely mathematical analyses what will happen in practical engineering—though I must keep off that hobby-horse or risk running into even more controversy! There even seem to be some suggestions that third-method is inherently unsatisfactory (which is surely not the case) regardless of the af filter used and the degree of balance achieved in the mixers! It all goes to show how it can take 20 years to get a good idea established—and even then risk being defeated by maths.

Meanwhile Joe Cropper, G3BY, has been trying out the Motorola MC1496 as balanced mixers in the rf section of a new third-method exciter designed to provide output directly on 9MHz. He finds that in comparison with the TBA120s the MC1496 has rather less gain but the stability of carrier suppression is better and do not require frequent adjustment (possibly because they dissipate less power); TBA120s are being retained for the af section.

Longlife soldering irons

Barry Priestley, G3JGO, mentions that he became fed up with soldering irons that overheated and burned the bit and usually before long destroyed the element. A few tests showed that his latest "25W" iron actually had a consumption of 32W, accounting for the overheating. His solution was to wire a 4μF, 600V, paper capacitor in an aluminium box in series with the iron: this "wattless" resistor drops the voltage applied to the iron to 210V or thereabouts, giving a reasonable bit temperature and (hopefully) a long element life.

Several other ideas relating to the problem of having soldering irons at the right temperature and ready for use are brought together in an article by E. L. Klein, W2FBW, in *Ham Radio* November 1975. One of these is the technique of wiring a power diode in series with the iron, with a microswitch arranged so that when the iron is lifted from its customary holder the diode is automatically short-circuited, putting the full mains voltage onto the element. While the diode is in circuit it rectifies the ac into pulsed dc, effectively reducing the consumption of the element but keeping the bit hot enough for immediate use (this technique has sometimes been used in television receivers to provide "instant" warm up). Another idea suggested by W2FBW is the use of a commercial thyristor-type light-dimmer switch to provide a variable voltage to the element.

Tone-burst for TR2200G

Perhaps we should vow not to provide any more tone-burst circuits but it would be a pity not to publish the convenient arrangement used by Peter Hackett, G3WCJ, in connection with a TR2200G, since this automatically provides the correct

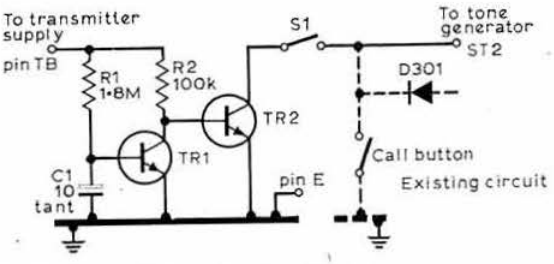


Fig 11. Automatic tone-burst oscillator for TR2200 as used by G3WCJ

period of tone for repeaters and thus simplifies mobile operation by eliminating the need for a call-button. It was developed by G3WCJ with help from J. Beauchamp, BRS34966.

The call-button is replaced by a transistor switch driven by a simple timer which is triggered by the rise of the transmitter supply voltage. The existing call-button (and D301) can be removed and a miniature spst toggle switch fitted in its place. The circuit can then be switched out for simplex working; alternatively TR2 can be put directly in parallel with the call-button.

With care, G3WCJ reports, the circuit can be built small enough to fit between wire-wrap pins AC, BC and OM close by the call-button. Another possible position would be behind the front panel between the meter and volume control.

Pin TB is located in the centre of the receiver board and pin E immediately behind the call-button.

Polarization and aerial comparisons

Ian Davies, G3KZR, was very interested in G6FB's comparisons of ground-plane and dipole performance (*TT* August 1975) and has been carrying out some similar tests; but he has come across a factor which indicates that such comparisons are considerably more difficult to make significant when the aerials have different polarization. This is particularly true when using single-hop European signals as the basis for such comparisons.

He found when comparing a ground-plane with a G5RV-type inverted-V dipole that the results, unless considerable care was taken, could be positively misleading. This was because over quite short periods of time the relative strengths of the two aerials tended to reverse themselves; for example, at first the inverted-V might be showing as much as 2dB better signal, but a couple of minutes later both aerials would be providing similar signals, and soon afterwards the ground-plane might be showing a significant advantage. Even to achieve this required much rapid switching and the need to assess rapidly-fading ssb signals.

What of course was happening was that the polarity of the down-coming signals was constantly changing, resulting in significant polarization coupling losses on one or other of the aerials at any given moment. Although we tend to think of hf signals bounced back from the ionosphere as being so mixed up that polarization no longer matters, this is not really the case. It is better to think of the signals as elliptically polarized with the major axis constantly rotating. This phenomenon is, in fact, used as the basis of polarization diversity reception in some commercial hf applications.

But it does complicate the issue when trying to assess aerials on the basis of signal reports. □

oscar news

AMSAT-UK construction group

The group met at the University of East Anglia on 8 November, when David Walland was elected secretary and Geoff Garside, G3MYT, project manager of the contribution to the Phase 3 Oscar. In order to expedite the construction of the 21-28MHz transponder, it was agreed to request a 145-29MHz unit from AMSAT for modification. It was reported that G4ANT has agreed to design and construct the aerial for this project. During the day's discussion slides of the construction of Oscar 6 and 7 were shown. The secretary can be contacted via G3UEA, QTHR.

Excessive power

Mode switching on Oscar 7 is attributable to the use of excessive power on mode B. All that is required to make 100 per cent dx QSOs is 100W erp. Use of moonbounce-type aerials and high power will cause further degradation of the batteries and the early demise of a satellite that is a valuable tool for thousands of users. Users in West Europe should take notice of this warning.

Oscar model

The model of Oscar 7 which attracted much attention at the recent Telecom 75 exhibition is now available on loan for exhibitions in Europe. The model, constructed by F6DBG and F1DRG, is complete and ready for transport, and the weight of the satellite and packing case is 28kg. Requests for loan of the model should be sent to J. M. den Herder, c/o CERN Lab II, 1211 Geneva 23, Switzerland. □

An alignment aid for vhf receivers

(Continued from page 38)

It is recommended that a signal generator or off-air signal be used for initial alignment, as there is a risk that one or more of the front-end circuits may be peaked up to resonate at an image or other spurious frequency when a wideband signal source is used.

Modifications

The speaker shown in Fig. 1 is included on the assumption that the unit will be connected by inserting a jack plug into the headphone/external speaker jack of the receiver, thereby muting the receiver's internal speaker. If desired, the speaker shown may be replaced by a 15Ω 1W resistor.

A more sensitive meter movement can be used. Should this be contemplated then R12 = R13 = (750,000 ÷ meter sensitivity in microamps) and C3 = 1,000,000/R13, where capacitance is in microfarads and resistance is in ohms. This will give slightly greater meter damping than in the prototype.

As it is unlikely that the instrument will be in constant use it was not considered worthwhile to incorporate a mains unit. If desired, however, this can readily be added using a miniature transformer rated 9V-0-9V at 50mA, a small bridge rectifier and two 470μF 16V capacitors. Voltage stabilization is not necessary, and no change in performance has been noted with changes in supply voltages from less than 8V to more than 14V.

Acknowledgements

The author is indebted to numerous members of Southampton Radio Club for helpful theoretical and practical suggestions.

References

[1] *The Radio Amateurs' VHF Manual*, ARRL, 1972, pp 320-321.
[2] "Operational amplifiers," G. B. Clayton, *Wireless World* February-December 1969.
[3] "Experiments with operational amplifiers," G. B. Clayton, *Wireless World* June 1972 to September 1973. □

SSTV sync generator

(Continued from page 39)

The 6·3V ac filament transformer is only used to obtain the 50Hz sine wave which is fed to pin 1 of IC1. This ic is a one-shot multivibrator which converts the sine wave into a square wave in order to drive IC2. The latter is an astable connected in such a way that it divides 50Hz by three. The resulting 16·66Hz output is fed into pin 1 of IC3, which is another monostable, and this gives 5ms pulses at 16·66Hz.

RV1 is used to set the width of these horizontal pulses. TR1 is used to provide a negative-going output to the horizontal timebase generator of the video source. If positive-going pulses are required, TR1 and its associated 15kΩ and 1kΩ resistors can be omitted (this also applies to TR2).

The horizontal frequency is also fed to the counters IC4 and IC5 which divide it by 120. The 0·139Hz output is fed to IC6 which gives a 30ms output pulse every 7·2s, the pulse width being set by RV2. This pulse is passed to TR2 which inverts it for the vertical amplifier of the video source.

The 5ms and 30ms pulses are also mixed via the two IN914 diodes and TR3 to give negative composite sync pulses which are fed directly to the video and sync mixer unit that drives the modulator (Fig 1). The resulting output from the modulator is a mixture of superimposed video coming from the 931A photomultiplier, and line and frame pulses giving out the full 120 lines of scan. This can be plugged directly into the microphone input socket of an ssb transmitter, or fed straight to the input terminal of a monitor or both together if it is wished to observe the pictures that are actually going out over the air. Sufficient output is in fact available from the sync generator to drive a flying spot scanner and two or three other pieces of equipment simultaneously.

Construction notes

The layout is non-critical as the unit is working at low audio frequencies. Any ic pins not referred to in the circuit diagram should be left unconnected. All ICs and transistors are currently listed and available from several UK sources.

Bibliography

"Sync generator for sstv", D. R. Patterson, WA2EWO, *Ham Radio* June 1972, p50. □

microwaves

Dain Evans, G3RPE*

USA ehf allocations

Since 14 November, American amateurs have been able to use frequencies within the bands 48-50GHz, 71-76GHz, 165-170GHz and 240-250GHz, and all frequencies above 300GHz. The RSGB has for some time been trying to get a similar allocation for UK amateurs, but so far without success. However, as was reported in *Microwaves* last May, the Home Office is prepared to consider requests to work at frequencies above 40GHz on the basis of individual applications.

A new Microwave Award

To encourage the large amount of new activity on 1·3GHz, the VHF Committee has decided to introduce a Microwave Award for this band. Any contact made after 1 January 1976 over a path which exceeds 600km in length will qualify. These awards are of course administered by G5UM.

Microwave round tables

Advance warning for the fifth microwave round table: this will be held on 15 February, again at the IBA Engineering Headquarters near Winchester. The main topic will be given next month.

The fourth round table was held on 2 November and attracted 60 visitors, including two from GM and two from PA0. The general subject matter was microwave dx and how this could be achieved. G3RPE discussed the size of equipment required to work the Microwave Award distances on each of the bands using various modes of propagation—within ducts, over line-of-sight paths and via tropospheric scatter. For the first two modes the power requirements are trivial—a few milliwatts—except on 24GHz when the humidity is high. Even for troposcatter, which would give reliable dx under normal conditions, the powers required are practical for amateurs. However, data for moonbounce supplied by G3LTF is not very encouraging at the higher microwave frequencies. For example, the path loss at 10GHz is 289dB, which will be difficult to overcome.

G8DEK provided sets of graphical data for 10GHz which enable the potential of a given set of equipment to be estimated in a simple way, and its likely performance over both optical and obstructed paths to be predicted. This type of data is specially useful at this time with increasing interest in at-home operation. G8DEK also outlined the many problems in getting varactor multipliers to work reliably, and the progress he had made in this direction. His philosophy was to fit an attenuator of at least 6dB between the driver and the varactor, and not to squeeze out the last milliwatt of power. G3BNL described his 24GHz narrow-band equipment and played some convincing recordings of contacts with G3EEZ. G3WJG discussed some practical aspects of travelling wave tubes: these devices although unfamiliar to most amateurs, offer an attractive method of generating moderate powers on the microwave bands.

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

Two welcome visitors were G2HIF and G3SEK, from the VHF Contests Committee, who took part in an informal discussion on the design of microwave contests. It was suggested that there should be more contests but that each be restricted to no more than three bands to reduce to more manageable proportions the amount of equipment to be taken out and to allow each of the bands a more reasonable effort.

Mention must also be made of the high-quality junk stand, and of the now well-used 10GHz test facilities organized by G3JHM. Special thanks for what was a most interesting day go to the speakers who volunteered, and to Ann Hayter and Wendy Barber and their junior helpers who catered so well.

Operating news

The main news must of course be that October opening. Perhaps the best indication of its potency was that probably for the first time ever there was international QRM on the calling channel on 1,296·2MHz. G3WDG in Bristol worked OZ9OR at 1,040km and had a one-way with OZ9FR, and contacts also with DK6ASA, HB9AMH/P and a pair of PA0s. Most of these contacts were made at a time when signals were only 5-10dB above noise and would not have been possible without the rather powerful equipment he uses. At a time when conditions presumably were better, G3COJ worked into Berlin using just 8W to a single quad-Yagi.

DL7QY worked five G stations from Berlin, the best dx being G3NHE. The strongest signals came from G3LQR. On 432MHz they exceeded 50dB above noise, and on 1·3GHz were 25dB above noise. Several attempts were made to work on 2·304GHz using 4kW erp but none was successful. DL7QY suggests that the temperature inversion responsible was rather too high at 800m agl. He is now active also on 10GHz, transmit frequency 10·368GHz, receiver tuning range 10·250-10·500GHz. The latter covers the whole of the present German allocation: they lost the bottom 250MHz a few years ago.

News from Italy is that I4BER is now responsible for co-ordinating microwave activity in that country. He reports that 10-15 stations are now active on 1·3GHz in central and northern Italy, and occasionally contacts are made with YU stations. Several stations now operate 10GHz with equipment similar to that used in the UK. The best dx so far is 67km.

One item of news relates to operation from "fixed" sites, which is about due for development. G8DEK (Winchester) has a dish aerial mounted above roof height on a mast and fed via waveguide which, among other things, enables him to monitor GB3IOW continuously. When fed with 3W of rf, signals were heard on many places in Hayling Island over a 40km path, which includes as an obstruction the 400ft-high South Downs.

Useful frequencies in the design of equipment

There are already in circulation a number of usefully related frequencies which greatly simplify the design of microwave equipment. Well-known ones are that all the microwave bands from 2·3GHz can be covered from a 1·152GHz driver, that 1·152 + 0·144 = 1·296GHz and that 10·368GHz can be generated by 8 × 1·296 or 9 × 1·152GHz. A less well-known relationship is, for example, that 3·456GHz is 8 × 432MHz. There must be many others which people have discovered, and it would be valuable to collect them together.

Sporadic-E observations in 1975

by R. A. HAM, FRAS, BRS15744*

THE 1975 sporadic-E season commenced in the early morning of 7 May, and ended 107 days later around 0700ut on 21 August. During this period, sporadic-E reflections influenced the normal paths of radio signals between 39–80MHz on 38 days, compared with 37 days in 1974 and 71 days in 1973.

Although there were no extensive sporadic-E disturbances observed during April, there were, however, events of minor importance which took place during the early mornings on 2, 10, 12, 13, 18, 20, 23 and 30 April. Throughout each period prolonged bursts of signals were frequently heard simultaneously from a Polish broadcast station in the 70MHz band and a Russian television transmitter in the 50MHz band. Similar events to this occurred on 4, 5, 6, 8 and 13 May, 5 June, 16 and 25 July, 7, 9, 19 and 24 August.

Observations were made daily at approximately 0800, 1230 and 1800ut at the author's observatory situated in Sussex, and the sporadic-E events recorded during these times are indicated by the dark squares on the chart in Fig 1 and labelled A, B and C respectively.

Continental broadcast stations

On 29 of the 38 days indicated in Fig 1. the influence of sporadic-E extended to 73MHz, and the signals from many East European broadcast stations were reflected towards the United Kingdom.

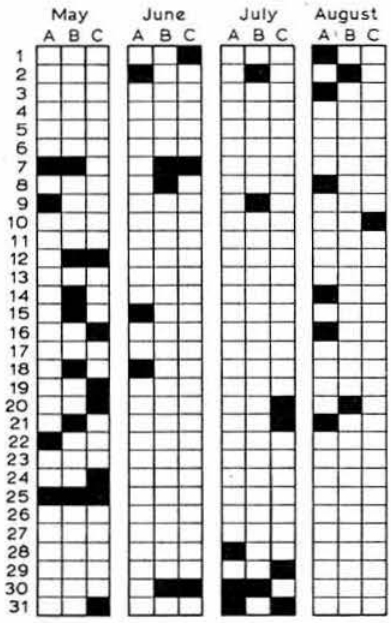


Fig 1. Incidence of sporadic-E during 1975

Fig 2(a) shows the radio-frequency distribution and the number of times that these signals were heard via sporadic-E, using a horizontal dipole. These signals were very strong in the UK when sporadic-E was present.

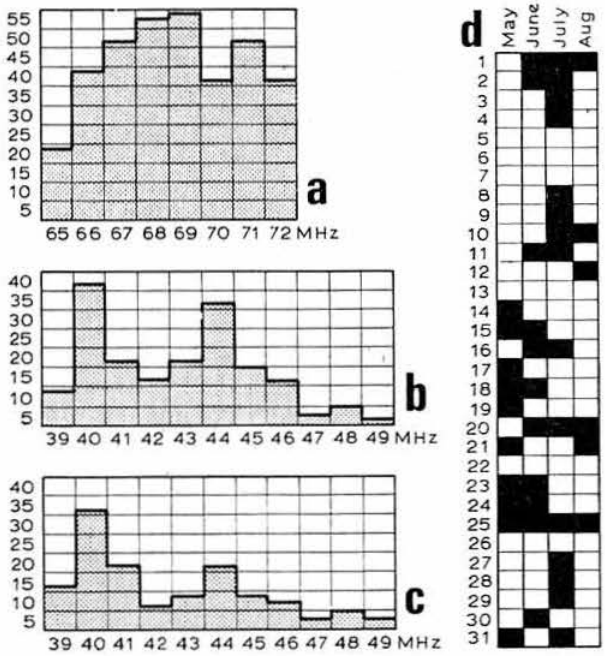


Fig 2. Distribution of (a) East European fm stations, (b) European rt signals and (c) electronic devices, as heard by the author via sporadic-E in 1975. (d) Days on which the signal from the IBP station DL0IGI was heard in Southern England

The 29 days when sporadic-E disturbed the frequency range 65–73MHz are listed below, and the figures in parentheses are the comparable number of days for 1974 and 1973 respectively.

April	—	(1, 0)
May	12, 15, 16, 18, 19, 21, 22, 24, 25, 31	(7, 2)
June	1, 7, 8, 15, 18, 30	(6, 13)
July	2, 9, 20, 21, 28, 31	(2, 5)
August	1, 2, 3, 10, 14, 16, 20	(2, 9)

As in previous years all of these broadcast signals were subject to deep and sharp fading shortly before the beginning and the end of each event.

Under normal ionospheric conditions the regular stations within the range 30–80MHz are easily identifiable, and the inter-station frequencies are normally quiet. However, when sporadic-E is present a variety of radio signals, some of which have been deflected for more than 1,000 miles, can be heard in the UK throughout this frequency range. The practice of

*Faraday, Greyfriars, Storrington, Sussex.

previous years was continued and the R1 television channel (49·75MHz) was monitored, using a vertical dipole, this giving an early warning of sporadic-E. A signal on this frequency is usually heard at the advent of sporadic-E, remaining consistently strong throughout the lifetime of the event, and the last to fade away at the end.

European radiotelephone stations

These two-way signals are obvious to the observer without his knowing the language being used, and Fig 2(b) shows their distribution as heard by the author during the 1975 season. The total number of these signals heard was 160 compared with 178 in 1974. Although, again, the main activity was around 40MHz, there was a marked increase in the number of these stations heard around 44MHz (22 in 1974), and a decrease of 17 at 39MHz.

Electronic devices

This is a general term used to describe the host of tones, teleprinters and various beacons which appear between 39-50MHz when the E region is disturbed. Fig 2(c) illustrates the radio-frequency distribution of these signals heard during the 1975 season, and shows once more that the main activity in this field is around 40MHz.

Major events

There were two major events during the 1975 sporadic-E season. The first began in the mid-morning on 21 May, and ended around 1700ut, and the second, on 20 August, was very similar to the first both in time and character. Exceptionally strong signals from 38 East European broadcast stations were received between 65 and 73MHz during the May event, and some 27 stations during the August event. On both occasions, strong signals from a host of electronic devices, and rt stations (of European origin) were heard between 39–50MHz.

The author is again indebted to Igor Hajek of the Lancaster University language department for listening to tapes recorded during these sporadic-E disturbances and identifying signals from Poland, USSR, Hungary, Czechoslovakia, Romania, Estonia and Finland.

10m band

Sporadic-E conditions affecting the 10m band were identified on the 42 days indicated in Fig 2(d) ,when a strong signal, sometimes for long periods, was recorded from the International Beacon Project station DL0IGI (28·195MHz) situated near Salzburg. The signal from the IBP station 5B4CY (28·180MHz) situated in Limassol was heard during the big opening on 21 May, and again on 1, 2 and 25 June. □

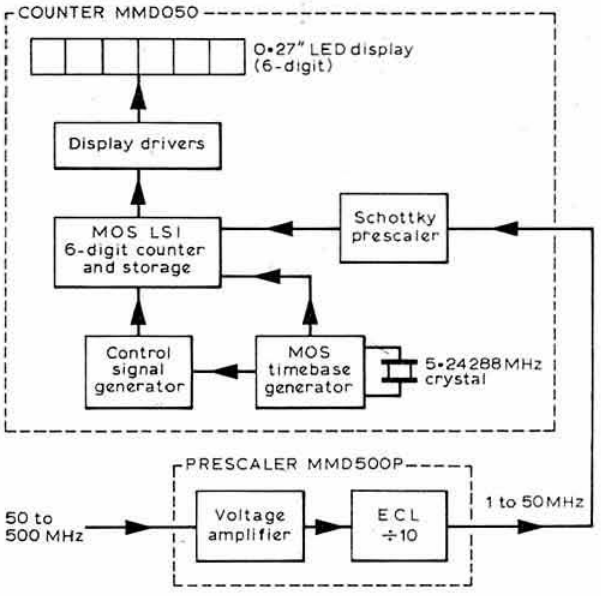
NEW PRODUCT

DFM and prescaler

Digital measuring techniques are now an accepted part of amateur radio and, with the reduction in the cost of the devices necessary, doubtless an increasing number of instruments will become available. However, while it should not be assumed that the digital instrument is always better or more useful than its analogue counterpart, in the field of frequency measurement the digital display is unchallenged. Many commercial counters have been available for some time, and latterly instruments designed for amateur radio applications have been obtainable. In the first case the counter usually incorporates a number of functions not essential for use in an amateur station, generally with a corresponding price tag, while instruments available in the amateur market have not yet come down to a level acceptable to most potential users.

Microwave Modules are now offering a low-cost six-digit frequency meter with a frequency range of 1–50MHz. This is a basic instrument with no frills but provides the user with the facility of reading frequency to within about 200Hz at 50MHz. Operation is from 11–15V at 250mA using an external power source. The unit is contained in the same small size of die-cast box as the manufacturer's range of converters. Similarly housed is a 500MHz prescaler designed for use with the counter but also suitable for use with other instruments. The prescaler has an input frequency of 50-500MHz with the specification showing an input sensitivity of 100μW. The input impedance of both the counter and the prescaler is low, being of the order of 100Ω. The power requirements of 11–15V at 100mA is derived from an external source.

Together these two units provide a way of obtaining



accurate frequency indication on all bands between 1·8 and 432MHz. Apart from straightforward reading of transmitter frequency, the counter is the means by which crystal oscillators can be brought on to frequency with speed and accuracy.

The specifications of the two units are given on page 951 of the December 1975 issue of *Radio Communication*. The frequency meter type MMD050 sells at £66 and the prescaler costs £27, both prices including VAT. Further information is available from Microwave Modules Ltd, Brookfield Drive, Aintree, Liverpool L9 7AN. *G2BVN*

4-2-70

Martin Dann, G3NHE*

Aurora

On the afternoon of 9 November the strange tones of aurora-reflected cw and the weird whispers of similarly-propagated ssb were to be heard again on the vhf bands. Reports indicate that the event, for most people, lasted for about 3h (from around 1550 to 1850gmt with no second phase) and was deemed by those participating to have been a good, if not spectacular, opening. The exception appears to have been the south-west and South Wales where much less was heard than by stations further east.

RSGB auroral co-ordinator G2FKZ reports some slight teething troubles with the RSGB warning scheme which should soon be ironed out. Part of the problem was a high proportion of unanswered telephones in the Midlands and east, aggravated by the unusual fact that the auroral opening seemed to hit most of the country at the same time. Charlie Newton comments that following the opening several requests have been received from people wanting to be included on the warning circuit, but he wishes to point out that it is not intended to make any alterations or additions to the net for at least a year in order to give the scheme a fair chance to prove itself.

It appears that responsibility for the November aurora could lie with a disturbed area of the sun which has been very active since at least May 1974. It is appearing approximately one day earlier every third rotation, and its appearance coincides with the 9 November auroral activity. As G2FKZ remarks, the inability to explain just why we did not get auroral openings on previous rotations shows just how much more we need to learn about the phenomenon.

The writer missed both the warning and the first hour of the event, but is grateful for the premonition which caused him to check the bands immediately after returning from a weekend away from home. During the next couple of hours before a rapid fade-out occurred between 1850 and 1853gmt, 144MHz cw contacts were made with G, GW, GI, PA, DK, SM, LA and SP, but no auroral signals were heard by G3NHE on 432MHz. There was a noticeable drift to the west of the reflection point (G2FKZ made it 10° in 2h), considerable variation in optimum beam heading although from one station to another was noted.

As mentioned earlier, the full impact of the opening was not felt in South Wales where, for a long time, GW3NJW was hearing only a few semi-locals with Ar tone. Clive received the warning via the *Dubus* net from ON5QW at 1415gmt, passing it on to the RSGB system via G3USF. At 1550 GM4BVD was worked, but little else occurred as far as GW3NJW was concerned until 1715, when signals from G, GI and GW were heard. With Clive, signals began to fade at 1830gmt and the opening was over by 1850gmt, no second phase being heard.

On 70MHz, a report from SWL Jonathan Ruff in Co Antrim lists several G and GM stations heard on his 4-el, although G3RJX did not hear GM or GI from Birmingham. Brian noted that when he switched to an aerial beaming south-east, most of the signals audible via the auroral curtain were also audible on a direct path.

Following the main event on 9 November, there were two further openings of lesser intensity, on 17 and 22 November, in both cases during the afternoon and early evening. During the latter opening, G3DAO down in Selsey, West Sussex, was hearing auroral signals between 1652 and 1830, but he only worked two GMs and heard two more. From what he could gather, LA, SM, DL and GI were also active, but not audible in the south. There were also a couple of earlier, minor, auroras on 2 and 3 November, reported by GM8FFX, when GM3ZSS (operating from 8FFX's Aberdeen QTH) worked SM, DL, OZ and LA on 2m, and heard UP2CP (QRA MO61f).

A final comment on the recent auroral activity from GM3JFG in Fortrose, Highland Region, who in 20 years at his old Invergordon QTH had only managed to work 11 countries on 2m. During the November auroras Iain worked a total of 15 countries, as well as quite a number of English counties, showing what a blessing this type of opening is to remote northern stations.

Moonbounce

Congratulations to the members of the North Staffordshire Polytechnic ARC who, using the club call G3VZI, were successful in exchanging reports of 569 with WA6LET during the 432MHz e-m-e tests on 23 November. The station ran 350W from parallel 4CX250Bs, to a 20ft dish, with two folded dipoles and Pawsey stub balun. The receiver consisted of a BFR91 pre-amp/Microwave Modules converter/Racal RA17. The equipment was designed and assembled by Richard Harden, G4DUB, as his final year project for an electronics BSc—with large support from the Polytechnic's technical staff, especially Alan Johnson, G8JVU. Operators taking part in the successful test were G4DUB, G8JVU and G4EER.

October opening continued

Shortage of space prevented us including all reports received on the big lift of last October, and others were too late for the deadline. As the opening was something of an exceptional event, however, we decided it was worthwhile including the outstanding comment this month.

The mode of transmission favoured by G3DNQ is 144MHz fm, which he uses on his journeys between his home in Bishop's Stortford and London. On 25 October the Belgian repeater ON0OV on channel R4 came up long enough for Donald to work several surprised Belgian and Dutch stations, but the real lift for G3DNQ was on 27/28 October. With the IC22 and 25W pa plugged into the fixed station crossed 10-el Yagis, 25 contacts were made with stations all over Germany through the repeater DB0UF on the first evening, and a further 45 contacts were made on the following morning before going to work. Donald comments that the clogging of all repeater inputs during the lift reinforces his doubts of the wisdom of using so few of the available channels for UK repeaters.

Also using 144MHz fm, but only 1W of it to a λ/4 whip, was G4BXN, operating from one of Sheffield University's halls of residence. With this John raised DB1AC/P in FL3Of on 28 October, followed by a string of stations through the German repeater DB0XE.

* 49 Windermere Court, North Anston, Sheffield S31 7GJ.

Operating only outside tv hours on cw, G3OTK found conditions best towards Scandinavia on 26 October, working several SMs. On the Monday, Richard found the emphasis was towards the east, and during the day worked into Berlin and Poland. After tv hours the best dx was worked; SP5JC in KM65f, which was the realization of an ambition by G3OTK to work over 1,000 miles the hard way (not via Oscar).

Neil Whiteside, A8859, of Hitchin, had only been listening on vhf for a month when the dx started rolling in via his 4-el Yagi. From the lift Neil gained five new countries, heard many Continentals through GB3PI, and obviously found conditions very exciting. Let us hope that this taste of dx adds fuel to Neil's interest in vhf listening.

Finally, another "first" arising out of the opening is, as far as we know, the 432MHz contact between DK6ASA and GC2FZC for the first GC/DL on this band. Walter also heard SM7DEZ, but no contact resulted. GC2FZC wholeheartedly agrees with G3HVI's comments about the difficulty in obtaining contacts on 432MHz when running crystal-controlled a.m. Walter has often called sidebanders (particularly during contests) who would undoubtedly have been delighted to work GC, but who were obviously listening only on their own frequency.

Odd opening

Des Kaylor, G8IIR, experienced on 30 November what appears to have been an example of very limited ducting on 2m. For about 2h from 1730gmt, Des was able to work a string of Frenchmen, as well as DC5KQ and EI6CD, all on ssb using a Liner 2 to a 6/6-el aerial from his Oxford QTH. G8IIR later learned that he was heard working the dx by several stations who were unable themselves to detect the Continentals. He was also told by the German station that his was the only signal from G heard at that time, so the range of the opening seems to have been very narrow. It would be interesting to know if any other stations experienced a lift in conditions at the same time.

New Dutch prefixes

PA0DAK reports that the new prefix PA2 will be used when the PA0 series is exhausted; similarly, the new Dutch Class C licence (vhf and above only) will become PE2 when PE0 runs out, and the Class D beginner's licence will be PD0, then PD2.

The callsign PI4RYN is being used by the Dutch amateur information station near The Hague (CM73j) and vhf/uhf transmissions go out each Sunday morning at 1100gmt, and Sunday evening at 2200gmt on 144·555, 145·0 and 433·15MHz, all on fm. The organization responsible is called SOVIROZA, and reports will be appreciated, particularly on 432MHz. These should go to SOVIROZA, PO Box 11, Den Haag NL2076, The Netherlands, and acknowledgement will be by a special QSL card.

Class B

Suggestions from certain quarters that G8 plus threes should be given a set period to translate their Class B licence to Class A by passing the morse test aroused some opposition, and not only among the G8s. A long discussion between a group of London amateurs, including Class A licensees and some old-timers, resulted in the unanimous opinion that amateur radio in general, and vhf cw in particular, would be far more constructively served if the Class Bs were allowed to operate on cw under strictly-controlled conditions (such as within a limited frequency range and with limited power). This would give the would-be telegraphists the opportunity to learn the art under practical conditions and allow them to discover for themselves the efficacy of the mode, thus encouraging the necessary effort to make the transition from Class B to Class A. There would, of course, be no obligation on those with no interest in cw to make use of the suggested facility.

Comment on this idea has been received from Peter Cutler, G3DAO, who, with a cw-only 2m Senior award to his credit, can be said to be something of a supporter of the mode. Peter expressed a good deal of support for the suggestion, providing the exercise was taken seriously, and makes some further suggestions of his own. He feels that it might be a good idea to issue a special "novice" cw licence (GN8ZZZ or G8ZZZ/N for example) for a fixed period, at the end of which the holder would revert back to the normal Class B if they had not taken the morse test for a G4 call. G3DAO suggests a 50W input power limit and a frequency of 144·105 to 144·125MHz, allowing the use of "black boxes" which do not tune below 144·1MHz.

If readers have any strong feelings on the above suggestions, which though controversial are at least constructive, we should be pleased to hear from them.

FM channel

The West Suffolk Repeater Group will be holding field tests from the site of the proposed West Suffolk 70cm repeater on Sunday 11 January. The location is in Sudbury (AM74c) and the aerials are at about 250ft asl. Using the callsign G8HPA/A, the group will radiate 10W erp on 433·2MHz from 10am until dusk, and reports (to G3HPA, QTHR) will be appreciated.

Plans for another 70cm repeater are mooted by the Kent Repeater Group in its Newsletter No 6, but the group is at pains to make it clear that this is in addition to the 2m repeater, proposals for which they still intend to pursue with vigour, despite the unfavourable Home Office reaction. The suggested 70cm repeater will be sponsored by a group, as yet un-named, affiliated to the KRG, but should there be any risk of this affecting the 2m repeater proposal the 70cm plans would be dropped.

The expected date for operation of the Central Scotland repeater, GB3CS, is now the summer of 1976, due to long and frustrating licensing delays.

Feedback

G2FKZ of the Scientific Studies Committee is disappointed by the lack of information received on the results obtained by stations participating in the November auroras, pointing out that a good deal of work and expense has gone into setting-up and running a warning system to ensure activity. He warns that if this does not result in the reports which are the whole purpose of the exercise, the scheme will have to be abandoned.

In an attempt to encourage more reporting of not only auroras, but tropo and other types of opening, Charlie Newton suggests the issuing of a standard report sheet, similar to the existing propagation log sheet, but much more widely distributed. The report sheets could be issued on request (in

FMD Certificates

The following have been issued since the last list was published in the January 1975 issue of *Radio Communication*. The last full list was published in the December 1973 issue.

70MHz Transmitting

113 G3SJX/P; 114 G3VHH; 115 G5HD; 116 G(W)2AMV/P; 117 G2AMV; 118 G3MCS; 119 G3RJX

70MHz Senior Transmitting

21 G3LVP; 22 G3OHC; 23 G3XBY; 24 G3NHE; 25 G3FIJ; 26 GD2HDZ; 27 G3HBG; 28 G5UM; 29 G4AIR.

70MHz Receiving

5 BRS34348.

144MHz Transmitting

413 G8HAK; 414 GW8BXQ; 415 GW8BXQ/A; 416 GM4CXP; 417 G2ATM/M; 418 G8HHI; 419 G4APL; 420 G4BKG; 421 G8CXK/P; 422 GI8HXV; 423 G8HGP; 424 G8EOJ; 425 G3OZT; 426 G8IKO; 427 G8IQH; 428 GM8FVC/P; 429 G8DHD; 430 G8FDL; 431 G8FBL/P; 432 GW3KGD; 433 G3ZKE; 434 G4BRO; 435 G8IMV; 436 G8GMC; 437 G8DHC; 438 G4CMT; 439 G8IMF; 440 GW8CWP/P; 441 G8IYI; 442 GM8EUG/P; 443 G8BZN; 444 G3JHM (new QTH); 445 GW8HVP; 446 G2BLA; 447 G8GAU; 448 G8JKX; 449 G8IWA; 450 G3UOK; 451 G4DLB; 452 G8DET; 453 G(W)2AMV/P; 454 G2AMV; 455 G2AMV (new QTH); 456 G8IAT; 457 G8AAY; 458 SM7FJE; 459 ON8IW; 460 G8EGY; 461 GM4BDJ; 462 G3XSK; 463 GW4BXE; 464 G8ENY; 465 G8ENY/P; 466 G8GGL; 467 G8HYU; 468 G8IXG; 469 G8KDV; 470 G8JAY; 471 GW4CQT; 472 G8HQW; 473 G8CCV.

144MHz Senior Transmitting

69 G3OHC; 70 G3BW; 71 G8FNI/G4BYK; 72 G3ZNZ; 73 G3NAS; 74 G4CZP; 75 G3OSS; 76 GW8FKB; 77 G4CDF; 78 GW8DUP; 79 G3VSA; 80 G3FPK; 81 G3AAV; 82 G8BKR.

144MHz Receiving

30 BRS35217.

144MHz Senior Receiving

1 BRS 35217.

432MHz Transmitting

10 G5HD; 111 G8AYY/P; 112 GW8FQF; 113 G8BDJ.

432MHz Senior Transmitting

24 G3UBX; 25 G3XBY.

432MHz Receiving

5 BRS34348.

432MHz Senior Receiving

1 BRS34348.

1·3GHz Transmitting

7 G3NHE.

Supreme

9 G3NHE; 10 GD2HDZ; 11 G5UM; 12 G3XBY.

Microwave 10GHz

18 GM8HEY/P; 19 GW4ALN/P; 20 G3JHM/P; 21 GW8FJG/P.

Microwave 24GHz

1 G3BNL/P; 2 GW3EEZ/P.

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the manner of contest log sheets) or distributed at events such as the VHF Convention. These could then be sent on completion to the writer of *4-2-70* for extraction of information for the column, then forwarded to the Scientific Studies Committee. In this way maximum publicity would be given to the use of the vhf/uhf bands for serious scientific study. The views of members on whether the return of information would be sufficient to justify the cost of producing the report sheets would be appreciated.

Where has the quality gone?

Whether or not assertions that a.m. is a dying mode are correct (and we received little response either way when we suggested that possibility some time ago), it is difficult to deny that the decline of that mode is a sad thing for those with a degree of aural sensitivity. As Jack Hum, G5UM, comments, the quack of ssb is not tolerable for very long by ears conditioned to reasonable hi-fi reproduction (which is not in any way to denigrate the many merits possessed by ssb in other respects).

From 145MHz down to the area where ssb starts (a little above 144·3MHz today, perhaps 144·5MHz in a couple of years) there is a large untenanted area of the band where there is room to transmit good-quality audio, and where comments about "BBC-like quality" may yet be heard again. Obviously this could be done by fm or a.m., the latter having some advantages to the man who still prefers to build his own station or who cannot afford to "go commercial".

Jack Hum feels that pundits who declare that a.m. is a dying mode could still be proved wrong if enough operators helped to fill up that vacant space below 145MHz with emissions that do justice to the human voice, rather than offer a travesty of it.

Contest comment

When conditions are poor during a 432MHz contest, it seems to have the unfortunate effect of driving people away from their shacks, making things appear much worse than they actually are. Such was the case on 16 November for the 432MHz Open Contest, when, though the state of the band was dismal, activity was even worse, denying one the satisfaction of even a reasonable number of low-scoring contacts. Several stations observed that they had done better in the 2h sessions of some of the cumulative contests on 432MHz than they did in the 8h of this event.

The main bands of interest for Paul Gaskin, G8AYY, are 70 and 23cm, and he offers some thoughts for the future planning of contests on these bands. Paul notes that an increasing number of 70cm operators have equipped themselves for the next band up, and he feels that the natural link between 70 and 23cm is greater than that between 2m and 70cm. While there was considerable opposition to the old 144/432MHz contests, Paul is sure that combined 432/1,296MHz events would find favour, and has made proposals to this effect to the VHF Contests Committee. Members' views on this suggestion would be welcome.

Awards

70MHz Transmitting: No 119 to G3RJX of Birmingham.
144MHz Transmitting: No 460 to G8EGY; No 461 GM4BDJ; No 462 G3XSK; No 463 GW4BXE; No 464 G8ENY; No 465 G8ENY/P; No 466 G8GGL; No 467 G8HYU (now G4EPA); No 468 G8IXG.
144MHz Senior Transmitting: No 81 to G3AAV; No 82 to G8BKR.
432MHz Senior Transmitting: No 25 to G3XBY, which, by reason of Senior Awards already held for 144MHz and 70MHz, earns him Supreme Award No 12.

Dale Harvey found the 432MHz Senior Award the easiest to complete in terms of operating, but the most difficult to obtain cards for, the last taking three months to elicit. Congratulations to G3XBY on achieving the rare distinction of a Supreme Award.

Another award winner finding difficulty in wringing QSLs from stations is G3AAV. Neil completed sufficient contacts for his 144MHz Senior Award in 1971, but is *still* waiting for confirmation from SP and OZ. In fact, G3AAV has worked numerous OZs, but has not yet managed to persuade one of them to part with a card. Fortunately two new countries worked this year, LA and HB9, obliged with cards very quickly, allowing Neil to claim his certificate No 81.

The other 144MHz Senior Award winner this month, G8BKR, made all his contacts with relatively low-power a.m. from a site in Bristol surrounded by rising ground. John

found QSL returns good—80 per cent on direct QSLs and 60–65 per cent overall. Less happy with direct QSL returns is G4AIR—when he turned in his 70MHz Senior claim the other month he expressed disappointment with the people (10 out of 22) who failed to return his SAEs. On the other side of the coin, G4AIR offers special thanks to a number of recent 70MHz portable expeditionaries who unfailingly QSLd despite the undoubted calls on their time.

GM8BDX feels that the decision to require cards from three stations in each of the nine Scottish regions for FMD Award claims is a reasonable compromise. However, Alex suggests that the three stations should be located in three different districts within the region. This would help to promote the continuation of portable operation, which has long been an important part of the Scottish vhf scene. It would also help to prevent the unbalanced situation where, in a region of 1,000 to 2,000 square miles, three stations in one city could be sufficient for a claim, the remainder of the region being disregarded. Alex has sounded out opinion locally and found general agreement with this idea, which has been passed on to the vhf awards manager for consideration.

Miscellany

Alan Strong, G3WXI, wishes to thank all those who replied to the request for assistance with the research project on radio aurora being carried out by Sheffield University. All will be contacted in due course, and Alan regrets the delay, due in part to a spell in hospital and subsequent convalescence, during the first half of the year.

G3EHM in Stoke-on-Trent would like us to pass on the information that he is available most evenings for tests on 432MHz (and 1·3GHz if required), and he has sufficient power to give the best possible chance of success: 400W p.e.p. ssb on 432MHz and 150W of a.m. or cw on 1·3GHz.

Those who are interested in achievement tables might like to know of the "tops" lists carried by the Berlin-published magazine *Dubus*, which specializes in vhf dx news. This table is based on the number of QRA locator squares worked on the various vhf/uhf/shf bands, and at the moment a UK amateur, G3LQR, heads the list on three bands. Since the departure of GW3ZTH to South Africa, the English-language version of *Dubus* is obtainable through GW3NJW, QTHR.

GM3JFG runs a nightly sked with G3AAV, G3NEO and others on 144·05MHz at 2125gmt. Signals have been heard in both directions, but so far no contact has resulted. Iain would be pleased to keep skeds with any other stations who think that a QSO with GM3JFG in the old county of Ross is possible. Iain adds that he hopes to be QRV on 4m and 70cm, ssb and cw, before long.

Quite frequently reports are received too late for the deadline from members who say they have been waiting for the current issue of *Radio Communication* to arrive. Unfortunately, for various reasons, not the least of which is a deteriorating postal service, the writer's deadline occurs *before* many members have received the current issue, which is why we publish the latest date for receipt of information for the following two months. To avoid disappointment (particularly where the news is of immediate interest) we should, therefore, be most grateful if members would note the final dates given at the end of each *4-2-70*.

Finally, those dates for the next two issues are; for February, reports should reach G3NHE by 7 January, and for the March issue, the latest date is 4 February. □

AMSAT 1975 report

DURING 1975, the seventh year of operation of the Radio Amateur Satellite Corporation, Oscar 6 observed its third birthday, outliving its original lifetime goal by 300 per cent. The spacecraft continues to operate well, although it is occasionally necessary to reduce the operating schedule as the solar panels gradually degrade with time. Oscar 6 might well continue to operate far into the future, providing that our telecommand station operators are able to maintain their regular control of the spacecraft.

Oscar 7 reached its first birthday on 15 November 1975 and continues to perform generally well. Like most satellites of comparable complexity, the spacecraft exhibits several anomalies, such as occasional mysterious "mode-jumping", but none which seriously jeopardizes the mission objectives.

New Oscar 6 telecommand stations came into operation during 1975 at the University of Surrey, the Technical University of Budapest, Hungary, and also in California.

In March, an international AMSAT experimenters' conference was held, attended by representatives of AMSAT-Canada, AMSAT-Deutschland, Project Australis, AMSAT and the San Bernardino Microwave Society. The purpose of this meeting was to define the AMSAT Phase 3 spacecraft. Phase 3 spacecraft are intended for operation in high-altitude, near-synchronous or synchronous-transfer orbits, where the communications time and range are much greater than was previously possible with low-orbiting satellites.

Current activity

Progress is continuing on the design and breadboarding of portions of the Phase 3 spacecraft. Plans are for the spacecraft to carry two transponders, one using a frequency of 145·9MHz for the uplink and 435·1MHz for the downlink, the other using 435·1MHz for the uplink and 145·9MHz for the downlink. The two transponders would operate alternately according to a prearranged schedule, as is already done with the two transponders aboard Oscar 7. The Phase 3 spacecraft will also contain a microprocessor (already developed), which will function as a command decoder, telemetry encoder (providing morse code or teletype format, or any other code programmed into it), and provide experiment control functions as well.

The preferred orbit for the Phase 3 spacecraft is a highly-elliptical, high-inclination one having an apogee of about 24,000 statute miles (39,000km) and a perigee of 900 statute miles (1,450km), with an inclination of 100°. Such an orbit gives better coverage of the higher latitudes than is possible with a geostationary spacecraft, and can be achieved by using an on-board apogee kick motor to take the spacecraft from a 900 mile (1,450km) ITOS/NOAA circular orbit into the desired elliptical one.

AMSAT-Deutschland in Marburg is responsible for the overall Phase 3 spacecraft design and breadboarding, while AMSAT-Canada in Ottawa and Montreal is responsible for prototype and flight spacecraft fabrication. Project Australis has agreed to assist in the development of required ground-system equipment, and AMSAT-Washington will arrange testing and launch preparations.

In addition to spacecraft development, portable AMSAT satellite terminal equipment is being packaged for use in demonstrations and deployment to disaster areas in the event of emergencies. The terminals are battery operated, and capable of ssb operation with all transponders in Oscars 6 and 7 as well as the Phase 3 spacecraft to follow.

Future projects

In addition to AMSAT Phase 3, AMSAT affiliate organizations are involved in other satellite hardware projects. Members of the Japan AMSAT Association are developing a 144-432MHz 4W linear transponder which employs "state-of-the-art" rf power mosfet techniques. AMSAT-Canada members are repackaging the Oscar 6 and 7 144-28MHz transponder, using thick-film hybrid printed-circuit techniques instead of hand wiring. In the United States, a multi-channel analogue telemetry system is under development, and AMSAT-UK members in England are discussing a possible 21-28MHz transponder project. □

the month on the air

John Allaway, G3FKM*

AT the beginning of what is likely to be a very unusual and interesting year for your scribe, he would like to take this opportunity to wish a happy 1976 to all readers of *MOTA*. It is hoped that as many as possible will be able to be present at the Presidential Installation in Birmingham on 23 January.

A letter has been received from G4CKA saying that his callsign is being pirated on 14MHz and higher bands by an operator calling himself Graeme or Rich. G4CKA has not been active on these bands himself during the past year. Likewise a message has been received from G4DJE to the effect that his call is being used by an unauthorized person on 3·5 and 14MHz, and this has been happening since November 1974.

DX news

A number of new prefixes will be in use from the Netherlands wef 1 January 1976. There are now four licence classes—A (all bands, 150W input), B (all bands, 50W input), C (vhf, 50W input), and D (channelized and crystal-controlled on 144MHz). Class A and B licensees will continue to use the PA0 prefix, Class C will be PE0. Those graduating to Classes A and B from Class C will change their PE0 to PA3 and retain their former suffix. The total possible prefixes are therefore PA0, PA1, PA3, PA6, PA9, PE2, PI1, PI5, PI50, PA25 and PD3 (hf), plus PI3 and PE0.

News has now been received that in fact VS9MB may well remain on the air until 31 March. There are two operators who operate regularly, one of whom uses his own callsign (VS9MPH), the other being Bruce Evans. Some activity may be expected most days.

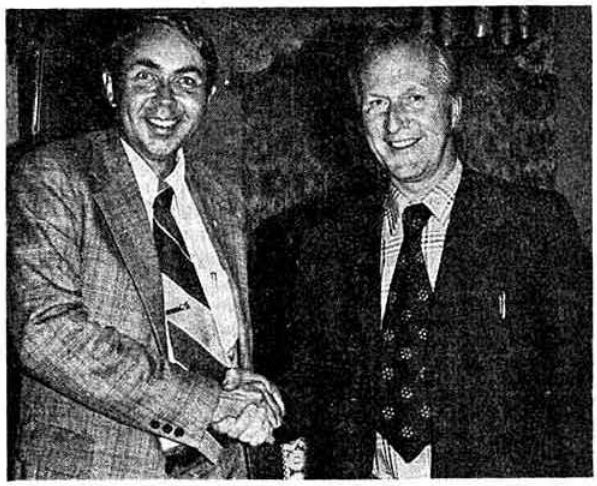
A9XBD reports that FL8OM operated from Jabal at Tair Is on 8 November as FL8OM/A. Those who were lucky enough to make contact are advised to QSL via DJ1TC.

Tom Fishpool, G3KEF, is at the present time in Papua New Guinea and has the callsign P29KE. His location is 5,300ft asl and he uses the equipment shown in the picture. QSLs go to the address in *QTH Corner*.

Ken Abbot, 9G1GD, has written to clear up the confusion concerning the inability of W3HQO to QSL on his behalf. It seems that Ken left Ghana in January 1972 for Nigeria where he has been unable to get a licence so far. His 9G1GD licence is being renewed yearly and he very occasionally uses it when in Ghana; on these occasions he tries to make it clear that he does not QSL. He believes that his call is being pirated.

To commemorate the 50th anniversary of the Radio Club Dominicano, the special station HI50RCD will operate from January to December 1976. All contacts will be confirmed by a special gold QSL card.

* 10 Knightlow Road, Birmingham B17 8QB.



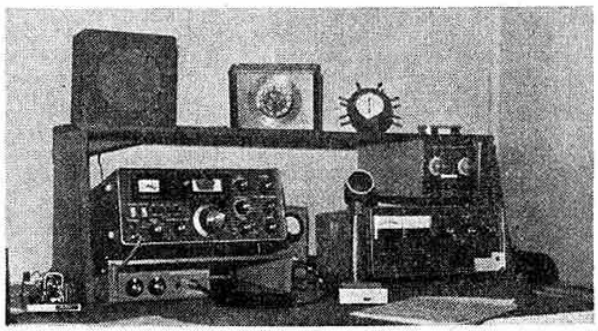
Dr J. Attaway, K4IIF, (left) dx editor of "CQ" magazine, with G3FKM during a social evening with members of the White Rose RC at the home of G3ZBA in Leeds

Up-to-date information on ZD9 licences has been received from the Superintendent of Posts & Telegraphs on the island —Ian Anderson, ZD9BT. Apart from himself there is only Alexander Cumming (his relief, who has the call ZD9BU) on Tristan. ZD9GE is a radio technician belonging to the South African meteorological team located on Gough Is, and his relief will be ZD9GF. All other callsigns supposedly belonging to the ZD9 area are pirates.

9V1SO expected to close down at the end of 1975 and return to Weston-super-Mare as G3XGY. He has enjoyed his period on the air from Singapore and remarks on the politeness of Japanese amateurs. He also thanks all those who have made efforts during the recent poor conditions to work the weak and watery stations like 9V1SO! Please send 9V1SO cards to the address in *QTH Corner*—those sent to the 9V1 bureau will be destroyed.

Those still awaiting the arrival of a QSL card from AC3PT may derive some encouragement from the fact that 9H4G is said to have received a card for an August 1974 contact via ISWL. W1FLS has made it clear that he only acted as QSL manager for AC3PT for the period 1969-70.

In future LX1 prefixes will be issued to Luxembourg nationals, LX2 to reciprocal licensees, and LX9 and LX0 will be reserved for club stations.



The station of P29KE

Jaime Nunes, CT3AR, photographed by G3VPO in September 1975 in Madeira

Any reader needing a QSL to confirm a contact with 6O1KM back in September 1969 should contact Max McCamy, 7515 Vernwood, Houston, Texas, 77040, USA.

3V8CA appears to be the only authorized Tunisian station at the present time. F6CPU operates as second operator, and the station equipment consists of a Heathkit HW32A, a 1kW linear amplifier and ground-plane aerials.

The expeditions to VX9A and VY0A were very successful and 10,000 and 5,000 contacts respectively resulted. Although conditions on the two islands were far from pleasant (departure from Sable Is was delayed for several days by bad weather,) the operators seem to have done an excellent job, and were a model to intending dxpeditioners in the way in which they disciplined those not obeying the rules. QSLs may be obtained by sending an addressed envelope and one irc only to the addresses given in December *QTH Corner*. Country status for both Sable and St Paul Islands is expected to be announced in the January issue of *QST*.

CR9AJ is using an FT400 and 21MHz dipole. He has no morse key at present; he will probably be in Macao for three years.

Top band news

G3ORP has supplied a list of signals causing interference to UK stations on 160m, and asks overseas stations to try to avoid the following frequencies: 1,800, 1,801, 1,802·5, 1,804·2, and 1,805·75KHz (all Hi-Fix A1). There is a carrier on 1,802KHz which seems to be drifting a little lower. 1,802 and 1,803-1,804KHz seem to be clear. USA/VE stations are asked to clearly indicate their listening frequency, bearing in mind that 1,827-1,828·8KHz is sometimes occupied by a coastal station. He also points out that DHJ uses 1,830·5 KHz—not 1·827MHz as stated in November *MOTA*.

W1BB, in his October 1975 *160 Meter DX Bulletin*, listed more 160m WAC holders. These are: WB8APH, K6UA, PY1DVG, 5Z4KL, W2DEO, JA3AA, JA2EUO, JA3ONB, JA7NI, JA2GQO, OK1FCW, GM4ACG, G3SZA, DK3BJ, 9L1JT, JA6WGE, JA3PNP, JA5DQH and GW3UCB, and WB8APH who achieved the first ever ssb WAC on 160m.

VK6HD is active for 15min before his sunrise (1 January—2115, 11 January—2121, 21 January 2131) transmitting on 1,801KHz and listening in the 1,825-1,835KHz area; for 10min after sunrise he listens on his own frequency.

ZD8TM expects to be on the air from St Helena on 160m during January. There is also a report that Easter Is will be heard on the band when CE0AE has his equipment.

VP8KF has returned to the UK, and anyone needing a QSL should write to him at Reservoir Cottage, Redhill, Nottingham, NG5 8PE.

In a letter received just as *MOTA* went to press, VK3CZ reported hearing signals from Europe at about 1900. OK1HAS, OK1MMW, OK2FGA, OH2BM, and DL0KF were heard at RST4/559. He says that Australian amateurs use 1,8025KHz, and that often when DHJ is a good signal there are no other Europeans on the band. From now until March is the best time for VK/G contacts, and Arthur asks callers to *send their callsigns fairly slowly* and to indicate *where they will be listening*—eg "CQ DX 02" or "CQ DX 25".

Brian, 9V1SO (G3XGY), and second harmonic Simon

Contests

The 1976 ARRL International DX Competition

0000 7 February to 2359 8 February and 0000 6 March to 2359 7 March (phone).

0000 21 February to 2359 22 February and 0000 20 March to 2359 March (cw).

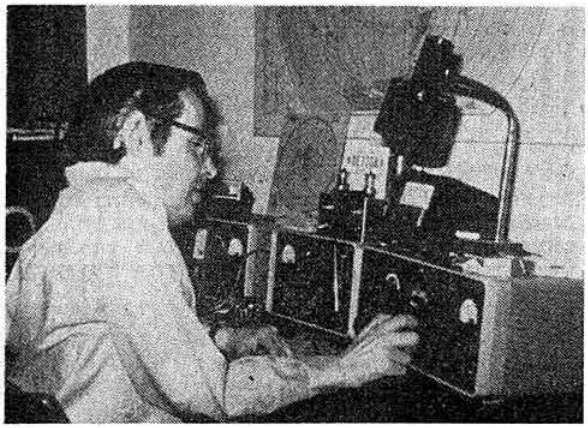
Single-operator (1) all band, (2) high band—14, 21 and 28 MHz, and (3) low band—1·8, 3·5, and 7MHz classes. Multi-operator single-transmitter and multi-transmitter sections. Send RS/T followed by transmitter input power. W/VE stations send RS/T and state/province. Work stations once per band. Score is number of valid contacts multiplied by three multiplied by the total of USA states and Canadian call areas worked on each band added together. Logs and summary sheets must reach ARRL, 225 Main St, Newington, Conn, 06111, USA no later than 19 April. Both log forms and summary sheets are available from G3FKM (sae please), the former have space for details of 100 contacts. Note that this contest will be an excellent opportunity to work stations for the special Bicentennial Worked All States award.

French DX Contest

1400 31 January to 2200 1 February (cw)

1400 27 February to 2200 28 February (phone)

Work French and DUF stations plus ON, HB, LX, VE2, OD, HH, 3B, 9U, 9Q and 9X. Stations may be worked once on each band. Exchange RS/T plus QSO number (from 001). French stations will give the number of their department, and ON and HB two letters marking their canton or province. Each QSO counts three points, but those with F8REF are worth 10. Multiplier is total of departments, cantons, provinces, DUF countries, and prefixes mentioned above. Logs go to REF Traffic Manager, Lucien Aubry, F8TM, rue Marceau 53, 91120, Palaiseau, France. (Contest QSOs may be used as credit for the DUF, DPF, DDFM, DTA, and DNF awards).



Tom Gabbert, K3NZV, is currently on the air from Vienna using the call OE1ZGA

In the **1975 French Contest (cw section)** the following UK scores were noted:

G3ESF	60,883 points	G2AJB	1,848 points
G3SXW	45,570 points	G2WQ/A	714 points
G3BTO	31,464 points	G2WQ	676 points
GM4DKO	27,367 points	G3TXF	507 points
G8DI	11,760 points	G4BWP	360 points
G4BUO	3,906 points	G4DBW	63 points

In the phone section **G6UW** (38,475 points), **GW3GHC** (32,076), G3TOE (21,567), G4ACQ (19,845), G4BWP (6,426) and G4BBA (4,860) were listed.

The 3·5MHz YU-DX Contest 1975

2100 11 January to 2100 12 January.

3·5MHz cw only. Exchange RST plus serial number (from 001). Contacts between stations in same country count one point, on same continent two points, in different continents five points, and with Yugoslavia 10 points. The multiplier is the number of DXCC countries plus YU prefixes worked. Logs should indicate date, time, station worked, numbers given/received, country /YU prefix, if new multiplier, and points. Summary sheet should include signed declaration of operation within rules. Logs should reach YU-DX Club SRJ, PO Box 48, 11000 Belgrade, Yugoslavia before 15 March.

The CQ WW DX 160 Contest

2200 23 January to 1600 25 January.

CW only. Exchange RST plus serial number (from 001). Contacts with own country count two points, with other countries five points, and with the USA and Canada 10 points. Multiplier is one for each US state, Canadian province, and DXCC country worked. Logs must be mailed before 28 February to: CQ 160 Contest, 14 Vanderventer Ave, Port Washington, LI, NY, 11050, USA. Log sheets may be obtained from the same address (large sase plus IRCs please).

Awards

USA Bicentennial WAS Award

A special Worked All States award is being issued to all those who confirm contact with all 50 of the USA states during 1976. No special band or mode endorsements will be made, otherwise rules will be similar to those for the normal award.

QTH Corner

C5AJ	via DL7AH, H. Lillenthal, Thalhof, 8031 Gilching, W Germany
FG0MM	via WA1JKJ, 147 Lincoln St, Franklin, Mass, 02038, USA.
FY7AK	via F2QQ, R. Gemehl, c/o 52 rue de Saussure, F-75017 Paris, France.
HI50RCD	PO Box 1157, Santo Domingo, D.N., Dominican Republic.
WA6LRG/KB6	607 Arbor Drive, Vandenburg AFB, Cal, 93427, USA.
ON0ITU	via ON5TO, PO Box 33, B-8000 Brugge, WV, Belgium.
N8GMI	K8HPS, 1700 West Third Av, Flint, Mich, 48594, USA.
P29KE	BRS32669, 7 Fair Isle Drive, Nuneaton, Warwicks.
P29PN	Box 219, Madang, Papua New Guinea.
P29WG	W. Gielis, 1 Virgil St, Hyde Park, Townsville, 4810, Qd, Australia.
VP1BJ	via G4ZJ, 18 Hawthorn Drive, Topcliffe Barracks, Thirsk, N Yorks.
VP2DX	(29/30 *Nov only*) K4GKD, 30 South Old Glebe Rd., Arlington, Va, 22204, USA.
VP5TI	via G3RWU, 49 Parklands Av,Worthing, Sussex.
VQ9DF	via ON6FN
ZD9GF	via ZS5SH.
ZK2AO	Box 36, Niue.
ZK2AP	via W0JRN, 5985 South Milwaukee Way, Littleton, Colo, 80121, USA
9V1SO	only to c/o G3XGY, via RSGB.

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

Anyone may apply—regardless of past awards earned. Special application forms may be obtained from: ARRL, 221 Main Street, Newington, Conn, 06111, USA. It is believed that there will be no charge to applicants from outside the USA and Canada.

The Hague Award

For contacting at least seven of the following stations who are located in The Hague: PA0s ABB, ANY, AWN, BDH, CFS, CSL, DYK, HER, HET, HJZ, HLA, HSW, HVG, HWG, ION, JBK, JCM, JMY, JOH, JWO, JWU, KTV, LAK, MDL, PET, PMB, PUY, RB, TLX, TVH, VER, WAR and WOF. Send a list of contacts certified by two other amateurs, together with five IRCs, to: H. F. Clauzing, PA0CFS, The Hague 2019, v Diepenburchstr 43, Netherlands.

The USA-WPX-76 Award

This will be issued free to any licensed amateur who can provide a list (certified by two licensed amateurs) of contacts with at least 200 USA stations using the special bicentennial prefixes during 1976. At least 35 different special prefixes must be included. Contacts may be on any band or mode, and no special endorsements are available. Special prefix stations operating in KL7 and KH6 will count for the special prefix of that area; within the USA-portable prefixes will count for the area in which operation is conducted (AA3FKM/1 would count as AA1). Applications should be made on the regular WPX application forms and only the complete call of the station claimed need be given. The 35 different prefixes should be listed alphabetically in the left column of the application and the remaining 165 stations listed in three columns of 50, and one of 15. Applications should go to: WPX Contest Manager, Bernie Welch, W8IMZ, 7735 Redbank Lane, Dayton, Ohio, 45424, USA.

Band reports

Very low sunspot activity and some magnetic disturbances have resulted in a considerable falling off in conditions since last month. However, the aurora on 22 November was followed the next morning by a spell of very good propagation into the USA on 1·8MHz.

Many thanks to the following for supplying logs from which the listing below was prepared: DA2WN, Gs 2CDT, 2HKU, 4RZ, 5JL, 6GH, 3KSH, 3NKQ, 3ORP, 3UOL, 3YMC, GW4BLE and G4BTI, BRSs 17567, 31301 and 35608, and As 8312 and 8428.

Stations listed in italics were using cw.

1·8MHz. 0000 EA8CR. **0100** *KV4FZ, W4DO.* **0200** *PY1RO, W8LRL, K9MBS.* **0300** *W4EX, W5PWW.* **0600** *W3AU, W3GL, W3GPE, W6BYB/VE1.* **0700** *XJ3BMV.* **0800** *W1BB, W1HCT,* K1PBW, *W6MZW/1, DJ6QT/CT3.* **2200** *VS6DO, 9H1AV.*

3·5MHz. 0000 *JT1AT,* VP2s ABC, LCX, SQ, VBG. **0300** *FP8AA.* **0600** *ZF1RF.* **0700** *CN8AD, VP2MKJ* (QSL to K4CKJ), *W6PVB, ZLs.* **0800** VP2VBG. **1400** K6ANE, K6QW, W6NLZ, W7SFA. **1500** VS6DO. **1600** JAs. **1800** JA6BSM, OE6DK/YK. **1900** JA1JRK. **2000** *JAs 2ANG, 4FCS, 5PL, 6ACZ, 0DXG,* JA8IEV/JDI, ZS1MH, 9X5SP. **2100** A4XGD, DU1EJ, JW5NM, VE1XU/SU, YB0ABV, 5Z4PD. **2200** VS6DO, 9M2DW. **2300** *AP2KS* (QSL to SM1CNS), *FG7AM,* KV4FZ, *DJ3KR/OA4, VP2MIR* (QSL to W7FCD).

7MHz. 0000 *C5AJ, CP3CN, OZ5DX/CT3* (QSL to OZ5DX), *EP2OD* (QSL to K4OD), *LU, 3V8DQ, 8P6.* **0100** *VP2s, KX, MIR, VU2KMK,* **0700** *C6ABA, JAs, VKs, ZLs.* **2000** *DU1OR, VKs, ZS6BT.* **2100** *JA2HO, 5B4CD* (QSL to SM5EII). **2200** *JAs.* **2300** *A9XU, VP5TI, ZD8TM, WA7SIN/8R1* (QSL to W3HNK), *9G1JX* (QSL to DL7SI).

14MHz. 0000 VP8ON. **0700** *FK8s BX, CC. HM1IJ.* **0800** VP9HZ (QSL to G8AXB). **0900** KX6LQ, *5L2FY* (QSL to JA1QOQ). **1200** P29KE, VKs, VR4DX, ZLs. **1500** FR7BE, *HZ3TYQ,* VK9XI. **1600** A2CBW (QSL to DK3KD), *FR7AI/J,* FR7ZL/G, *3B8DO.* **1700** *HH9DL,* KH6BB, W6/W7s, ZS2MI. **1800** *KH6CF.* **1900** FY0BHI, 9L1JM. **2000** VP8s HA, NN, NP (QSL to G4BNH). **2100** KH6CDR, VP8OA.

21MHz. 0900 FH8CY, 9V1RR (PO Box 2728, Singapore). **1000** AP2KS, CR9AJ, *FB8ZF.* **1100** CE6DO, JY9CS, *TU2EF,* ZL3JC. **1200** FY7AK, VK6s. **1400** FR7BE, 5N2NAS. **1600** *FR7AI/J.*

28MHz. 1100 DJ6QT/CT3, *3B8DO.* **1200** OA4BP. **1600** *FY7AK,* KP4YD, *DJ3KR/OA4, VP2MIR,* WA2FBV, ZD7FT, *3V8DQ.* **1900** *OX3DL.*

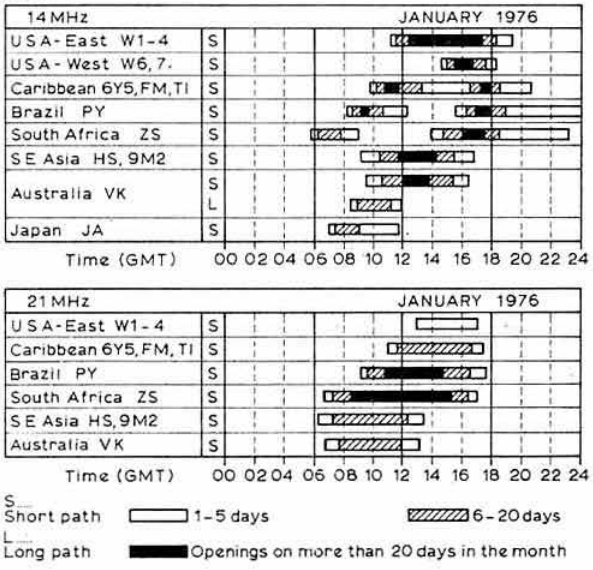
Many thanks to all correspondents, and also to the authors of the following for information: the **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0TO*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6WA*), the **DXers Magazine**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

Please send all items for **February** issue **to reach G3FKM** no later than **7 January,** and for **March** by **4 February.** □

Propagation Predictions

Conditions in January will differ little from the forecast given for December which will hold good for all bands mentioned. It is again pointed out that all times are given in gmt. This is done to facilitate conversion into local time of various dx countries such as east and west USA, Asia and Australia.

The provisional sunspot number for November 1975 was 19·3, with appreciable solar activity occurring during the second and third weeks. MUFs approximated to the seasonal normal and there were some short periods of unsettled conditions. The predicted smoothed monthly sunspot numbers from the Swiss Federal Observatory for March, April and May 1976 are 8, 6 and 5 respectively.



RSGB QSL BUREAU SUB-MANAGERS

(At 1 December 1975)

G2:	J. W. Russell, G2ZR, 55 Holcombe Close, Bathampton, Bath BA2 6UP.
G3 and G4 two-letter calls, G5 calls and GC calls:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London SW20.
G6 two and three-letter calls; G8 calls:	Mr & Mrs A. J. Mathews, G6QM, 62 Ashlands Road, Hesters Way, Cheltenham GL51 0DE.
G3AAA-DZZ:	C. A. Bradbury, BRS1066, 13 Salisbury Avenue Cheltenham, GL51 5BT.
G3EAA-HZZ:	S. L. Newport, G4DEV, 101 Elibank Road, Eltham, London SE9 1QJ.
G3IAA-KZZ:	G. L. V. Butler, G2BUL, 130 Coulsdon Road, Old Coulsdon, Surrey CR3 2LE.
G3LAA-NZZ:	C. A. P. Henderson, G8KNW, 76c The Avenue, Beckenham, Kent.
G3OAA-PZZ:	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex CM1 2TT.
G3RAA-RZZ:	D. Dell, G3PQF, 6 Rye Close, Cove, Farnborough, Hants.
G3SAA-TZZ:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London SW20.
G3UAA-VZZ:	M. Newton, G3UKW, 2 Marlowe Court, Garforth, Leeds, LS25 1PR.
G3WAA-XZZ:	F. G. Rylands, G2VF, 39 Parkside Avenue. Millbrook, Southampton, Hants SO1 9AF,
G3YAA-ZZZ:	H. R. Boutle, G2CLP, 14 Queen's Drive, Bedford.
G4AAA-AZZ:	C. Johnson, BRS31379, 118 Harvest Road, Smethwick, Warley, Worcs B67 6NG.
G4BAA-BZZ:	R. F. Rawlings, G3WBV, 74 The Lindens Fieldway, New Addington, Surrey CRO 9EL.
G4CAA-CZZ:	T. Cheesley, G4CHP, 2 Willows Close, Upper Tasburgh, Norwich NR15 1NE.
G4DAA-EZZ:	D. Buckley, G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent BR5 1PX.
GB:	C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs BL8 3HL.
GD:	W. P. Waid, GD3GQX, 1 Mount William, Summer Hill, Douglas, Isle of Man.
GI:	R. R. Parsons, GI3HXV, 45 Erinvale Avenue, Finaghy, Belfast.
GM:	D. R. Macadie, GM6MD, 11 Marchmont Road, Ayr KA7 2SB.
GW:	J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff.
BRS and A numbers:	D. Bourne, G4CYW, "Roughways", Chub Tor, Yelverton, Devon PL20 6HY.

swl news

Bob Treacher, BRS32525 *

Your scribe would like to wish all readers a very happy and prosperous New Year, and to thank sincerely those who write in, their help being essential to the compilation of this feature.

QSL Bureau

Dave Borne, G4CYW, the BRS and A QSL sub-manager, also echoes "Happy New Year" to all *SWL News* readers. He thinks it is time to remind us once again of several very salient points regarding QSLing. For incoming cards, send a sensible size of envelope—if they are too small, cards have to be folded, and if too large they become difficult to file and are subject to damage in the post. The minimum postage (6½p second class and 8½p first class) is sufficient for about 15 cards. Please put your BRS or A number on the top left-hand corner of envelopes and include a serial number and any special instructions ("wait six" etc).

Dave mentions that it also helps all concerned if he is advised of any change of address or swl number so that records can be kept up-to-date and QSLs can be re-routed where necessary. Our sub-manager will gladly answer correspondence from his "clients" but insists on an sae before replying. Please mention your BRS or A number as this is Dave's only method of identification.

Finally, all outgoing cards should be sent only to G2MI and sorted in countries (for the USA in call areas, eg W1, W2 etc). Readers may be interested to learn that G2MI has over a million cards to sort each year, so please make a New Year resolution to make his task a little easier this year.

Table matters

Will Keith Kerr, BRS35943, maintain his lead at the head of the 1975 table? Neville Spry, BRS17567, continues to edge closer each month, the countries difference now being only 45. The March issue will carry the final results, and even though the table was not quite so well supported in 1975, a table for 1976 will appear on exactly the same lines. All that is required is to keep a record of countries heard on all bands from 10 to 160m as from 1 January 1976, and submit the number of countries heard on each band to your scribe before the deadline date given in each issue.

Listener contest activity

Keith Kerr, BRS35943, reports taking part in the Cray Valley Listeners Contest, during which band conditions were good. Keith's unchecked score of 249,856 certainly bears out this statement. He also found the VK/ZL contest the following weekend worthwhile, with a claimed score of 4,922 submitted. QRM on 40 and 80m was bad and very little 15m Pacific activity was heard. Conditions during the RSGB 21/28MHz Contest were quite good, although due to other commitments Keith could only have a short listening session.

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

1975 Countries Table

Station	10	15	20	40	80	160	Total	Mode
BRS35943	84	187	231	116	151	0	769	ssb
BRS17567	84	160	232	69	170	9	724	ssb
BRS35608	52	117	202	164	86	0	621	cw
A8312	39	120	176	100	119	30	594	ssb/cw
A8428	28	99	184	46	109	5	471	ssb
BRS25901	32	72	182	69	78	7	440	ssb
A8849	39	116	143	52	67	11	428	ssb/cw
A8088	29	61	110	38	50	11	299	ssb
BRS35454	0	64	129	21	58	4	276	ssb
BRS34658	4	8	64	45	94	7	222	ssb
BRS29641	6	38	35	27	30	0	136	ssb
BRS35754	0	0	38	0	51	1	90	ssb

Dave Sharred, A8312, on the other hand, spent the full 12 hours by his receiver during this contest and has claimed a five-figure score. The 7MHz cw section was also entered and a score of over 2,000 claimed, although the 7MHz phone section does not seem to have been quite as productive. Dave also sent a check log for the second 1·8MHz CW Contest and proclaims there is enough swl activity to warrant an swl section in all transmitting-only contests. A point with which your scribe also agrees.

DX fever

What was VX9A? VX9A was an expedition mounted by a group of VE operators at the end of October from Sable Island, off the coast of Eastern Canada. The same group of operators then went on to activate St Paul Island and it is thought that both these sites will count as new countries for DXCC purposes.

Another rarity noted this time was JA8IEV/JD1 (Minami Torishima) on 80m ssb at around 2030gmt late in November. A close watch on the dx portion of 80m should prove very profitable during the early evenings this month. Stations in the Far East and Pacific will be audible from 1500 in Britain, and conditions at around 2300 should also be good to this part of the globe.

The mail

It is very rewarding to hear from new contributors. Robert Dowdell, BRS29641, from Burgess Hill in West Sussex, has submitted his list of countries heard since mid-July. Robert was about to move QTH when he wrote and was hoping that more elaborate aerials could be installed at the new location.

Andrew Glanville also writes for the first time and, although preparing for "mock" O-Level examinations, appears to get a fair amount of time to listen on the amateur bands. Andrew uses an ex-army R206 Mk2, which has 15 valves and weighs no less than 120lb—this does not include the psu! Mainly an ssb fanatic, Andrew dabbles in 160m cw as well, although from his comments he does not rate the band too highly.

One who would I am sure disagree is Dave Sharred, our 160m wizard. His 1975 160m country total is now 30, after he added EA8CR, who was 579 on cw and 56 on ssb at around 2330. 160m confirmations have also increased to 26, following QSLs from GC and VK6HD. Non-receipts include an HC2 and OA8V, and Dave also points out there has been no success yet with a G/VK3 sked at 1900 daily.

Finale

That is the pick of the correspondence for this issue. Remember, last additions for the 1975 countries table, plus news and comments should reach the writer by 27 January. □

The 1975 AGM

MORE than 150 members assembled at the Royal Society of Arts in central London for the 49th Annual General Meeting of the Society. The President, Cyril Parsons, GW8NP, was in the chair and he was supported by the Treasurer, John Brown, G3DVV, and the General Manager, George Jessop, G6JP. In order to save time the notice convening the meeting, published in the November issue of *Radio Communication*, was taken as read. The minutes of the 1974 AGM were then approved.

Accounts

The adoption of the audited accounts was proposed and seconded. Questions were asked about the amount of the bad debts written off (almost entirely due to defaulting advertisers) and the profit on publications. Some discussion took place concerning the qualified report of the auditors. The Treasurer explained that due to inefficiency in the subscription department at the end of 1974, membership renewal notices were late in despatch. However, the position had been largely rectified but subscriptions had been received long after the true renewal date. The auditors were of the opinion that credit for these late renewals should only be taken as from the date of receipt and not the true date of renewal. In the case of a subscription due for renewal in January, but not paid until May, it meant that credit could only be taken for 2/12 of the subscription (May) instead of 7/12 (January). The accounts were approved.

Subscriptions

The meeting then passed to item 3, the special resolution amending article 19 of the Society's Articles of Association. As expected, this item was the subject of considerable discussion, mainly concerned with the issue of a "blank cheque" to Council to increase the subscriptions in the future. One point not appreciated by many is that in a case of this type, governed by the Companies Acts, no alteration to the resolution is possible. It is either passed as submitted or it is rejected. It was pointed out from the floor of the meeting that no blank cheque was being given. Control of the subscription could be effected by a special resolution at the next AGM, by rejection of the accounts and ultimately by the election of Council members holding views acceptable to the majority. Several speakers made the point that as the members of Council had been elected by the Society membership they should be allowed to run the Society in the way that they believed best.

In his answers to questions the Treasurer said that the alteration to the Articles had been recommended by the Department of Trade and Industry; the cost of an Extraordinary General Meeting to amend subscription rates was about £500 and that it was the intention of Council to raise the subscription to £8 for a UK corporate member. This had been clearly stated in *Radio Communication*. John Brown agreed that the increase in rates would cause a loss of membership but the alternative was a cessation of Society services and a rapidly worsening financial position. It was vital that the RSGB and other national societies should be strong and representative, as their efforts would have a considerable effect on the future of the amateur service at the 1979 WARC.

Eventually the special resolution was passed by 124 votes to 13 and the meeting proceeded to the agenda items dealing with the result of the recent elections to Council, the remuneration of the auditors and any other business.

Honorary Member

The President then announced that Council had invited Dr J. A. Saxton, CBE, to become an Honorary Member of the Society, which invitation had been accepted. In presenting Dr Saxton with his certificate of Honorary Membership, the President referred to the support which the Society had received during the two years in which Dr Saxton had served as President. In his reply Dr Saxton stressed the need for a strong society and the maximum effort devoted to preparations for the 1979 WARC. He expressed his continuing interest in the affairs of the Society and looked forward to future participation.

After the conclusion of the official business as required by the Companies Acts, and following requests from the floor, the President commenced the informal discussion at 8.10pm.

Informal discussion

This was opened from the Chair with a proposal to charge for the services of the QSL Bureau by the sale of stamps which would be affixed to cards sent through the bureau. The charges were proposed as ½p per card for a member and 1p for a non-member. The annual cost of the QSL Bureau was about £2,000 and it was believed that this could be recovered and a profit made by the scheme proposed. G2MI expressed his opposition to the scheme mainly on the ground of increased administrative work within the bureau and the return of unstamped cards. G4DAX suggested that QSLs were no longer necessary in the light of the present cost and postage and that the present custom of exchanging QSLs should cease.

The annual question of selling the Journal on bookstalls was raised and G3JFF asked that *Radio Communication* should be available for sale at rallies and conventions.

G2FKZ pointed out that it was not obvious that much of the money contributed to IARU was ploughed back into projects undertaken by the RSGB and the annual outlay should be regarded in that light.

Ron Ham enquired if members could covenant to pay a sum over a period of five or seven years to the Society who could then recover the tax payable. The Treasurer replied that this could be done but this amount could only be paid in addition to the subscription.

There was some discussion regarding the application of the 25% rate of VAT and the President reported on the discussions with the Customs and Excise authorities. G4APG felt that the terms of the amateur licence, particularly with regard to self-training, could not be reconciled with the higher rate of VAT.

G3RQB asked if decentralisation of headquarters could save money and the Treasurer drew attention to the existence of a committee of the Society which had this matter under continual scrutiny. At the present time there would not be any saving by moving headquarters, particularly in view of the increase in wages and costs in areas away from London. Council believed that 35 Doughty Street was an economical location.

The long delay between the meetings of Council and publication of "Council Proceedings" provoked some comment. G4DAX suggested approval of these by post, leading to earlier publication, and G8AUU proposed that Council should take steps to speed the publication of the reports of meetings. The President drew attention to the news bulletin which was now being circulated on a regular basis to RRs and ARs, and G6JP was congratulated on a broadcast

The President presenting trophies at the AGM. Left: the Col Thomas Rose Bowl for Mr A. J. Slater, G3FXB, who also received the BERU Junior Rose Bowl. Centre: Mr R. Treacher, BRS32525, receives the Metcalfe Trophy. Right: members of the Addiscombe ARC who received the Houston-Fergus Trophy

Also receiving trophies from the President. Left: the G5RV Trophy to Mr J. W. Swinnerton on behalf of the Interference Committee. Centre: the Founders Trophy to C. Newton, G2FKZ. Right: representatives of the East Barnet ARCG receiving the Bristol Trophy. *All AGM photos by A. Goddard, G3NQR*

made over BBC Radio 4. G2MI asked that greater use be made of the GB2RS service and G8AUU asked that this should be extended. In replying G6JP asked that members should submit news items and also indicate the type of material they wished to hear on the news bulletin service. Headquarters could prepare and distribute a bulletin but they could not provide the entire content.

The informal discussion closed at 8.45pm and the presentation of the awards and trophies then took place. Appreciation is given to the honorary trophies manager, Peter Miles, G3KDB, for his work in assembling and servicing the many trophies, all of which were in glittering condition.

In closing the meeting at 9.05pm the President thanked members for their attendance and extended his best wishes for the festive season and the New Year.

The following telegram was received by the President from the Yugoslav national society prior to the AGM:
All the best to officers and members of the RSGB for their big activity in amateur radio — SRJ Secretary.

The writer makes no apology for the omission of the callsigns of many speakers in the above account. Although repeatedly asked to identify themselves many members obviously preferred to remain anonymous. This brief report of the AGM is an informal account in advance of the minutes of the meeting and in no way is a formal record of the occasion.
G2BVN

council proceedings

A brief report of the Council meeting held on 15 September 1975

Present: Dr E. J. Allaway (Executive Vice-President, in the Chair). Messrs R. J. Baker, P. Balestrini, J. O. Brown, D. Byrne, R. W. Fisher, W. J. Green, L. E. Newnham, W. McGonigle, J. R. Petty, W. A. Scarr, A. E. Smith, R. F. Stevens, D. M. Thomas, F. C. Ward (members of Council), R. J. Hughes (by invitation), G. R. Jessop (general manager), A. W. Hutchinson (editor), D. A. Evans (minutes secretary).

Apologies for absence had been received from Messrs C. H. Parsons and D. M. Pratt.

Financial report

Mr Brown read the final accounts, subject to audit, for the year ended 30 June 1975, and said that he would be able to provide further financial breakdowns at the next Council meeting on *Radio Communication* costs, administration costs and costs relating to other departments. After taking into account the VAT repayment, the loss in the year was approximately £12,500, mainly due to inflation and the cost of *Radio Communication*.

Mr Brown raised the question of the increased subscription, which the Finance & Staff Committee had recommended should be £8. If this figure were accepted it would probably produce a deficit of some £16,000 for the year ending 30 June 1976, but it was hoped that a profit on the sale of books would reduce this.

It was essential that action be taken to implement the subscription rise from January 1976, subject to approval of the special resolution at the AGM. After considerable discussion, Council agreed to accept the recommendation that the subscription be raised from 1 January 1976. A suitably worded notice would appear in the November issue of *Radio Communication*.

General manager's report

Mr Jessop reported on staffing problems in the accounts department, but a new employee was due to start; Mr F. Deeks, head of the accounts department, had decided to retire at the end of the year. (Council extended the Society's thanks to Mr Deeks for his services over the past few years).

Correspondence was now being answered in two to three days and book orders were being processed in the same amount of time.

Membership and affiliation

Mr Jessop reported that membership figures for August were not yet available but that the July figures showed a net increase of 120.

It was resolved:

(i) to accept reduced subscriptions from 21 members;
(ii) to waive the subscriptions of 13 members on the grounds of blindness or other disability;
(iii) to approve Life Membership applications from two members;
(iv) to grant affiliation to the Greater Peterborough ARS; the British Railways ARS, Tavistock, Devon; the Rutherford Laboratory ARC, Chilton Didcot; the Sherburne RC, Hornsey N7; and the 91st Leicester Scout Group.

RSGB President for 1976

A proposal that Dr E. J. Allaway be the Society's 42nd President during 1976 was approved unanimously.

Annual report

A copy of the draft annual report was circulated, and after discussion and amendment its publication with the Report and Accounts was approved.

Regional representation

The introduction of the *Regional Representatives Newsletter*, which was being circulated to regional and area representatives and to Council members, was generally welcomed.

The position regarding Region 11, which still had no representative, was examined. The President and zonal manager would be visiting the region shortly and would report back.

Affiliated societies—contest operating

It was agreed that in future non-members of the Society could operate for affiliated societies (only) in RSGB contests.

Society trophies
The following awards were agreed:
Calcutta Key—for outstanding service to international friendship through amateur radio—to Noel Eaton, VE3CJ;
Founders Cup—for service to the Society—to Charles Newton, G2FKZ;
ROTAB Cup—for outstanding and consistent dx work—to Eric Chambers, G2FYT.

Repeaters
It was reported that the VHF Committee was organizing a meeting for repeater groups and other interested parties to be held on 18 October. Points to be included were:
(a) greater involvement and co-ordination with repeater groups;
(b) informing repeater groups of the latest Home Office attitudes;
(c) standards.

In future all applications for repeaters would be handled by RSGB HQ and passed to the VHF Committee for technical vetting and channel allocation. It was agreed that while the actual group building the repeater may be limited by invitation this would in no way mean that the use of the repeater was restricted in any way, and that it was Society policy not to have "private" or "restricted" repeaters.

Scientific Studies Committee
It was reported that there had been no apparent activity from the Scientific Studies Committee for some considerable time and it was felt that, in the absence of Mr Stone, Council should find a chairman who would lead and organize the committee.

It was proposed, seconded and approved that Mr R. J. Hughes be invited to be chairman of the committee.

Committee minutes and recommendations
Council accepted the minutes of the following committee meetings: IARU Working Group (17.6.75), Interference (27.6.75, 27.8.75), Finance & Staff (8.7.75, 2.9.75, 9.10.75), Mobile & Exhibition (8.7.75, 29.7.75), VHF (9.7.75), VHF Contests (19.6.75, 7.7.75, 28.7.75), Telecommunications Liaison (31.7.75), HF Contests (7.7.75).

The Council approved the following recommendations:
(i) Finance & Staff Committee. (a) that £8 including VAT be the subscription from 1 January 1976, (b) that Mr R. G. Flavell be asked to attend the 1976 CCIR meeting to be held in Geneva.
(ii) Mobile and Exhibition Committee. That the 1976 edition of the *RSGB Amateur Radio Call Book* should be on sale at the Leicester Exhibition only on the Society's stand.
(iii) VHF Committee. That Mr D. A. Evans be co-opted onto the VHF Committee.

IARU
Mr R. J. Hughes, G3GVV, (chairman, IARU Working Group) expressed pleasure in accepting Council's invitation to report on IARU matters at Council meetings. Mr Hughes made the following points:
(a) The preservation and extension of amateur frequencies is our prime problem and task. In 1979, at the World Administrative Radio Conference, each and every one of our bands will come under the closest scrutiny from commercial and professional users.
(b) The two most important documents submitted to the Warsaw IARU Region 1 Conference 1975, were: WA54, "The Amateur Service"; and WA55, "The Amateur Service, frequency planning." These had been accepted unanimously by the conference and their contents agreed with Regions 2 and 3; further, they had been brought specifically to the notice of the Home Office so that the licensing authority is now familiar with our requirements and aspirations.
(c) At international conferences, Afro-Asian countries could most easily control the balance of power and voting and it is imperative that they be kept informed of current developments.
(d) All members of the Society must be informed of the *critical* and *dangerous* period that amateur radio is entering. It was suggested that: (i) zonal managers arrange meetings with RRs to brief them and to advise them to seek information and speakers (information can be obtained from G2BVN; speakers can be arranged through G3GVV); (ii) space continues to be made available in *Radio Communication* for articles on IARU, 1979 WARC Conference, and associated topics.
(e) All of this will be of no avail unless ITU conferences and the WARC are attended by forward-looking and vigorous representatives of the Society. Such informed representation is urgently required, and unless this work is done amateur radio might not be in business after 1979.
(f) Because some members of the IARU Working Group felt so strongly about the need for liaison and representation, the Executive Vice-President together with Mr Hughes and Mr D. J. Andrews, would be willing to attend the proposed Region 2 Conference in Miami early in 1976.

Correspondence
The IERE had invited the Society to offer a contribution, possibly in the form of a paper or papers, in connection with the IERE Golden Jubilee next year. It was suggested that a paper on satellites and/or microwaves could be suitable.

A letter to the President from the beacon-keeper of GB3GW (Swansea 2m beacon) stated that he would soon be emigrating and in view of the long service of GB3GW he thought that it should now be permanently closed down. Mr Scarr said that GB3GW was a service to members in the south-west and every attempt should be made to preserve the GB3GW operation.

It was agreed that Mr D. M. Thomas and the President should speak to the GB3GW beacon-keeper to see what could be done and report back to Council, but that as a matter of principle the Society could not contribute directly to the purchase of the beacon. In addition, a letter of thanks should be sent thanking the beacon keeper for his past service.

Mr Smith asked if there was any prospect of the GW beacon being resited at the old GB3LER site or if there was any prospect of some money being raised to reinstate GB3LER which had been off the air since 1971.

Other business
Dr Allaway said that in view of the financial situation he would be prepared to forego the Presidential Installation next year if the Council thought this was appropriate. It was agreed, however, that the Presidential Installation should certainly be held: the venue would be in Birmingham on 23 January.

It was reported that a leader on amateur radio written by Mr Stevens would be published in a future edition of *Practical Wireless*. The theme of the leader, "Outlook unsettled", was the 1979 frequency conference.

obituaries

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

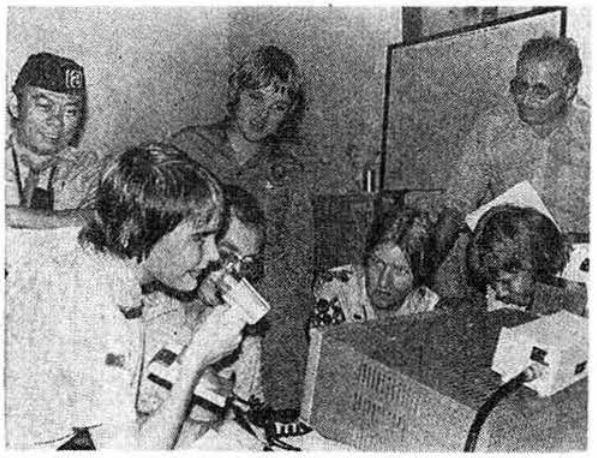
Mr F. J. Davies, G3KSS
Fred Davies died on 12 November, aged 75. He was a prominent member of the Stevenage and District Amateur Radio Society, and had operated RSGB slow morse practice transmissions, as well as giving individual morse tuition, for some time.
Mr R. Lyall, G8SG
Bob Lyall died on 19 November, aged 76. He was a very keen constructor and was often to be heard on 80m.
Mr D. Menteith, GM3IWU
Dave Menteith died on 21 November, aged 69. He had read the central Scotland GB2RS news bulletin almost since its inception, and was the honorary president of the Mid-Lanark Amateur Radio Society.

We have also been advised of the deaths of:
Mr H. S. Beckett, G5HK, on 20 November, aged 83.
Dr A. H. B. Cross, G3FN/9G1DL, on 15 August.
Sir Roger Hawkey, Bart, G5ZG, on 11 November, aged 70.
Mr H. R. S. Johnson, G3XFU, on 12 November, aged 76.
Mr W. A. Lawson, G4PF, on 6 November, aged 62.

1976 mobile rallies calendar

28 March—White Rose Rally, Lawnswood School, Leeds.
23 May—Northern Mobile Rally, Victoria Park Hall, Keighley, Yorkshire.
13 June—Elvaston Castle Rally, near Derby. Further details from P. Neal, G3WFU.

JOTA 1975



VS6AJ, the Hong Kong station, was operated on 10, 15 and 20m and made 129 QSOs with 38 countries. Scouts and Guides spoke to Scouts and Guides in 13 countries, and 517 Scouts, Guides and Cubs visited, and spoke from, the station. The international aspect of JOTA is shown by this photograph: (l to r) an Indonesian Scout group master, an English Scout at the microphone, VS6AF (Australian) operating, a Canadian Guide (standing), an Australian Guide leader, an English Scout and VS6AR (English, standing)

GB3LVS, operated by GM3HBT (shown), GM3MXN and GM3NKG for the 3rd Larkhall Venture Scout Unit (83rd Clydesdale Group), Larkhall, Strathclyde, at the local Scout headquarters. There were 70 QSOs on 3·5, 14 and 21MHz, mainly with European Scout groups. Equipment comprised: FT200, E-Zee Match, 132ft long wire, rf clipper unit using Datong module, and ETM-2b keyer. Photo: *Stonehouse & Larkhall Gazette*

Special event station

Rugby Radio Golden Jubilee, 1-11 January
GB3GBR will be operated by the Rugby Amateur Transmitting Society to celebrate the 50th year of operation of the Post Office's worldwide vlf service by GBR on 16kHz. Operation will be on hf and 2m.

The GB2BP story

by S. CRABTREE, GM3OXC

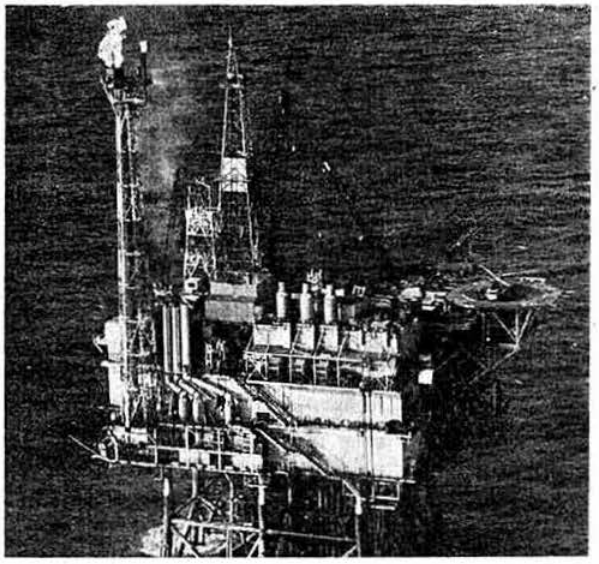
To commemorate the inauguration of the flow of oil from the Forties Field in the North Sea to Cruden Bay on the Aberdeenshire coast by HM The Queen on 3 November, the author and G5APC decided to operate a special station from Charlie Platform. After much hectic planning and seeking of permission from BP and the licensing authorities, the station eventually became a reality.

Initially it consisted of a 75S-3 receiver and KWM-A transceiver with a Millen matching unit, but a second installation consisting of an FT101B, KW107 supermatch was added later. Aerials consisted of an 80m vertical dipole suspended from the helideck 200ft above sea level and centre-fed with 150ft of coaxial cable, a 40m vertical dipole also suspended from the helideck, and a 14AVQ about 300ft above sea level. With 57,000 tons of steel beneath it, earthed radials were considered unnecessary!

Over the period of operation the conditions were far from good. Ws were worked on the first afternoon but did not reappear. VK, ZL etc were just not there. Towards the end, concentration was on 80m sideband, and despite late night and early morning enthusiasm only occasionally were stations outside Europe worked. Of these, the most notable were VP8NP, VX9A (Sable Island), VE1XU/SU, KV4AA, KZ5 and AP2. On 80m phone the band was virtually worked dry during each session and it is felt that everyone requiring a QSO had one.

To comply with the licence conditions the station was closed down at 0000 hours on 5 November. It was particularly pleasing that the final QSO was "in the family"—GW3IDC in Newport with a 58 signal on 80m.

In all, 790 stations in 59 countries were worked. Of these, 312 were UK stations. All bands were worked, but only one station on 10m (9H1CH on cw). More than half the QSOs were on 80m. All stations worked will receive QSL cards via the bureau eventually (or earlier if an sae is sent to GB2BP via BP Telecomms, Dyce). SWLs will also be acknowledged with a special card printed by BP for the occasion.



The BP Forties oilfield production platform FA (Graythorp 1). *A BP photograph*

Looking ahead

23 January—RSGB Presidential Installation, Executive Suite, Warwickshire CC Ground, Edgbaston.

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

8-9 May—National VHF/UHF Conference, Brunel University, Uxbridge, Middlesex.

your opinion

The Editor
Radio Communication
Sir—I wish it to be made quite clear that the two amateurs referred to in the first paragraph of the letter from GM8GDN were GM3SYD and myself. I am sorry to hear GM8GDN is perturbed by our views, but nevertheless we are perfectly entitled to hold and express them. The station referred to in paragraph two was neither GM3SYD nor GM3ZBE. It would be better all round if GM8GDN had the courage of his convictions and named the station to which his complaint was directed.

It should be noted GM3SYD was never on 2m ssb and I cannot operate above 144·34 except when reading the news on a.m. or fm!

A. M. Allan, GM3ZBE

PS. I have quite long hair!

The Editor
Radio Communication
Sir—As I wrote my cheque for this year's subscription, I thought back to the day I joined the RSGB as (I think) BRS580. The subscription was then 10 shillings, but a reasonable week's wage was, at that time, about £3.

The average manual worker's wage is today about 17 times larger. A subscription of about £8.50 would seem to be not unreasonable.

G. C. Oxley, G8MW

The Editor
Radio Communication
Sir—Mr Tye is evidently anti-repeater, and although I disagree with his point of view, I respect his opinions.

I cannot, however, understand his objection to Gs at the Woburn Rally using "walkie-talkies" to work the repeater and "saying G8---/M". What exactly does Mr Tye find wrong with this? Surely not the use of the /M suffix. (/M is in fact the *correct* suffix to use during this mode of operation.)

May I take this opportunity to thank all those responsible for our current (and future!) repeaters: although I rarely operate via repeaters, they can be very useful when needed.

I should also like to endorse the comments of F. C. Judd, and vote YES!

S. E. Parsons, G4DTW

The Editor
Radio Communication
Sir—No doubt this will be one of many letters that you will receive from progressive amateurs in Norfolk, goaded into writing as a result of your publication of the letter from G4BYV in the November issue. As Mr Tye's selected wording is undoubtedly intended to give the impression that his personal reactionary attitude is a majority general feeling, eg the use of "... Many of us in Norfolk ..." "... we feel that ..." "forced onto us" and "... we have our fair share ..." he can hardly be taken seriously using anything other than the singular term "I".

In a similar outburst in autumn two years ago, Mr Tye had published a letter to the local press, denigrating Oscar and its supporters. He claimed that "the more serious-minded amateurs" made contacts of over 900 miles without the use of Oscar, which only, on 2m, went to the half-way mark. Further (in 1973 mind you) that the 10m band also used provided easy world-wide communication.

It seems that Mr Tye is still having difficulty with propagation well understood by the experienced radio amateur, inasmuch as he demonstrates his inability to distinguish between highly-infrequent propagational anomalies and regular reliable communication. I have spent quite some time exploring mobile access to both GB3PO and GB3PI from Norfolk, and in common with those who are similarly aware, have found that there are very few parts of Norfolk from which this is possible, and then only in elevated conditions.

As for the potential repeater employment, a recent survey has shown that there exist some 300 possible users, of which 53 are already equipped for required current use. This does not include the many hundreds of amateurs who visit the Norfolk Broads and coastal resorts during the summer months, virtually all of which are in areas only a few feet above sea-level.

Two whole megahertz is still available on the 2m band, and there is plenty of room for progressive development, research into new techniques in the state of the art, and indeed the (unspecified) "... more useful job ..." that Mr Tye supports. It is the appreciation and recognition of these that will help us to maintain our continued use of the whole spectrum.

I would recommend to Mr Tye that he backs the effort to activate a local repeater, as at least it will permit him to explore and understand the predominant local attitude to the improved communications that would result, obliging him to use "I" and not "we" to any future inaccurate counter-productive public statements.

Pat Gowen, JP, AIST, G3IOR

The Editor
Radio Communication
Sir—In the eight months or so that I have been an active amateur and RSGB member I have formed the impression that vhf gets more attention than it merits. The recent letters from G4BYV and G2BCX raise questions on this subject which should be fully debated.

G4BYV suggests that the Bacton repeater would be of no value to the vast majority of amateurs in the area. If this is fair comment and is applicable to other repeaters, then are the abilities of those who put enormous effort into the provision of repeaters being used to best advantage? If on the other hand there is a demand for a repeater network of the type apparently favoured by G2BCX then should we not ask ourselves what long-term effects on the amateur movement may result from pre-occupation with communications systems of this type?

The average amateur is more versatile if less expert than his professional counterparts (the designers, engineers, aerial riggers, operators etc) because from his earliest swl days he has had to seek his own solutions to his particular operating problems, and on this type of experience the reputation and achievements of amateur radio have been built. There are of course those who have carried this tradition into vhf, but few beginners find vhf equipment easy to build or adapt at home, and since commercial gear is freely available it may be easily substituted. If those with experience and influence place excessive emphasis on vhf, a growing section within the amateur community may evolve dependent on commercial gear (and repeaters to work it through), a development which must be unhealthy for the movement as a whole.

No doubt many members would be keen to see the results of a representative survey of the views, interests and aspirations of their fellow members so that our joint efforts may be best directed.

D. H. Vance, GI3XZM

The Editor
Radio Communication
Sir—I operate regularly and actively on 160m. I wonder if anyone can explain why, on the evenings of cw contests on this band, certain amateur signals appear giving S-meter readings on my receiver which are at a remarkably higher level than any other amateur signals from equivalent distances at any other (non-contest) times.

Apart from locals, no amateurs received here even under excellent reception conditions normally achieve signal strength readings in any way comparable with the commercial cw station operating at around 1·83MHz. Yet on a contest evening some amateur signals suddenly emerge with received signal strengths which appear to compete quite closely with the commercial station.

Could it be that there is a fortuitous and extraordinary improvement in operating conditions coinciding with contests? (This of course would have to be a *selective* improvement in conditions, as the strength of the commercial station remains relatively unchanged on these occasions, and my own signal reports and many others remain predictably normal.)

Or could there perhaps be another explanation for this phenomenon which eludes me?

T. Hall, GM3HBT

The Editor
Radio Communication
Sir—Would all members please read the letter from G4DAX in the November issue again. It is of vital importance to all as radio amateurs. Working in marine telecommunications, I am among the few amateurs directly involved with the Home Office in type approval of marine equipment. It is not until one becomes involved in this commercial field that one realises the many pressures that are imposed on the rf spectrum, particularly for more space. Where big business is involved, we are expendable.

The RSGB will help fight for our future at the 1979 Conference. Support those who represent us, and show this letter to any non-member you can lay your hands on.

M. J. Cooper, GW8JOJ.

General rules for RSGB hf contests 1976

The general rules for all RSGB hf contests are given below. For each contest throughout the year a short supplementary set of rules will be published which must be read in conjunction with the general rules. *Note that Rules 7, 8g, 11b, 12a, have been revised since last year, and that the RSGB contest log sheet has also been revised.*

Reprints of these general rules will be available from HQ upon request.

1. Entrants must operate in accordance with the terms of their licence.

2. Contacts with unlicensed stations will not count for points.

3. Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed. Proof of contact may be required. Simultaneous operation on more than one band is not permitted.

4. (a) A fixed station must operate from the address shown on the licence.

(b) A portable station must operate from the same site for the duration of the contest and may not be located in a permanent building or use public mains. Power for all equipment may be derived only from a portable generator on the site, accumulators or batteries. No equipment or aerials may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to the storage of equipment.

(c) A mobile station is a station installed in a motor vehicle, or vessel on an inland waterway, so equipped that the station may be operated in motion without alteration.

(d) An alternative address station is a station at a location not named on the licence, other than a portable or mobile station.

5. Unless otherwise stated, single-operator entries only will be accepted.

(a) A single-operator station is one manned by an individual operator who receives no assistance whatsoever in operating, log keeping or checking etc from other persons during the contest period.

(b) A multi-operator station is one which does not conform to the definition of a single-operator station given above. In those contests where multi-operator entries are allowed, such entries will only be accepted provided that:

(i) The declaration is signed by only one operator, who will be regarded as the entrant,

(ii) The callsign of the operator concerned is indicated for each contact,

(iii) The names and callsigns of all operators are listed on the cover sheet, and

(iv) For stations located in the British Isles, all operators must be fully-paid-up members of the RSGB.

6. Eligible entrants. Unless otherwise stated, only fully-paid-up members of the RSGB resident in G, GC, GD, GI, GM and GW may enter. In those contests which are open to radio amateurs elsewhere, British Isles entrants (as defined above) must be members of the RSGB. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.

7. A contact consists of an exchange and acknowledgement of an RS report on telephony, or an RST report on telegraphy, and a three-figure serial number starting with 001 and increasing by one for each successive contact throughout the contest, irrespective of the band or mode in use. Serial numbers, *when sent*, must be recorded from non-competing stations.

8. Form of entry.

(a) Entries must be clearly written or typed on one side only of RSGB contest log sheets or international A4 size paper. Columns must be headed as shown in the example below.

(b) *Separate log sheets must be used for each band.*

(c) Logs must be kept, and entries submitted, in gmt.

(d) Each entry must include a cover sheet in the form shown below incorporating a signed declaration.

HF Contest Entry Cover Sheet (Form HFC2)

Contest ..... Date ..... Score .....

Section (if any) ..... Callsign .....

Name .....

Home address .....

Name of club or group (if applicable) .....

Address of station, or portable location (if other than home address above) .....

National Grid six-figure reference, county code letters, or other co-ordinates (see contest details) .....

Transmitter ..... Input power .....

Receiver ..... Aerial(s).....

Declaration. I declare that this station was operated strictly in accordance with the rules and the spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was ..... watts.

Date ..... Signed .....

Failure to sign the declaration will involve disqualification of the entry.

RSGB contest log sheets and cover sheets may be obtained from HQ upon request. The request must be accompanied by a large sae.

(e) All entries become the property of the RSGB. In the event of any dispute the ruling of the Council of the RSGB shall be final.

(f) All entries must be postmarked not later than 15 days following the contest. If acknowledgement of receipt is required, British Isles entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged. Overseas entrants should ensure that their logs reach the adjudicators within eight weeks of the date of the contest.

(g) Entries must be addressed to the adjudicator, whose address will appear in the supplementary rules for each contest, with the name of the contest marked in the top left-hand corner of the envelope.

9. For scoring purposes, aeronautical mobile and maritime mobile stations will count as mobile stations in the country of origin.

10. Awards

(a) Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates. Awards are, where possible, presented at the Annual General Meeting following the contest.

(b) The standard award format for contests is as follows: Some winners and section leaders will be the holders of particular trophies, and these will also receive a special certificate or plaque. Certificates of Merit will be awarded to the entrants placed first, second and third in each section of the contest, from (i) the British Isles and (ii) overseas.

11. Disqualification. Entrants may be disqualified on any one of the following counts:

(a) Failure to complete and sign the declaration.

(b) Frequent reports of poor-quality signals.

(c) Failure to record operators' callsigns against log entries (multi-operator entries only).

(d) Failure to use separate log sheets for each band.

(e) Failure to observe the terms of the entrant's licence.

Failure to observe and comply with other rules may also entail disqualification.

12. Errors in log. Points are deducted as follows:

(a) For errors in received information, on a proportional basis (eg one-third of points claimed for one error, two-thirds for two errors, all points lost for three or more errors);

(b) For errors in callsign, both sides lose *all* points for the contact;

(c) For unmarked duplicate contacts for which points have been claimed, additional penalty points may be deducted (eg five times the claimed score for that contact).

RSGB HF-VHF-UHF CONTEST LOG SHEET

Contest ..... Band.....MHz Sheet No. .....of..... Callsign .....

Date and time (gmt)	Callsign	RS(T) and Serial No.		(5)	(6)	(7)	Points claimed
		SENT	RECEIVED				

General rules for vhf/uhf/shf contests 1976

The rules governing all RSGB vhf/uhf/shf contests to be held in 1976 will be selected from the following general rules, which will be referred to by number. Supplementary rules will be added for the more complex events such as VHF NFD.

Please read these rules carefully.

Minor telephone queries can be answered outside working hours on Didcot 812584 or Wantage 3497. Small quantities of stationery can be obtained from any contest adjudicator at the addresses given with contest rules. If you are entering a contest it is only necessary to tick the bottom of the cover sheet (Form 427) and enclose an sae. All stationery is A4 size (30 by 21cm); envelopes which will hold flat sheets will carry far more than those which require the sheets to be folded.

1 Date and time. See individual contest details.

2 All entries must be sent to the adjudicator at the address given with the rules for the contest.

3 All operators must be members of the RSGB.

4 Sections:

(a) There are two sections:
Section F —fixed stations;
Section P —portable and temporary stations.
If less than 10 entries are received for either section, Rules 4b and 8b will apply instead. /A stations will be listed with portable stations, but may not enter portable contests run under rule 4d.

(b) All classes of stations with no separate sections.

(c) Fixed stations only.

(d) Portable stations only.

All equipment, including aerials, for portable and temporary stations must be installed on the site during the 24 hours preceding the contest, or during the contest itself. This does not apply to storage of equipment, or to its prior installation more than 1km away from the contest operating position.

Portable stations may be required to provide proof of permission to use a site.

5 Location

(a) Entrants may not change the location of their stations during the contest.

(b) Entrants may change the location of their stations during the contest on one occasion provided that only the highest scoring contact with a given station is claimed in the event of a repeat contact. Repeat contacts must be clearly marked as such in the contest log.

6 Modes

(a) Contacts may be made on all permitted modes.

(b) Entrants may transmit only A1 (cw) or F1 (fsk) and contact only other stations transmitting these modes.

7 Scoring system

(a) Contacts made between the distances shown in the table will score as indicated. Contacts on borders between scoring rings score **low.**

Km	Points	Km	Points
0–50	1	250–300	11
50–100	3	300–350	13
100–150	5	350–400	15
150–200	7	400–450	17
200–250	9	and pro rata	

Note that, (i) all radial rings are 50km wide, (ii) all possible scores are **odd** numbers.

(b) Contacts will be scored at one point/kilometre.

8 Awards

(a) In each section there will be an award to the highest scoring station. An award will also be made to the runner-up in each section in which there are 10 or more entries.

(b) Awards will be made to the highest scoring station and the runner-up. Additional awards will be made when appropriate.

9 Cross-band contacts

(a) Cross-band contacts do not count for points.

(b) Half points may be claimed by both stations for a cross-band contact if two-way communication cannot be established on the same band.

10 Repeat contacts

(a) Only one scoring contact may be made with a given station on each band covered by the contest. (ie callsigns that are fixed, /A, /P or /M or the same set of equipment used under a different callsign all count as one station.) If a station that has moved location is contacted a second time, only the higher scoring contact may be claimed. Serial numbers start at 001 and advance by one for each contact.

(b) One contact may be made with a given station (as defined in 10a) during each activity period. Only three out of seven activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purposes of checking. To be eligible for an award, an entrant must take part in a minimum of three activity periods. Serial numbers start at 001 for each activity period and advance by one for each contact.

11 Contest exchange

The contest exchange shall consist of:

(a) Both callsigns;

(b) RS or RST report followed by serial number;

(c) Both QTH locator (the standard five-symbol location system) and QTH.

QTH must be given as a point identifiable on the Ordnance Survey 10-mile or 1:625,000 maps, or as a bearing and distance up to 25km from such a point, to the nearest kilometre.

No points will be lost if an entrant is unable to obtain a serial number or complete location information from a station not taking part in the contest. But the receiving operator must obtain enough information to be able to calculate the claimed distance score.

12 Log keeping

Entrants must keep their own log records in accordance with licence requirements.

The logs for contest entries must be made out on current RSGB contest log sheets, tabulated as follows:

(a) Date/time (gmt);

(b) Callsign of station worked;

(c) My report on his signals and serial number sent;

(d) His report on my signals and serial number received;

(e) QTH locator received;

(f) QTH received;

(g) Points claimed.

13 An entrant must operate within the terms of his/her licence.

14 An entrant may not engage in more than one contact concurrently.

15 Stations using telephony in the recognized cw sub-bands 70·025–70·1MHz, 144·0–144·15MHz, 432·0–432·15MHz and 1,296·0–1,296·15MHz, or transmitting on beacon frequencies, are liable to disqualification or loss of points. Entrants are also encouraged to observe the other provisions of the RSGB/IARU bandplans.

16 Stations that persistently overmodulate, radiate poor quality signals, or otherwise contravene the code of practice for vhf/uhf contest operation (see p 66), are liable to disqualification or loss of points.

17 Special event callsigns (eg GB) may not be used.

18 Contacts made via a repeater or man-made satellite will not count for points.

19 Proof of contact may be required.

20 Entries

(a) All entries must be accompanied by an RSGB vhf/uhf contest cover sheet (Form 427). The cover sheet must be correctly made out and the declaration signed.

(b) All entries must be postmarked not more than 15 days after the end of the contest.

(c) All entries become the property of the RSGB and will not be returned.

(d) Gross errors in claimed score render the entrant liable to disqualification.

21 Failure to comply with any of the rules given for a particular contest may result in disqualification.

22 The ruling of the Council of the RSGB shall be final in all cases of dispute.

General rules for RSGB hf receiving contests

1. All entrants operating from the British Isles must be fully-paid-up members of the RSGB.
2. Single-operator entries only will be accepted.
3. To claim for points, a station may be logged once only on each band, whether fixed address, portable, mobile or alternative address.
4. A receiving station log must show in columns: date/time, callsign of station heard, report and serial number sent by station heard, callsign of station worked, band in megahertz, bonus points total points.
5. Where two or more bands are in use, separate log sheets must be submitted for each band.
6. In the column designated for "station worked", the same callsign shall not appear more than 20 times on each band throughout the contest.
7. A cover sheet shall be submitted with a contest log as under transmitting section General Rule 8(d) except that the last sentence of the declaration shall read: "I certify that I do not hold a transmitting licence."
8. The following rules from the transmitting section general rules also apply to receiving contests: 5(a), 8(e), 8(f), 8(g), 9, 10(a), 10(b), 11(a), 11(d), 12(a), 12(c).

General rules for listeners' vhf/uhf contests 1976

1. Dates and times. As for the concurrent transmitting contests.
2. Entries should be sent to the adjudicator of the transmitting contest, at the address given, and must be postmarked not more than 15 days after the end of the contest.
3. Listeners' contests are open to all non-licensed members of the RSGB. Only the entrant may operate the receiving station.
4. The station must remain at the same site for the duration of the contest, although portable operation is permitted.
5. Points will be scored in the same manner as in the transmitting contest (Rule 5).
6. Logs must show in columns: (a) date/time (gmt), (b) callsign of station heard, (c) my report on his signals, (d) report and serial number sent by station heard, (e) callsign of station being worked (f) location given by station heard, (g) points claimed.
   On 144MHz the callsign in column (e) may occur only once in every 20 contacts logged. CQ and test calls do not count for points and should not be logged.

The Hanson Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 6 March and 5 September.

Code of practice for vhf/uhf contest operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.
2. Take all possible steps to ensure that a site is not going to be used by some other group or club. If it is, come to an amicable agreement *before* the event. Groups are advised to select possible alternative sites.
3. *All transmitters* generate unwanted signals; it is the level of these signals that matters. In operation from a good site, levels of spurious radiation which may be acceptable from the home station may well be found excessive by nearby stations (up to 25 miles or even further).
4. Similarly, *all receivers* are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.
5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur-band spurious radiations, including noise modulation, to a level of —90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.
6. Above all, be gentlemanly at all times. Be helpful and *inform all stations* apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! If asked to close down by a Government or Post Office official, do so at once without objectionable behaviour. If the site owner requests your station to close down, accede to his request without hostility.

Code letters for use in RSGB contests

County/Region	Letters	County/Region	Letters	County/Region	Letters	County/Region	Letters
Alderney	ALD	Durham	DHM	Isles of Scilly	IOS	Salop	SLP
Antrim	ATM	Dyfed	DFD	Isle of Wight	IOW	Sark	SRK
Armagh	ARM			Jersey	JER	Shetland	SLD
Avon	AVN	Essex	ESX	Kent	KNT	Somerset	SOM
		Fermanagh	FMH	Lancashire	LNH	Staffordshire	SFD
Bedfordshire	BFD	Fife	FFE	Leicestershire	LEC	Strathclyde	SCD
Berkshire	BRK			Lincolnshire	LCN	Suffolk	SFK
Borders	BDS	Mid Glamorgan	GNM	Greater London	LDN	Surrey	SRY
Buckinghamshire	BKS	South Glamorgan	GNS	Londonderry	LDR	East Sussex	SXE
		West Glamorgan	GNW	Lothian	LTH	West Sussex	SXW
Cambridgeshire	CBE	Gloucestershire	GLR				
Central	CTR	Grampian	GRN	Greater Manchester	MCH	Tayside	TYS
Cheshire	CHS	Guernsey	GUR	Merseyside	MSY	Tyne & Wear	TWR
Cleveland	CVE	Gwent	GWT			Tyrone	TYR
Clwyd	CWD	Gwynedd	GDD	Norfolk	NOR		
Cornwall	CNL			Northamptonshire	NHM	Warwickshire	WKS
Cumbria	CBA	Hampshire	HPH	Northumberland	NLD	Western Isles	WIL
		Hereford & Worcester	HWR	Nottinghamshire	NOT	West Midlands	WMD
Derbyshire	DYS	Hertfordshire	HFD			Wiltshire	WLT
Devon	DVN	Highlands	HLD	Orkney	OKE		
Dorset	DOR	Humberside	HBS	Oxfordshire	OFE	North Yorkshire	YSN
Down	DWN					South Yorkshire	YSS
Dumfries & Galloway	DGL	Isle of Man	IOM	Powys	PWS	West Yorkshire	YSW

contest news

VHF NFD results continued

Posn	Callsign	Points	QSOs	QRA	Best dx	km
80	GM4BYF	244	16	YP42	G3ZIG/P	419
81	G3PUV	242	27	ZM64	G3MLS/P	160
82	GI3KVD	232	24	WO06	G3RKL/P	394
83	GW4CAX	186	29	YM05	G4CJG/P	241
84	G4AFN	152	28	ZL07	G3ZKA/P	156
85	GD4BEG	106	11	XO67	G3VVT/P	160
86	G3EEO	96	20	ZN71	G3VEH/P	155
87	G2ASF	52	6	ZM63	G3YHM/P	155

Listener: BRS15822 186
Check log gratefully received from G3NKS

70MHz band results

Posn	Callsign	Points	QSOs	QRA	Best dx	km
1	G3FDW	2,210	105	YO29	G4BHC/P	545
2	G3KFN	2,134	107	XK30	GM3YOR/P	619
3	GW4BUC	2,038	131	YN75	GM4CVI/P	437
4	G3VVT	2,036	110	YO79	G4BHC/P	475
5	GI3RXV	1,970	77	XO11	G3MLS/P	592
6	G4ADV	1,866	68	XK55	GM3JNW	675
7	G3VPF	1,780	104	YK16	GM3YOR/P	614
8	GW4CNY	1,682	105	YL05	GM3ZBE	605
9	G3ZOD	1,678	123	ZN61	GC3YGF/P	406
10	G3ZIG	1,598	89	AM06	G4ADV/P	510
11	G3TAA	1,564	108	ZK21	GM3JNW/P	582
12	G3VCV	1,506	115	AM51	GM4CVI/P	525
13	G3RKL	1,470	110	ZN53	GC3YGF/P	436
14	GW3UEY	1,466	103	YM55	GM3YOR/P	430
15	GC3YGF	1,452	69	YJ48	G3ZIG/P	465
16	G3SFG	1,446	113	ZL32	GM4CVI/P	585
17	G3ZXD	1,413	102	YK09	GM3JNW/P	551
18	G3VEH	1,364	106	AM62	GI3RXV/P	510
19	G4EFV	1,328	86	ZN48	G4BHC/P	475
20	G3ZKE	1,326	117	ZL30	GM4CVI/P	610
21	G3KGA	1,298	103	ZK10	GI3RXV/P	587
22	G3LCH	1,280	118	ZL59	GM3YOR/P	580
23	GM3YOR	1,252	54	YQ64	G3KFN/P	619
24	G3ZKA	1,224	100	ZK25	G3FDW/P	456
	G3WMR	1,224	109	AL52	GI3KVD/P	625
26	G3YHM	1,216	102	ZK09	GD2HDZ	455
27	G4AZS	1,214	91	YM36	GM3YOR/P	390
28	G3ZJG	1,212	101	ZM36	GM3YOR/P	425
29	G3TR	1,194	102	ZK06	GI3RXV/P	543
30	GM3JNW	1,180	42	YP18	G4BHC/P	640
31	G4AAH	1,162	90	ZN63	GM4CVI/P	420
32	G4EJP	1,150	101	ZL52	GI3RXV/P	486
33	G3NPF	1,136	96	ZK07	GI3RXV/P	553
34	G3TVY	1,124	89	ZN75	G4BHC/P	425
35	GM3WIL	1,084	48	XO20	G3ADV/P	490
36	G3PJX	1,068	102	ZL69	GI3RXV/P	540
37	G3XCH	1,058	104	ZL66	GM3YOR/P	580
38	G3WQK	1,020	92	AK11	G3FDW	460
39	GW3ONP	1,018	59	YM52	GM4CVI/P	520
40	G4DKX	988	68	AM66	G4ADV/P	484
41	G3OZE	955	60	ZN07	G4ADV/P	486
42	G3JKB	932	90	ZM80	GI3RXV/P	495
43	G3LNN	928	84	ZM31	GM3WIL/P	327
44	G4BZD	926	61	ZN44	G4BHC/P	444
45	G3WKS	900	74	AL73	G4BHC/P	461
46	G3KIN	868	100	ZL59	G3FDW/P	387
47	G3MOE	864	81	YL20	GI3RXV/P	410
48	G3WRR	860	83	AL70	G3FDW/P	430
49	G4BRA	824	87	ZL26	GM3WIL/P	395
50	G3MLS	812	84	ZK10	GI3RXV/P	576
51	G3TDR	786	88	ZL66	GI3RXV/P	507
52	G4DRS	772	76	ZM79	GM3YOR/P	493
53	G3YQW	766	94	ZL60	G3FDW/P	412
54	G3SXY	755	72	YL47	G3FDW/P	370
55	G3NEO	750	47	ZN54	GM3ZBE	435
56	G3KRT	728	73	ZL26	GI3RXV/P	475
57	G4CJG	716	38	ZO22	G3VPF/P	520
58	GM4AOS	674	20	XP45	G3LCH/P	555
59	G4BLT	652	75	ZL54	G3VVT/P	305
60	G3PQY	630	51	ZN18	G3KFN/P	412
61	G3OOU	616	61	AL52	GI3RXV/P	565
62	G3TAL	586	36	ZO56	G3KFN/P	463
63	G3LHJ	574	35	YK33	G3NEO/P	340
64	G3PGN	560	46	YN79	G4ADV/P	380
65	G3RXJ	556	75	ZK10	GI3RXV/P	580
66	G4ALG	528	69	ZL37	G4ADV/P	332
67	G4DDC	488	58	ZL18	G3KFN/P	275
68	G3GGL	468	40	YM47	G3RXJ/P	240
69	G3SJP	466	57	ZL33	G3FDW/P	276
70	G4EGU	422	54	AL54	G4DAC/P	420
71	G3UFW	414	45	ZL51	G4ADV/P	260
72	G3UGF	410	38	ZN11	G3LCH/P	285
73	G3CDG	388	32	YL10	GM3JNW/P	435
74	G6KI	352	42	YM50	G3ZIG/P	220
75	G3RZV	344	40	YK19	G3VVT/P	355
76	G3WOS	311	42	ZL08	G3FDW/P	325
77	G4BCS	264	23	ZM78	G3TAA/P	146
78	GC4ASO	260	17	YJ47	G3ZOD/P	410
	G3KTA	260	44	ZL60	GC3YGF/P	230

144MHz band results

Posn	Callsign (/P)	Points	QSOs	QRA	Best dx	Km
1	G8BQX	4,170	431	AK11	F1CYO/P	708
2	GW3WAS	3,484	446	YM14	PA0FTF	652
3	GW3OXD	3,195	430	YM55	DC9KT	740
4	G3SDS	2,957	349	YK16	F1AVQ/P	690
5	GW3FEC	2,877	411	YM12	F1DSQ/P	612
6	EI2VET	2,842	249	WN70	G4CDN	518
7	G3PMH	2,724	321	AM51	OZ1OF	725
8	GD3FLH	2,690	280	XO67	ON5FF/P	640
9	G3TNO	2,639	300	ZK07	F1CYO/P	736
10	G8FAB	2,637	358	ZL52	DC6FG	626
11	GW3UCB	2,539	376	YN75	DC9DZA	683
12	GW3WRA	2,516	361	YL05	F6BQX/P	525
13	G3UEU	2,407	350	YO69	PA0CKV/P	537
14	GC3OUR	2,198	193	YJ48	DJ9DLA	695
15	G8FCV	2,197	268	ZK21	DC8EEA	640
16	G3ODY	2,196	270	ZK10	F5HV/P	677
17	GW5BI	2,186	315	YL25	DK3QY	700
18	GW4CTF	2,124	356	YM25	DJ9DLA	707
19	G4BPO	2,119	230	AM66	DL0ZF/P	631
20	GW3XJQ	2,088	221	XL07	GM8FFX	585
21	G3SZY	2,086	261	AM62	DL0ZF/P	675
22	GM3KJF	2,083	206	XO20	G3ODY/P	508
23	G8FDK	2,060	211	XK30	PA0LMD/P	648
24	G3PFM	2,047	257	YK09	DK0MR/P	655
25	G4ALE	2,016	290	AL71	F5HV/P	670
26	G3UUT	2,015	245	ZN07	G4CRC/P	545
27	G3SEK	2,005	244	YO29	PA0CKV/P	570
28	G3PIA	1,956	322	ZL33	GM8BOW	561
29	G4CCC	1,940	311	ZL54	DC9KT	580
30	G3SHK	1,935	191	ZO56	DC9QUA	682
31	G8IWD	1,918	238	YK28	F1ANH/P	625
32	G3UES	1,888	275	ZL66	DL0DI/P	615
33	GW3VKL	1,884	301	YL06	PA0VZL	480
34	G8GUP	1,844	208	ZO22	F1CBC	590
35	G3UZF	1,793	293	ZL26	GI3ZTL	526
36	G4ATV	1,776	323	YM47	ON5QL	505
37	G3AMW	1,745	257	ZN18	GC3OUR/P	618
38	G3XLH	1,678	261	ZN07	GC3OUR/P	507
39	G3LRS	1,676	267	ZM36	DJ9DLA	570
40	G3EFX	1,654	234	ZK10	F5HV/P	664
41	GW8DLX	1,649	249	YM75	ON8IW	515
42	G6UQ	1,645	319	ZN61	PA0GN/P	550
43	G3WOR	1,638	253	ZK09	GI6YM/P	560
44	G4CDF	1,637	231	ZN48	PA0JOU/P	490
45	G4DDK	1,579	292	ZL26	GM8FFX	587
46	GW8IZS	1,566	200	YM52	GM8FFX	578
47	G4DPZ	1,561	253	YO79	ON5FF/P	530
48	G3JEQ	1,559	267	ZL77	GI6YM/P	530
49	G3CMH	1,555	217	YK05	GM3HAM/P	570
50	GI6YM	1,539	149	XO11	G3WOR/P	560
51	G3XC	1,498	135	XK55	GM8BJJ/P	670
52	G3WSC	1,476	221	ZK06	DK3QY	565
53	G3RSC	1,474	288	ZM31	GM8BRW/P	520
54	G3VER	1,470	256	ZM80	F1AUQ/P	625
55	G4BKG	1,423	223	—	—	—
56	G3UDA	1,395	214	YM17	DK1PQ/P	675
57	G3SRT	1,379	247	YM36	ON5FF/P	470
58	G8AUN	1,339	145	AM06	GI6YM/P	500
59	G8JMR	1,333	230	ZL26	DC8EEA	587
60	G8ELO	1,325	250	ZM64	GM8JXZ/A	540
61	G2DJ	1,324	272	ZN72	ON4TX/A	482
62	G3WDH	1,286	178	YO28	G4CRC/P	541
63	G3KUE	1,281	223	YN18	G3XC/P	425
64	GC3HFN	1,262	131	YJ47	G3UEU/P	510
65	GW3ZTT	1,253	229	YM05	ON5FF/P	430
66	G8CMU	1,250	307	YM28	GM8FFX	489
67	G6YB	1,203	219	YL47	GM4EGE/P	445
68	G3NJA	1,194	150	YK33	DC9DZA	670
69	G8EQD	1,178	218	ZN43	PA0JOU/P	530
70	GM3HAM	1,174	140	YP42	G3XC/P	581
71	G3XZW	1,156	179	YL75	GM3HAM/P	475
72	G3XPU	1,146	179	AL54	DC8EEA	475
73	G3AFT	1,144	245	ZL30	GI6YM/P	521
74	G4EHW	1,137	156	ZM40	DL6QBA	507
75	G8KFM	1,134	181	ZN46	DC9DZA	625
76	G8APB	1,108	206	ZM63	DC2RI/P	611
77	G3ZVW	1,096	209	ZL32	GM4EGE/P	435
78	G3HOX	1,076	222	YN28	G4CRC/P	430
79	G3WKX	1,071	221	ZL37	DC9DZA	487

Posn	Callsign (/P)	Points	QSOs	QRA	Best dx	Km
80	G4BOX	1,070	282	ZL59	GI6YM/P	541
81	G3IXH	1,069	169	ZN68	G4CRC/P	465
82	G8KIN	1,064	215	ZL59	DC8EEA	582
83	G3EKW	1,038	188	ZN75	PA0JOU/P	509
84	G6GS	1,036	205	ZL69	DC8EEA	545
85	G8KGC	1,030	209	ZN71	DK3QY	615
86	G4COA	1,027	201	ZM73	GI6YM/P	425
87	G8IAO	1,024	213	ZM78	GI6YM/P	462
88	G4ASE	1,012	182	ZM26	DC9DZA	510
89	G3MQV	1,000	195	ZM46	PA0GN/P	598
90	G3PHO	990	193	ZN53	ON5FF/P	410
91	G5BK	987	211	YL20	GM8GFF/P	431
92	G3VRE	976	173	ZL51	GM3HAM/P	482
93	G3IZD	946	169	ZK07	HB9AOA/P	690
94	G8EPR	944	230	YM46	ON5FF/P	450
95	G4EDW	935	121	AL67	GD3FLH/P	519
96	G8HDR	931	130	ZO71	ON5FF/P	502
97	G3EKD	914	178	YL20	ON6NI/A	448
98	G8FVZ	907	150	ZL09	PA0JOU/P	465
99	G4EFY	904	207	ZL66	GI6YM/P	525
100	GM3OLK	896	121	YQ64	G3SDS/P	614
101	G8HQJ	880	213	ZL60	GM3KJF/P	617
102	G4DQV	869	185	ZM41	PA0CIS	383
103	G4BP	868	115	ZO58	G3XC/P	500
104	GM8DVD	848	95	YP66	G3XC/P	535
105	G2SU	841	164	ZN11	ON5FF/P	492
106	GM8GFF	840	85	YP17	G8FDK/P	613
107	GM8BOW	836	76	YQ18	PA0VD	740
108	G3FJE	831	156	ZM79	DC9DZA	450
109	G3VCP	823	194	AL52	GD3FLH/P	463
110	G3WCB	817	175	ZL66	PA0JOU/P	520
111	GC3DVC	815	84	YJ70	ON4TX/A	475
112	G8HRC	803	158	AL31	GM3KJF/P	440
113	G3ZMS	801	155	ZK10	EI2VET/P	480
114	GM8IIO	766	80	YP18	G8FDK/P	570
115	GM4EGE	765	84	YP43	G3SDS/P	516
116	G8JYW/P	764	165	ZL07	PA0CKV/P	390
117	G8DDC	693	157	ZL18	EI2VET/P	402
118	G3WOA	687	144	AM71	GM3KJF/P	407
119	G8CDL	669	131	ZL08	PA0JOU/P	457
120	GM3BRS	663	63	XP45	G3VZF/P	520
121	G3GQC	656	143	ZN63	GC3OUR/P	415
122	G3DQW	636	108	ZM39	DC9DZA	465
123	G8AJR	633	123	AL11	GM3KJF/P	438
124	G3VEF	632	105	ZK05	DJ9DLA	564
125	G3VZV	630	89	YL73	F6CTT/P	475
126	G3UER	602	126	ZN44	GM8JXZ/A	410
127	G3RJW	548	148	ZL60	G8GUP/P	415
128	G3NIL	526	95	YK19	G3XIU/P	375
129	G3OHM	494	131	YM50	EI7DAR/P	330
130	G8KMK	434	123	ZN32	—	—
131	G4AJS	431	102	AL62	G8GUP/P	420
132	G3GHN	429	125	AL52	G8GUP/P	390
133	G8BEL	411	101	YL20	EI7DAR/P	468
134	G8AKB	409	91	ZN74	EI2VET/P	320
135	G8GFC	341	80	ZN75	GM8BOW/P	515
136	GM8FGD	330	38	YP43	G3SDS/P	515
137	G8AOL/MA	275	51	AL44	DK1PQ/P	406
138	GI4DBB	242	42	WO06	G4CDF/P	438

Check logs from: G3USE/P, G3VGG/P, G8BKR, G8EII, G8FSZ, G8IZD, G8KKX, G8KLO/M, EI7DAR/P.

144MHz LISTENERS RESULTS

Posn	Callsign	Score	QSOs	QRA	Best dx	Km
1	BRS34348	834	132	AL53b	EI2VET/P	490
2	BRS28005	624	106	ZK09d	GI3ZTL	670
3	BRS15822	201	69	ZL40j	—	—

432MHz band results

Posn	Callsign(/P)	Points	QSOs	QRA	Best dx	Km
1	GW3UHF	3,620	86	YN75	PA0FWS	491
2	GW3SLJ	3,530	92	YM54	GI3VPK/P	315
3	G8AYN	3,015	79	ZK21	G8GIW/P	462
4	G3JQA	2,962	94	ZN61	PA0FWS	425
5	G4BEL	2,880	85	AM51	GI3VPK/P	475
6	G8GIW	2,738	52	YO29	G3PRC/P	457
7	G8BCG	2,634	87	ZN61	GI3VPK/P	315
8	G3OBD	2,370	64	YK09	G8GIW/P	426
9	G3PRC	2,202	43	XK30	GI3VPK/P	483
10	G5HD	2,142	77	ZL52	G8GIW/P	385
11	G3NNG	2,022	77	ZL33	G8GIW/P	—
12	G3GRO	1,770	63	ZK06	G8GIW/P	433
13	G8TB	1,698	69	ZK10	GW3UHF/P	316
14	G4AEZ	1,584	60	ZL32	G8GIW/P	352
15	G8FMG	1,560	55	ZM78	GC4ASV/P	312
16	G3FZL	1,482	61	AL52	G3PRC/P	314
17	G3TPJ	1,450	64	AL31	G3PRC/P	330
18	G3WIR	1,428	66	ZL26	G8GIW/P	340
19	G4CQR	1,426	77	ZL59	G8GIW/P	408
20	G8EPG	1,410	45	ZN43	G8AYN/P	—
	G3UOS	1,410	53	ZN53	G8AYN/P	298
22	G4CDC	1,386	41	ZN48	GI3VPK/P	375
23	G4CFI	1,356	36	AM66	G3PRC/P	396
24	G2DSP	1,344	56	ZK07	GW3UHF/P	283
25	G3RXQ	1,320	60	ZL26	G8GIW/P	352
26	G4CDY	1,272	53	AL71	G3PRC/P	295
27	G8GDZ	1,242	55	YM50	G8TB/P	210
28	GC4ASV	1,230	24	YJ48	G4BEL/P	370
29	G3UI	1,134	35	ZN11	G3ZFP/P	315
30	G3WHL	1,122	41	ZN44	GI3VPK/P	340
31	G3ZFP	1,116	26	YL73	G3UI/P	340
32	GI3VPK	1,104	14	XO11	G3LQR	565
33	G4AZV	1,098	41	YM36	G8GIW/P	233
34	G3TLM	1,050	57	ZL69	G8GIW/P	417
35	G3EGV	1,032	34	YK16	G8BCG/P	276
36	G3TQF	996	44	ZM36	G8GIW/P	240
37	G3WPO	972	46	ZK10	GW3UHF/P	—
38	G4BOO	942	45	AL73	GW3SLJ/P	280
39	G4DDL	906	49	ZL26	GW3UHF/P	195
40	G4ARD	858	47	ZL18	GW3SLJ/P	190
	G8GCP	858	37	ZK09	G8GIW/P	440
42	G3ULT	852	46	ZL54	G8EPG/P	235
43	G3LTN	792	34	ZM73	G8TB/P	163
44	G3VCT	762	49	ZL37	GC4ASV/P	282
45	G3LXP	756	38	ZM80	GW3SLJ/P	215
46	G4CEQ	750	44	ZL60	GC4ASV/P	230
47	G3WZT	738	41	ZK07	GW3SLJ/P	236
48	G4DWZ	723	45	ZL30	G3PRC/P	285
49	G3ZYS	708	52	ZL59	G3OBD/P	156
50	G4DKN	672	44	ZL66	G8BCG/P	225
51	G8AVH	666	37	ZM31	G8GIW/P	245
52	G3RQZ	636	40	AL52	GW3UHF/P	290
53	G4BEW	590	16	AM06	G3OBD/P	313
54	G8IUT	564	33	ZN75	G4AZV/P	155
55	G2HDJ	558	37	ZL66	GW3SLJ/P	200
56	G8ATD	540	30	ZL08	GW3SLJ/P	180
57	G3YYF	504	30	AK11	G3OBD/P	170
58	G8IVK	498	31	ZL07	G3GRO/P	112
59	G8BXJ	492	26	YL47	G8BCG/P	205
60	G3PUV	480	24	ZM64	G3WHL/P	135
61	G8GBY	468	20	ZN18	GW3SLT/P	217
62	G3ZBI	444	30	ZN71	G3OBD/P	212
63	G8CLY	408	16	ZO56	GW3UHF/P	210
64	G3FVU	348	18	YK19	G4CDMY/P	215
65	G2ASF	346	18	ZM63	GW3UHF/P	153
66	G8AFA	318	15	YK05	G8DZ/P	175
67	G5KC	300	14	ZN07	GW3UHF/P	176
68	G8EHX	216	16	—	G3PUV/P	100
69	G3MQV	198	13	ZM46	G3JQA/P	175
70	G8AZM	174	13	—	—	—
	G8AYY	174	13	ZN71	GW3SLJ/P	124
72	G8FMT	154	12	ZL09	—	—
73	GM4CXP	150	5	YP18	GM3ZBE	—
74	G4CJG	120	5	ZO22	G3KGA/P	435
75	G3JKX	102	7	YM28	—	—
76	G3REI	96	12	ZL60	G4ARD/P	—
	GM8HEY	96	6	YQ64	GM4DIJ/P	102
78	GM4DIJ	90	3	YP42	GM3ZSS/P	184
79	GC3YIZ	84	2	YJ47	G2DSP/P	210
80	G3WDX	60	8	ZL66	G3XGS	60
81	G2BHW	24	2	XK55	G3PRC/P	88
	G4BWP	24	4	ZM79	G4BEL/P	40
	GM8BOW	24	2	YQ18	GM3OLK/P	80
84	G8JXK	14	3	YL75	G8AII	75
85	G8FDL	0	0	YN28	—	—

1·3GHz band results

Posn	Callsign (/P)	Points	QSOs	Power (W)	RX	Aerial
1	G3WDG	4,117	41	60 p.e.p.*	RF	4LY
2	G4BEL	4,104	34	60 p.e.p.*	RF	4½ft D
3	G3NNG	3,144	31	6*	RF	LY
4	GW3UHF	2,592	22	5 p.e.p.*	RF	4LY
5	G3RCV	2,574	23	14*	RF	LY
6	G3PRC	2,160	12	50 p.e.p.*	RF	LY
7	G3JQA	2,080	22	70 p.e.p.*	—	LY
8	G4BOO	1,935	22	7*	RF	5ff D
9	G3SJX	1,836	23	12*	RF	32-el
10	G8GDZ	1,651	19	8*	D	LY
11	G8BMF	1,629	19	10	RF	5ft D
12	G8TB	1,535	22	5*	D	3½ft D
13	G3FZL	1,494	21	5*	D	LY
14	G3VCT	1,491	22	2*	RF	2LY
15	G3GRO	1,335	19	25*	RF	LY
16	G8GCP	1,238	20	4*	D	LY
17	G3OBD	1,229	16	100 p.e.p.*	RF	2LY
18	G3UOS	1,198	18	1*	D	15Y
19	G3ULT	1,183	17	5*	D	LY
20	G3RQZ	1,172	19	1*	RF	LY
21	G8ATD	1,160	16	24	RF	6ft D
22	G3WZT	1,067	19	3*	RF	22PB
23	G4DKN	1,017	18	1*	RF	Two 33-el
24	G4ARD	1,006	15	15	RF	4ft D
25	G3ISO	993	20	12	D	LY
26	G4DWZ	929	18	75	D	6ft D

Posn	Callsign(/P)	Points	QSOs	Power (W)	RX	Aerial
27	G8IUT	925	13	10*	RF	5ftD
28	G8BCG	904	15	5*	RF	LY
29	G8BXJ	688	13	3*	RF	LY
30	G3WHL	834	14	5*	RF	34PB
31	G3YYF	809	11	8*	RF	4ftD
32	G3EGV	672	9	60	RF	12ftD
33	G8ADP	665	10	100	RF	LY
34	G3UQH	656	7	75	D	8ftD
35	G4CFI	640	7	1*	RF	LY
36	G3LXP	559	8	2½*	—	34PB
37	G8AFA	543	8	15*	—	6ftD
38	GW3SLJ	506	6	0·01 p.e.p.*	RF	4ftD
39	G8AYY	494	9	25	D	LY
40	G3TQA	491	9	2*	D	LY
41	G3ZBI	355	10	0·5	D	4ftD
42	G4BCQ	351	10	10*	D	LY
43	G3FVU	344	7	2*	RF	LY
44	G3WTP	304	7	3*	D	4ftD
45	GI3FFF	270	1	2·5	D	LY
46	G4AFN	199	3	27	D	3ftD
47	G3LTN	84	1	—	D	36PB

* RF output
RX: RF = RF stage, often BFR90; D = diode mixer
Aerials: LY = G3JVL loop Yagi; D = dish; PB = Parabeam

70MHz CW Contest rules

1000-1500gmt, 18 January

All entries and checklogs to: VHF Contests Committee, c/o G4BWY, 27 Manor Road, Barnet, Herts EN5 2LE.

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

432MHz Open Contest rules

1000-1500gmt, 8 February

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

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

First 1·8MHz Contest 1976 rules

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

2. When. 2100gmt Saturday 14 February to 0200gmt Sunday 15 February 1976.

3. Eligible entrants. All radio amateurs licensed to use 1·8MHz. Single-operator stations only may enter.

4. Sections.
(a) British Isles stations—RSGB members only.
(b) Overseas stations (including EI).

5. Contacts. CW (A1) only in the 1·8-2·0MHz band. County/region code letters, as published in this issue of *Radio Communication*, must be sent after the RST plus serial number group, eg for a contact from Surrey-599001 SRY.

6. Scoring.
(a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county/region, and for the first contact with each new country outside the British Isles.

(b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county/region.

7. Logs. Column 5 to be headed "Code rcvd". Entries must be addressed to the RSGB HF Contests Committee, c/o D. Thom, 20 Bramble Close, Copthorne, Crawley, West Sussex RH10 3QB.

8. Awards. The Somerset Trophy will be awarded to the winning station, and certificates of merit will be sent to the second- and third-placed entrants. The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the Second 1·8MHz Contest 1975.

A certificate of merit will be awarded to the highest-placed entrant whose 18th birthday falls on or after 16 February 1976. Entrants wishing to compete for this award should state their date of birth on the cover sheet, and write clearly "Under 18" at the TOP of the cover sheet. Entries will only be eligible for this award where operation has taken place under the entrant's own callsign, and from the "main address" as stated on the station licence.

November 1975 144MHz CW Contest results

There was a good response to this contest, with 35 entrants compared with 22 last year. In addition a number of operators participated in the contest but did not enter—could more of these be persuaded to in future, however low the score? Conditions were on the whole poor to average, although a number of good dx QSOs did occur. Comments from entrants almost entirely indicate satisfaction with the contest—cw men still thoroughly enjoy their aspect of vhf operation.

In response to several queries, it should be noted that this contest is a co-ordinated IARU Region 1 event, and has been for a number of years.

The winner will be awarded a certificate, as will G3XDY, the leading fixed station. Thanks are due to G2HH, G6PG and GW5YB for sending in check logs.

G3FZL

Posn.	Callsign	Points	QSOs	Best dx	Km
1	G3YYF/P	427	53	G3BW	480
2	G3LCH/P	359	53	ON5UP	562
3	G3XDY	356	47	DJ0JEA	459
4	G3NNG	348	62	ON4YZ/A	400
5	ON8IW	332	26	G3WRA/P	508
6	G3UUT/P	285	27	ON5FF	490
7	G3NHE	282	44	ON5FF	417
8	G3SHK	275	57	G3BW	384
9	G6XM	258	44	ON8IW	390
10	G3WOH	251	35	G3GZJ	394
11	G3DAO	243	35	PA0PFW	430
12	G3KMI	220	40	G3UUT/P	380
13	G3XTT	208	38	DK0MR/P	580
14	G3GNR	196	24	G3NEO	352
15	G3USB	188	34	ON5FF	275
	G4AQR/P	188	37	ON8IW	433
17	G6UW	186	38	ON5FF	280
18	G3FPK	177	33	G3BW	425
19	G3XYC	149	33	G3GNR	290
20	G3OZT	147	23	G3UUT/P	415
21	G4DRO	130	29	G3NHE	305
22	G3FIJ	120	22	G3CHN	365
23	GW3MFY	112	22	G3TNO	243
24	G4DLB	100	24	G3WTP	256
25	G3SZS	99	21	G3UUT/P	290
26	G4CWD	86	22	G3YYF	220
27	G2BLA	84	28	G3WRA/P	189
28	G5UM	82	20	ON5FF	360
29	G3XTJ	80	24	ON5FF	262
30	G3JFY	79	19	G3LCH/P	238
31	G2WS	58	16	G3USB	230
32	G3GC	52	22	G3WRA/P	188
33	G4BBA	45	9	ON5FF	320
34	G3IOI	38	14	ON5FF	220
35	GM3YOR	3	3	GM4BIP	40

STOP PRESS. The entry of G3WRA/P was delayed in the post; his claimed score was 297, with 47 QSOs, and best dx with ON8IW at 490km. An entry posted late, due to inability to obtain log sheets, was received from G3WKS/A with a claimed score of 155 from 36 QSOs.

80m Field Day 1975 results

Appalling weather, with nation-wide high winds and continuous rain in the south, served to reduce the numbers but not the enthusiasm of the entrants to this contest. The number of contacts made by the leading stations was higher than usual, possibly due to fixed station operators being kept from gardening and painting chores by that weather. Nineteen portable callsigns appear in the logs.

Once again, the leading station, G4ALE/P, was operated by members of the Addiscombe Amateur Radio Club, this year G3SJX and G3XJO, and they made 110 contacts to win the Houston-Fergus Trophy. Not far behind was the Mansfield Radio Society, G3GQC/P, operated by G3DBZ and G3XWZ, and in third place was a solo entrant, G3KLH.

To encourage the single-operator entry a multiplier based upon weight of equipment at the site has been suggested and comments on this proposal are invited. However, no drastic rule changes are likely for the 1976 event, as the date is being advanced to 18 July.

G3IAS

Posn	Callsign	QTH	Points	Posn	Callsign	QTH	Points
1	G4ALE	Oakham	670	6	G4DDX	Stevenage	393
2	G3GQC	Mansfield	616	7	G3NEO	Todwick	305
3	G3KLH	Salisbury	570	8	G3EIW	Orpington	203
4	GW3HGL	Colwyn Bay	546	9	G6GH	Boston	145
5	G3JKY	Bromley	420	10	G3LMG	Clawton	129

Check logs were received from G3IAS/P, G4ALG, G4BWP, G4CLR, G4CMY. These operators are thanked for their interest and assistance in checking the results.

October 1975 70MHz Fixed Contest results

Congratulations to G3JYP, who took first place, and to runners-up G3NHE and G3XCS. General opinion was favourable, although some entrants were obviously torn in their loyalty by the conditions on 144MHz and 432MHz. As always, some stations worked everyone audible hours before the end, and others thought the contest too short. Most stations asked for it to be included in this year's calendar, some in preference to a cumulative contest. One station asked for a better tabulation of results—comments on this are invited.

P.W.W.

Posn	Callsign	Points	QRA	Best dx	Km	QSOs
1	G3JYP	484	YO38	G3XCS	480	42
2	G3NHE	361	ZN54	G3XCS	375	51
3	G3XCS	358	XK49	G3JYP	475	26
4	G3VPK	343	AL14	GM4DMZ/P	480	55
5	G3RJX	311	ZM31	GM4DMZ/P	—	53
6	G3ZIG	309	AM35	GM4DMZ/P	435	45
7	G3LVP	254	AL33	GM4DMZ/P	510	50
8	G4BWG	243	ZL50	GM4DMZ/P	490	61
9	G3NPI	236	ZL46	GD2HDZ	380	48
10	G3ONP	228	YM40	GM4DMZ/P	335	38
11	G3ZKE	215	ZL40	G3JYP	350	48
12	G3RWM	211	ZM32	GM4DMZ/P	352	37
13	G3SXY/A	194	YL48	G3JYP	340	30
14	G4BYP	190	YN46	G3XCS	340	28
15	GD2HDZ	189	XO68	G3VPK	425	17
16	G4DKX	186	AM76	GM4DMZ/P	496	32
17	G5UM	180	ZM35	G3JYP	225	40
18	G4CWH	172	ZL59	G3UHH	179	52
19	G4ARD/A	170	ZL08	GD2HDZ	375	44
20	G3FJE/A	155	ZM79	GM4DMZ/P	425	37
	G4AEZ	155	ZL30	G3JYP	355	41
22	G3WHK	147	ZL49	G3UHH	292	43
23	G6UW	146	AM61	GM4DMZ/P	430	32
24	G3SEK	141	ZL34	G3JYP	335	33
25	G6HD	138	AL41	G3JYP	395	32
26	G5HD	129	ZK02	G3JYP	410	23
	G3PGN	129	AL22	G3JYP	380	29
28	G3FIJ	119	AL05	G3XCS	370	21
29	G3TWG	116	ZL27	G3NEO	198	36
30	G3BTO	102	ZL55	G3NEO/G3NHE	215	28
31	G3YQW	82	ZL70	G4CMT	294	18
32	G3HBG	68	ZL60	G3JYP	420	10
33	G4CQF	55	ZL19	G5UM	111	25
34	G8LY	42	ZK14	G3LVP	132	12
35	GM3YOR	23	YQ65	G3JYP	177	11

Check log received from G3VPS/M.

Contests calendar

11 January	Affiliated Societies (Rules in December issue)
18 January	70MHz CW (Rules in this issue)
23-25 January	CQ WW 160 CW
31 January	1 February French (CW)
7-8 February	ARRL DX (Phone)
8 February	432MHz Open (Rules in January issue)
14-15 February	First 1·8MHz (Rules in January issue)
21-22 February	ARRL DX (CW)
28-29 February	French (Phone)
6-7 March	ARRL DX (Phone)
6-7 March	144MHz Open & Listeners
6-7 March	ARRL DX (Phone)
13-14 March	Commonwealth (Rules in November issue)
20-21 March	ARRL DX (CW)
27-28 March	CQ WW WPX SSB
3-4 April	70MHz Open
11 April	3·5MHz LP
24-25 April	1·3GHz Open (Trophy)
24-25 April	PACC
24-25 April	Bermuda Phone
1-2 May	432MHz Open & Listeners (Trophy)
8-9 May	Bermuda CW
29-30 May	144MHz Portable
12-13 June	HF NFD
19-20 June	Microwave
26-27 June	Summer 1·8MHz
3-4 July	VHF NFD & Listeners
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

raynet

S.W. Law, G3PAZ *

The Raynet Committee extends all good wishes to members for a very bright and successful 1976, coupled with sincere thanks for the good work accomplished in 1975. Membership shows a steady increase and it is a thought to ponder upon that our 25th anniversary might well produce a nice round figure of 2,000 if the trend continues.

However, much work still remains to be done in the exploration of the possibilities of new technology as more sophisticated types of equipment become more freely available. Indeed there are many reports noted of group activity on hitherto untried modes and yet higher frequencies and their applications to particular requirements. Let us not forget, however, that the well-tried methods which have so far stood up so well to the test of time are by no means to be cast aside.

The radio amateur has the great advantage of an elasticity in communications which may well be envied by the professional at times. In this lies one of the secrets of the service which we can provide when called upon in times of trouble. Our job is to get the message over accurately using the knowledge and equipment we have acquired in our self-training in accordance with the regulations controlling amateur radio. So, "black boxes" notwithstanding, if the message goes over accurately on top band cw the job is well done!

3·5MHz band net

Will all members please note that the monthly net on 3·700MHz will be at midday on Sunday 18 January, also that the net is not (as so many imagine) confined to controllers alone. All members are welcome to call in and give reports and items of news. This applies particularly to those in isolated areas who may thus keep in touch with the latest news. Remember the third Sunday in every month and whet your appetite for lunch—and Raynet!

Inflation

It is with regret that we have to announce some inevitable increases in the prices of various Raynet items. These are as follows: yellow Raynet stickers, 25p; car screen stickers RAEN, 19p; lapel badges, RAEN, 40p; headed Raynet notepaper, 50 sheets @ 61p (enquire re larger quantities); Raynet Manuals, 30p. All prices are inclusive of postage, and are in accordance with the changes made by the Society. May we also remind members that an sae would be appreciated when cards are sent for re-registration.

Local nets

No doubt many groups arrange a periodic net or reporting night at stated times. For those who have not yet done this we quote a few examples from the south. Surrey, weekly on Wednesday 2030-2130 general news, 2130-2200 short availability reports, both on 70·365MHz. SE London, first Monday each month, 2000, to include NW Kent on 145·200 and/or 70·355MHz. Also Mid-Kent and E Kent at 2030 using same frequencies. Members in other areas should listen around or enquire about local nets if they are not already aware of them.

Publicity

There are still many hundreds of thousands of citizens who have no knowledge whatsoever of the existence of radio amateurs, let alone of Raynet. Do not be surprised therefore if several police cars turn up at your exercise because of a call from a suspicious member of the public. It costs little and is elementary courtesy to save police time by informing the police of the time and place of your activities. Besides, it is good for public relations and liaison and you will gain regard as a responsible body.

* 130 Alexandra Road, Croydon, Surrey CR0 6EW.

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). In the case of Region 11 clubs, they can send them direct to the editor until an RR is appointed.

Items of news and dates of forthcoming events should reach RRs by 24 January for the March issue.

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

Ainsdale (AARC)—Thursdays fortnightly, 8.15pm. 1, 15, 29 Jan, 12, 26 Feb, 11 Mar. Ainsdale Scout Headquarters. Further details from G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. YMCA, Shearbank Road, Blackburn. Visitors always welcome. Sec G4CDR.

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 (B&RRS)—Second Tuesday in each month but with informal meetings including morse and RAE classes every Tuesday. The latter got off to a good start with 28 students and is run by G3RSM. It is hoped to hold a dinner dance on 19 February. A recent construction competition was a great success, with new members featuring in the prize-winners. Sec G4ECM, tel Heywood 65911.

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.

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 3·71MHz 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)—Wednesdays, 7.30pm. All meetings include morse classes. 7 Jan (Talk on club project, John Kenning G8EUO, A. B. Langfield), 21 Jan ("Chassis bashing", Tom Cook), 4 Feb (AGM), 17 Feb ("Devices for the blind", Andy Howell) 13 Mar. ("Valves", Barrie Langfield), 10 Mar ("Power distribution", Peter Smith), 17 Mar ("Steam versus diesel", G. Kennedy), 24 Mar ("Oscilloscopes", Eric Horne), 31 Mar (Junk sale). 203 Droylesden Road, Newton Heath, Manchester 10. Sec G8IYX.

Manchester (South Manchester RC)—Fridays, 8pm. Sale Moor Community Centre, Norris Road, Sale, Cheshire. Morse practice precedes the lectures. The VHF lads meet on Mondays at the club shack, Greeba, Shady Lane, Manchester 23, at 8pm. Visitors are welcome on both evenings. 2 Jan (New Year DF contest), 9 Jan (Mystery lecture, J. McBurney, G4AUR), 16 Jan ("Electronic fire detection", D. C. Holland, G3WFT), 23 Jan (RTTY, R. Harrison G8DVR), 30 Jan ("Repeaters", G. L. Adams, G3LEQ), 6 Feb (Visit to Piccadilly Radio Studios—to be arranged), 13 Feb ("Model aircraft", T. Winter, G4AOK), 20 Feb (Night on the air), 27 Feb (Surplus equipment sale). 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)—1, 15, 29 Jan, 12, 26 Feb, 11 Mar. 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.

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, second and fourth Tuesdays in each month. Poolstock Cricket Club, Keats Avenue, Poolstock, Wigan. Sec G8FTF.

Winsford (Mid-Cheshire ARC)—Wednesdays. Technical Activities Centre, rear of Verdin Buildings, Verdin Comprehensive School, Grange Lane, Winsford. RAE class 7.15pm to 8pm. Club Station G3ZTT is active most club nights on 160m or 80m. Monday is net night on 160m. 8pm onwards—around 1·91MHz. Tuesday is 2m net night at the same time—around 145·5MHz. Annual dinner 10 Jan. Sec G8HAV, 15 Llandovery Close, Winsford.

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.

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

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

Doncaster (DADARS)—Mondays, 7.30pm. Doncaster Technical College Refrectory, Watergate, Doncaster. Chairman G3KBU.

Halifax (Northern Heights ARS)—7 Jan (Members slide evening), 14 Jan ("Castle acoustic loudspeaker design"), 21 Jan (Visit to Birkenshaw fire station), 28 Jan ("70cm" by G8AXY—Provisional), 4 Feb (Open), 11 Feb ("Model helicopter design"—provisional), 18 Feb (Committee meeting), 26 Feb (Open).

Hull (HAD ARS)—Fridays, 7.30pm. 592 Hessle Road, Hull, (near flyover), 2 Jan ("Principles of oscillators" by G3WWD), 9 Jan ("Moog synthesizer" by G4BHF), 16 Jan (Annual dinner), 23 Jan (Lecture by G8GLM).

Leeds (Whiterose RS)—Wednesdays, 7.30pm (lectures start at 8.30pm). 83 Town Street, Armley, Leeds. 28 Jan (AGM), 28 Mar (Next White Rose rally at Lawnswood Hill School).

Scarborough (SARS)—Fridays 7.30pm, Scarborough Technical College, Corby Road, Scarborough. 9 Jan (Surplus gear), 16 Jan (AGM), 23 Jan (Mullard film show), 30 Jan (Talk by G8KU), 6 Feb (Surplus gear), 13 Feb ("Early days" by swl Charles). Hon sec Charles Whitaker, 1 Rye Field Close, Eastfield, Scarborough.

York (YARS)—Fridays (except for the third Friday in the month), 7.30pm. United Services Clubroom, 61 Micklegate. The annual dinner took place in York on 31 October, and was well attended and enhanced by the presence of the Region 2 RR and his wife. Full programme next issue. Hon sec K. R. Cass, G3WVO.

The Region 2 representative sends New Year greetings to all.

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

Birmingham (Midland ARS)—20 Jan ("Electron microscopes" by Mike Webb, G3OOQ), 17 Feb (Progress report on the Birmingham repeater GB3BM by G3BA and G8AMD). 8pm. Please check venue of meetings with G3ZKQ, tel 021-427 3088.

Birmingham (Slade R&SS)—9, 23 Jan, 6, 20 Feb, 8pm. The Committee Room, Church House, Erdington, Birmingham. G8GRC.

Birmingham (South Birmingham RS)—7 Jan (Awards for home construction contest and members' lecturettes), 4 Feb, 3 Mar, 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. G8GDZ.

Bromsgrove (B&DARC)—9 Jan ("QM70 products" by G3ZUL), 13 Feb, 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, 7.30pm. Winfray Annexe of the College. G8ISJ.

Dudley (DARC)—Second and fourth Tuesdays in each month. 7.45pm. Central Library, Dudley. G4BFT.

Hereford (HARS)—2, 16 Jan, 6, 20 Feb. Civil Defence HQ, Gaol Street, Hereford. G4CNY.

Lichfield (LARS)—5 Jan (Film show), 20 Jan (Natter nite), 2 Feb, 17 Feb (Natter-nite), 1 Mar ("Panoramic adapters" by G8CGW and G3SVT). 8pm, Swan Hotel, Lichfield. Sunday net 12 noon, 21·150MHz. G3NLY.

Solihull (SARS)—20 Jan ("Foreign railways"), 17 Feb, 7.30pm. The Manor House, High Street, Solihull. Social outing 20 Feb. G4AXW.

Stoke-on-Trent (North Staffs ARS)—Mondays, 7.30pm. Harold Clowes Community Centre, Bentilee, Stoke-on-Trent. G8KUZ.

Stourbridge (S&DARS)—6 Jan, 3 Feb, 2 Mar (Informals at "Shrubbery Cottage" public house, Heath Lane, Stourbridge), 19 Jan (Annual constructors' competition), 16 Feb, 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)—Wednesdays, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. G4AXZ.

Wolverhampton (WARS)—5 Jan ("Sparks at sea" by Bill Humphries, G3IGK), 12 Jan (Natter-nite), 19 Jan (Discussion on speech processors), 2 Feb ("QM70 products" by G3ZUL), 9 Feb (Natter-nite), 16 Feb (Club aerial project), 1 Mar, 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton. G8GCV.

Worcester (W&DARC)—5 Jan, 2, 21 Feb, 1 Mar, 8pm. The Old Pheasant, New Street, Worcester. Annual dinner 17 Jan. G4BXS

REGION 4—RR T. Darn, G3FGY, 1 Sandham Lane, Ripley, Derbys.

Derby (DADARS)—7 Jan (Surplus sale), 14 Jan (Ladies' evening, "The year in retrospect"), 21 Jan (Film show), 23 Jan (Visit to RSGB Presidential installation at Birmingham), 28 Jan (Ladies' night, "Rocks, fossils and minerals of Derby and district" by C. P. H. Barnes). 4 Feb (Surplus sale), 11 Feb ("Technical topics"), 18 Feb (Film show), 21 Feb (Annual dinner at the Derbyshire Yeoman), 25 Feb (Open meeting to discuss field days and contests in 1976). 7.30pm. Societies Club Room, 119 Green Lane, Derby. Visitors coming to Derby and prospective members welcome. G2CVV.

Derby (NHCAARS)—Fridays. 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby. G4CTZ.

Grimsby (GARS)—Alternate Thursdays. Room 3, Grimsby Community Centre. Further information from sec G. J. Smith, 6 Fenby Close, Grimsby, South Humberside DN37 9QJ.

Leicester (LRS)—Mondays 7.30pm. Gilroes Estate Cottage, Groby Road, Leicester. (Morse practice 8-8.30pm). 5 Jan ("Oscilloscopes"), 12 Jan (AGM), 26 Jan "Capacitors", 16 Feb (To be arranged). New members welcome. G3TQF.

Lincoln (LSWC)—Wednesdays. Lecture Room of the Lincoln Astronomical Society, Westcliffe St, off Burton Rd, Lincoln. At the AGM on 15 Oct John Birkett was voted in as president to replace the late Dr Ian Brown. The club is undergoing a little reorganization at present to put on more interesting programmes. Nets are held on Thursdays at 2000 on 2m and Sundays at 1100 on 80m. G4DBS.

Loughborough (LARS)—Loughborough are now re-affiliating to the RSGB and have a new clubroom where they can get organized once again. Further information from J. Smith, G4DZL, 91 Anson Rd, Shepshed, Loughborough, Leics.

Melton Mowbray (MMARS)—The subscription has now been increased to 75p per year and subs are now due. G3NVK.

Nottingham (ARCON)—1 Jan ("Activity night"), 8 Jan (Forum), 15 Jan (Talk on "Specifications" by G4AFJ), 22 Jan (Activity night), 29 Jan (Tape and slide lecture, "History of Radio"), 5 Feb (Forum), 12 Feb ("Digital Frequency Meter" by G3TVY and G8FWH), 19 Feb (Activity night), 26 Feb (Tape and slide lecture "Oscar Seven"). The club has now been issued with the callsign of the late John Curnow, G6CW, so that all his good work for amateur radio will be remembered. All meetings at Woodthorpe House, Mansfield Rd, Nottingham at 7.30pm. Visitors welcome. G4EKW.

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

Bedford (B&DARC)—8 Jan (Contests and planning 1976), 15 Jan (Informal), 22 Jan (Club on the air, G3WTP), 29 Jan (Members' gear), 5 Feb (Club quiz), 12 Feb (A longer lecture by Bob Woodhouse), 19 Feb ("Test equipment", G8FMG), 26 Feb (RSGB tape/slide lecture). 8pm. United Services Club, The Broadway. Sec G8FMG.

Cambridge (C&DARC)—Fridays, 7.30pm. Corporation Yard, Victoria Rd. Sec G3YRZ.

Dunstable (DDRC)—2 Jan (Holiday dx—Tell us), 9 Jan (Video as G8ENS sees it), 16 Jan ("Clans" gather). Fridays, 8pm. Chews House, 77 High St South. Sec G3XWS.

Peterborough (GPARC)—11 Jan (Aff Soc Contest), 22 Jan (AGM). Fourth Thursday every month, 7.30pm. Southfield Infants School, Stanground. Sec G4BBA.

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.

Reading (RARC)—First and third Tuesdays in each month. 8pm. "White Horse," Emmer Green. 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)—12 Jan (AGM), 29 Jan (Talk and demonstration by South Midlands Communications Ltd), 9, 27 Feb (To be announced). 7.30 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)—First and third Thursdays in each month, 8pm. Eltham United Reformed Church Hall, 1 Court Road, SE9. Sec G3YWO.

Croydon (Surrey Radio Contact Club)—Third Tuesday in each month, 8pm. "The Ship", 47 High Street, Croydon. Sec G3FWR, tel 01-657 3258.

Crystal Palace (CP&DRC)—17 Jan ("Amateur constructional techniques" by G3IIR), 21 Feb (AGM). 8pm. Emmanuel Church Hall, Barry Road, SE22. Sec G3FZL, tel 01-699 6940.

Esher (Thames Valley ARTS)—First Wednesday in each month, 8pm. King George's Hall, Esher, Surrey. Details from 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)—14 Jan (Debate on future of amateur radio), 11 Feb (Teach-in on digital electronics). 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.

Three lively quiz sessions were held to foster relations between the members of the Echelford, Thames Valley and Sutton & Cheam societies during September and October. With each home team providing the questions in turn, the visitors were put to the test on a wide variety of subjects directly linked to amateur radio.

The photograph shows John Sonley, G3XZV, (centre), who leads the Thames Valley quiz team, at home to the members of Echelford (left rear) and Sutton and Cheam (right). The contest was won outright by Echelford's brilliant display of knowledge and an amazing ability to punch their answer button quicker than anyone else!

Reigate (RATS)—6 Jan, 3 Feb (Natter-nites), "Marquis of Granby", Hooley Lane, Redhill. 20 Jan, 17 Feb (To be announced). 8pm. St Marks Church Hall, Alma Road, Reigate. Sec G3RIN, tel Reigate 47659.
Sutton & Cheam (SCRS)—13 Jan ("VLF-QRO distribution" by John Parker, G3OLX), 17 Feb (Constructional contest). 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 of future events from G3RXJ.
Canterbury (East Kent RS)—First Thursday in each month. Westgate Hall, Canterbury. Third Thursday in the month devoted to the constructor.
Chichester (C&DARC)—First Tuesday and third Thursday in the 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.
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.

REGION 9—RR H. W. Leonard, G4UZ. 4 Start Bay Park, Strete, Dartmouth TQ6 0RY.
Camborne (Cornish RAC)—First Thursday in each month 7.30pm. 1 Jan ("Intelligent use of the junk box" by G3RMG), 5 Feb ("Lining up an sw receiver" by G3VWK), 4 Mar ("Slow-scan tv" by G3LPB). SWEB Clubroom, Pool, Camborne. Details from G3NKE, tel Camborne 2419.
Exeter (EARS)—Second Monday in each month, 7.45pm. Coombe House, Coombe Street, Exeter. Full details from sec Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
Newquay (N&DARS)—Alternate Wednesdays starting 12 Nov. 7.45pm. Treviglas School. Full details from G8GOR.
Torbay (TARS)—Tuesdays, with special meeting on last Saturday of each month, 7.30pm. 4 Jan (TARS/Bristol contest), 31 Jan (Film show—"PO tower"), 28 Feb ("Marine photography" by Maurice Aldridge). Rear of 94, Belgrave Road, Torquay. Visitors always 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.
Cardiff (CRSGBG)—Second Monday in each month, 7.30pm. BBC Social Club, 118 Newport Road, Cardiff. 12 Jan ("Linear amplifiers", by GW3NWS. Details from GW3GHC.
Pembroke (PRSGBG)—Last Friday in each month. Defensible Barracks, Pembroke Dock. Details from sec GW3XJQ.
Pontypool (PRSGBG)—Tuesdays, 7pm. Educational Settlement, Park Hill Road, Pontypool. Details from GW3JBH.
Porth (Rhondda ARS)—Every other Thursday, 7.20pm. Transport Employers Club, Porth. Details from GW3PHH.
Port Talbot (PTARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW3ACF.
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.
Tondu (Glamorgan VHF/UHF Group)—Third Tuesday in each month, 7.30pm. NCB Social Club, Tondu, near Bridgend. 20 Jan ("VHF radio in the NCB", GW3XJH), 17 Feb (Club station activity). Details from sec GW8HEZ.

REGION 12—RR Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus, DD8 3NR.
Aberdeen (ARS)—Friday evenings. 92 Crown Street, Aberdeen. Sec GM4BKV.
Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Kingsway Technical College. Sec GM4AQM.
Inverness (Queens Own Cameron Highlanders Memorial Youth Club, Radio Section)—Now under control of Education Authority—Sec W. M. Begg, 68 Tomnahurich Street, Inverness.
Lerwick (RC)—Wednesday evenings, Annsbrae House, Lerwick, Sec GM3HTH.
Perth (P&DARC)—New club in course of formation. Members interested should contact sec GM3YEW.

A strong radio society must have full representation of the members. Region 12 still requires area representatives in the areas of the Highlands and Islands Authorities. Would any member willing to undertake this duty please contact the regional representative, GM8BZX.

The John P. Male Memorial Trophy being presented by Mrs Helen Male to "The Hamsters" as leading Scottish single-station NFD entry. Left to right: Donald Yeaman, GM4ASY; C. R. McAnerny, GM3XNJ; Eric Margetts, GM4BOA; Mrs Helen Male; Mike Parks, GM8HBU; Eric Walker, GM4BNZ; and Jim Stirling, GM3UWX. The trophy was presented by the Greenock and DARC in memory of the former honorary president of the club. Photo: *Greenock Telegraph*

REGION 13—RR Rev S. J. Smith, GM4DNM, St Ninians, 6 Derren Drive, Cardenden, Fife KY5 0JG.

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, Pittencrieff School, Maitland Street, Dunfermline. Further details from GM8HEY.

Edinburgh (Lothians RS)—8 Jan (Project review), 22 Jan (Talk by GM3OWI), 12 Feb (Junk sale), 26 Feb (Quiz). Adult Education Centre, Riddles Court, High Street. Sec GM8BJF.

Glenrothes (G&DARC)—First Sunday in each month: every Wednesday 7.30pm. Old Nursery Bldgs, Leslie, Fife. Sec GM3YOR.

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

The fourth annual get-together of Fife amateur radio enthusiasts was held on Wednesday 12 November in the Laurel Bank Hotel, Markinch. It attracted over 80 enthusiasts from the extremities of the county and other areas. GM3OLK demonstrated some microwave equipment and a demonstration of some sstv pictures was held by means of a monitor and some tape recordings.

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

Ardeer (ARCARS)—Thursdays, 7.30pm. Ardeer Recreation Club, Stevenston, Ayrshire. Details from GM8BOM.

Ayr (ARG)—Every second Sunday evening. Community Leisure Centre, 24 Wellington Square, Ayr. Details from GM3THI.

Falkirk (F&DRSGBG)—Temperance Cafe, Lint Riggs, Falkirk. Further details from GM3OQI.

Glasgow (West of Scotland ARS)—Friday evenings. 7.30pm. 22 Robertson Street. Programme and other details from GM3RHR, tel 041-772 3085.

Greenock (G&DARC)—Tuesdays and Fridays, 7.30pm. 22 Inverkip Street, Greenock. Details from GM3LYI.

Motherwell (Mid-Lanark ARS)—Fridays, with alternate meetings informal. Morse class every other Friday. Wrangholm Hall Community Centre, Jerviston Street. Further details from 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)—First Friday in each month, 8pm. Redcliff Hotel, Seacliff Road, Bangor. 2 Jan ("Stabilized power supplies" by GI3HXV). 6 Feb ("Reflections on transmission lines" by GI3VCI). Hon sec D. Steele, 59 Donaghadee Road, Millisle, Co Down.

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

Belfast (CoBYMCARC)—Saturdays, 2.30pm. 7 Brunswick Street, Belfast. All welcome. Sec GI4CRO.

Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. Next meeting 21 Jan. Everyone welcome to this friendly group. 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 NR134PJ.

University of East Anglia (R&EC)—Wednesdays, 1315. G3UEA Clubroom, University Village. The VEAREC is now reactivated for the new term, and a comprehensive programme of events is being arranged. Sec David Eglinton.

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

Basingstoke (BARC)—First and third Saturdays in each month. Chineham House, Popley, Basingstoke. 7.30pm. Sec Jan, xyl of G3ZRM.

Basingstoke (UKFMG—Southern)—First Wednesday in each month, 8pm. Chineham House, Popley, Basingstoke. Sec G3ZRM.

Bournemouth (Wessex ARG)—First Friday in each month and the Monday 17 days later. 8pm. Cricketers Arms, Windham Road. Sec G8BBN.

Chippenham (C&DARC)—Meetings every Tuesday, 7.30pm. The Boys High School, Hardenhuish Lane, Chippenham. G3UFN.

Fareham (F&DARC)—Wednesdays, 7.30pm. Porchester Community Centre, Room 9. Details from G8FFI.

Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Sec G8KUY. PRO G8ATK.

Guernsey (GRES)—Tuesdays, 8pm (Fridays cw class). The Lodge, La Corbinerie Oberlands, St Martin's, Guernsey.

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

Portsmouth (P&DRC)—Wednesdays, 3.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. G3NCO.

Salisbury (SR&ES)—Tuesdays. Salisbury Activity Centre, Wilton Road. Sec G2FIX.

Southampton University (SUARC)—Tuesday evenings. also informal meetings, every lunchtime during term in the clubroom, Old Union Building. Sec T. Williams, G3YOZ.

Southampton (SRSGBG)—Second Saturday in each month at the Lanchester Building, Southampton University, also Wednesday at the clubroom, Kent Road. Both at 7.30pm. G4AEU.

South Dorset (SDRS)—First Tuesday in each month, 7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. G3WAO.

West Dorset (WDARG)—First Friday in each month, 8pm. British Legion Club Hall, Dorchester. Sec L. A. Barnes, G8GHU, Flat 1, 107 The Esplanade, Weymouth.

Winchester (WARC)—First and third Fridays in each month, 7.30pm. Antrim House, St Cross Road, Winchester. Sec G4BKE.

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.

Middlesbrough (PORC)—Sec G8CDP, 200 Marton Rd, Middlesbrough.

Morpeth (Northumbria EC)—Thursdays, 7.30pm. Old Wheatsheaf Yard, Morpeth, except first Thursday each month when a lecture is held (open to public) at Ashington High School Annex, 7.30pm. Sec G8GVN.

South Shields (SSD&RS)—Fridays, 7.30pm. Trinity House, Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue, Kings Estate, Wallsend.

Sunderland (ARS)—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)—20 Jan (AGM), 15 Feb (Gen discussion). 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)—Wednesdays, 8pm. Rosedale Sports Club, Andrews Lane, (off Goffs Lane), Cheshunt, Herts. Sec R. E. Chastell, 4 Fairly Way, Cheshunt.

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)—Second and fourth Thursdays in each month. 22 Jan (RSGB Tape and slide lecture—subject to be announced), 12 Feb (To be announced), 26 Feb (Ditto). 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)—Wednesdays, 8pm. British Legion House, Weston 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 (Shebourne 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)—Third Wednesday in each month, 8pm. Market Hall, St Albans. Visitors very welcome. Further details from sec G3YHY, tel Watford 25633.

Stevenage (S&DARS)—First and third Thursdays in each month, 8pm. 8 Jan (Radar lecture), 22 Jan (Tape and slides lecture), 5 Feb (Exhibition preparations), 13 Feb (Radio exhibition at opening of leisure centre), 19 Feb (Anerchoic chambers lecture). Hawker Siddeley Dynamics Ltd, Gunnels Wood Road. Sec Paul Tewkesbury, 267 York Road.

REGION 20—RR R. 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)—Mondays, 7pm. 26 Jan (AGM and auction). Becket Hall, St Thomas Street, Bristol 1. Sec G3ULJ.

Bristol (BARC)—Tuesdays, 7.45pm. 24 Bright Street, Barton Hill, Bristol 5. G4BZZ.

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 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)—8 Jan (RSGB tape "Amateur radio as my window"), 22 Jan ("Operator J again"), 5 Feb (RSGB tape "Anthology of radio signals"), 12 Feb ("The series-parallel impedance transformation"), 4 Mar (RSGB tape "Radio aurora"). The Youth Centre, 31 The Park, Yeovil. Sec G3NOF.

The sstv scene

R. F. G. THURLOW, G3WW*

BATC SSTV Convention

The British Amateur Television Club organized a successful sstv convention on 11 October at Aston University, Birmingham, which was attended by some 100 active sstv operators and viewers from all over the British Isles.

Volker Wraase, DL2RZ, of Kiel, demonstrated the SFC-1404 slow-to-fast scan converter which he had designed, and which was recently displayed at Telecom 75 in Geneva. He "stole the show" with the conversion of normal incoming sstv signals into a constant-brightness display on an ordinary tv monitor, this giving excellent reproduction. When this "frozen" sstv picture technique was first demonstrated by amateurs at the Dayton Hamvention in Ohio in April 1974, the reaction was that "sstv would never be the same again," and this same view was expressed at Birmingham.

Discussions immediately started as to how to build such a converter as cheaply as possible, and much interest was shown in the lecture "A review of memory integrated circuits—as available to the amateur in the next two years" given by G. W. Tysoe, G8FWL. A recording of the lecture "SSTV slow-to-fast image processor" given by Dr George Steber, WB9LVI, at the Dayton 75 SSTV Forum, which was based on his articles in *QST* (March/May 1975), was also well attended for the same reason.

Most of the amateur-constructed sstv equipment displaying pictures, either by pre-recorded cassettes or the normal small fast-scan commercial cameras, used the fast-to-slow scan converter design by W6MXV, and others used designs of W7HBW/0 and W0LMD. Two keyboards designed by W0LMD were in constant operation, one into a Robot 70A monitor.

Among the sstv monitors operating, five were of the W6MXV monitor design with Spacemark and MK Products components and circuit improvements, which also appeared in other monitors with 5in and 7in tubes. Also on view were flying-spot scanners, pattern generators, a micro computer and the prototype of a solid-state CQ and callsign generator.

Western Electronics of Southampton displayed the latest Hamvision SS727 camera and monitor with both fast- and slow-scan viewing, and the SS303 monitor. Lowe Electronics displayed the complete Venus range of sstv equipment. Two monitors made up from MK Products kits were displayed by amateurs present.

Worked All States!

Neville Jackson, G3IAD, recently worked W0EGP in Nebraska on 14·230MHz sstv. This was the 50th USA state he has worked in 21 months' operation, and it qualified him for the first sstv WAS Award gained outside the USA. G3IAD has now had two-way sstv QSOs with 93 countries. □

*2 Church Street, Wimblington, March, Cambs.

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

Heath RA-1 rx with xtal cal, £28. G3WWH, QTHR. Tel Bayston Hill 3383.

AM10B Cambridge on 2m, rx varicap tuned, £23. New "roller-coaster", £4. B7G xtals, Marconi 100kHz, £1; 1MHz, 75p. HB vhf power meter, SO259 sockets, £2.50. STC 10·7MHz xtal filter 445/LQU/901B, £3.50. N type terminating loads 50Ω 5W xtals. Lists for meters and xtals etc. All carriage extra. G8ENI, QTHR. Tel Cheslyn Hay 415374.

Geloso 209 rx, 10-160m, £35. 20/15/10m preamp (6AC7), £3. LC audio filter, 200Hz wide, centred about 1kHz, £2. 50W o/p, 2m nbfm tx, £20. 144-28MHz converter with preamp, 116MHz o/p, £15. 160/80m cw tx, 5763 pa, £5. G3RWL, QTHR. Tel 01-366 4297.

Cowlgill motor with two extra reduction gears, 2in thrust bearing with pulley, fixing brackets, heavy-duty 24V transformer, complete installation, £20. Buyer collects. *Wanted:* Siemens E52B rx, also data for same. 5B/254Ms. G3GUU, QTHR.

TF144G, vgc, with all leads, £18. Two T1154Ms, with handbook, £8.50. Klystron psu, £5. CA512 vswr indicator, £6. RTA1B a.m. tx/rx, 28V, £10. Clearing various tv rx, buyer collects. *Wanted:* 4EP1/7 CRTs, cheap. Tel Uxbridge 30006 after 7pm.

24V motor, ¼hp, geared 100rpm, £3. Four-gang 10KΩ pot, £1. Square-law resistor (ideal mixer), 50p. TV delay line, 30p. 8ft telescopic whip, £1.80. 0-9 KGM display, 12V, £1. *Wanted:* 35MHz xtal. G8ABR.

Swan 350C, 400W p.e.p., with psu, in good cond, £250. TA33jr with AR40 and 36ft mast, £60. Buyer collects. G3GBB, QTHR. Tel Chevington 474.

FT101, fb cond, modified for top band, fitted blower, recently overhauled by Western Electronics, complete with mic, leads, plugs etc, will del up to 50 miles. G3HAS, QTHR.

R107, £10. PCR rx inc psu, £5. G8AEV 2m converter, 4-6 i.f., £10. Microwave Modules 4m converter, 28MHz i.f., unused, £15. TE20D sig gen, £10. A.M./CW 40W 2m vfo tx, £20. Various other items. TXs, xtals, etc must go. G8JWX, QTHR.

FT-2 Auto, xtals on GB3LO, GB3SN, 144·48, 144·80, 145·00, S20, S21, S22, plus mobile mounting bracket, £150. G8IXR, QTHR. Tel 01-529 1893.

G2DAF tx, no psu, needs attention, £20. Low-band Reporter, £5. JXK 2m fet converter, 2-4MHz i.f., £12. KW E-Z match. Carriage extra. G3XTT, QTHR. Tel Northampton 29423.

Liner 2, little used, fitted preamp, £130. Datong clipper, £35. KW trap dipole, hardly used, £20. SWR10 bridge, £4. G3WZQ, 25 Dakyn Drive, Stock, nr Ingatestone, Essex. Tel Stock 840527.

Two pairs Pocketfones, back-back on 70cm, batteries, charger, spares, £48. GEC660 4W hand-held tx/rx, £45. MM type 2m conv, 28-30 i.f., £4. Stereo tape deck, 9V, £5. SAE 8MHz xtals, spares, AM25T (six-chan) Vanguard, £12. Rotherham, 15 Chapelfields, Swinford, Leics.

Six chan Pye AM25B/V Vanguard. Low-band with control box, cable, mic, battery, plug, cradle, £8.50. Pack only, £6. Pye Pocketfones, £20 per pair. All plus carriage. J. M. Griffiths, The Grange, Gladstone Street, Abertillery, Gwent. Tel Abertillery 2010 anytime.

Europa Four transverter, complete, £55. KW 160m atu, £12. RF field strength indicator, tunes 1MHz to 250MHz, £3. G3YWS, QTHR. Tel Newark 2413.

FM tuner boards, varicap tuning, audio out, tested with circuit, £3.50. Matching stereo decoder, £2.50. Creed 25 five-hole tape punch, handbook, £11. 250V Papst axial blower, 5¾ by 5¾ by 1½in, £1.25. Radio interference mains filters, 10A, £1. G3YLQ, QTHR. Tel Luton 25595.

Europa B transverter, does not fit my TS520, £80 ono. R216, rx 19-157MHz a.m., fm, cw, offers. Tentec PM3 QRP rig, 20/40m, £25 ono. AR40 rotator, silent control, six months old, offers. G4DDX, QTHR. Tel Stevenage 2885.

2m Liner linear, 40w p.e.p. output, £25. Tw2 tx, psu, mic, xtals, complete with converter, £35 ono. TW70 70cm converter, 14-18MHz i.f., £7 ono. Poulter, G3WHK, 279 Aragon Road, Morden, Surrey. Tel 01-337 0117.

TA33, £35,000. Will throw in centrally-heated house with radio room, three bedrooms, three reception, two bathrooms, set in garden of nearly one acre, including tennis court, garages, greenhouses, outbuildings. Outskirts of Dorset village. G3RYE. Tel (0305) 852737.

Hallicrafters FPM/300 Mk2 'Safari' tx/rx, save over £100 on list price, six months old, 80-10m, built in psu (mains and 12V), fan, manual, mobile mounting kit with dc lead, £325. G3PLI, QTHR. Tel Bradford (0274) 29692 daytime or Bingley (09766) 5218 evenings.

EC10 Mk1 with 2m converter and h/b 2m a.m. tx, includes various xtals and spares, £50 ono. G3UDY, QTHR. Tel Nailsea 4537.

Pye (CAT) 50kHz-31MHz double s/het, filter, etc, manual, £25. Woden 750V 250mA, £3.50. Bound vols *Bulls* and *SWM* 1962, 1963, 1964 mint, unbound perf *Bulls* 1966, 1967. Please add carriage. *Wanted:* Paros 22TR tx/rx, mint cond. G3ESB, QTHR. Tel Derby 671536.

HT transformer, Dynatron, input 210/240V, outputs 410–0–410V 125mA, 310V 125mA, 4V 2·5A twice, 6·3V 4A twice, 6·3V 1A, 2V 1·4A, black crackle case, £5. Two lf chokes, matching cases, 20mH, £1 each. 12 asstd meters, Weston, Ferranti, EMI, sae list. E. Kentish Barnes, Morchard Bishop, Crediton, Devon.

FTDX401 with a.m. facility and cw filter plus matching spkr and mic, with handbook in original packing, £275. Carriage extra. G4ELM, c/o 49 West Ley, Burnham-on-Crouch, Essex.

"Rad Com", complete years 1966 to 1974, £3 per year. Also single numbers. G8FMH, QTHR. Tel Basingstoke 23979 evenings.

FR50B, includes top band, xtal calibrator, FL50B, FV50B, £140. Will sell FL50B and FV50B separately, £80. All as new, buyer to collect. GW3TFQ, QTHR. Tel Port Talbot 87860.

FLDX400, 3·5–30MHz, £175. FR100, 1·5–30MHz plus fm, transceives with FL400/500, £85. AR88D, amplified agc, S-meter, mech filter, prod dect, give-away at £45. W1191 wavemeter, mains psu, £5. Honda E300, little used, £65. J-Beam, 2m, 10-el, £5. All handbooks for above. G8ART, QTHR. Tel Guilsborough 633 (Northants).

45ft Versatower, buyer collects, £110 ono. Consider 2m transverter (Europa etc) asp art payment and/or fm hb Cambridge or "black box". G4BJX, QTHR. Tel Blagdon Hill 253.

Going hf. Liner 2 plus rx preamp, 8-el Yagi, halo, Trio 9R-59DS plus spkr, all 12 months old, exchange for hf band rig, ie FT200 etc. G4EJD, 125 Armshead Road, Werrington, Stoke-on-Trent ST9 0EL. Tel Ash Bank 3458.

Eddystone EC10 Mk2 with ac psu, almost new, £60. Yaesu 4m converter, will fit FLDX400, £6. Eagle signal generator, £10. G4BBI, QTHR. Tel Chesterfield 72440 after 7pm.

Linear Conchord 30W amp and RSC spkr, twice used, £35 ono. A. Dunsmore, 2 Glenmavis Drive, Bathgate, West Lothian EH48 4BZ. Tel 53841.

FT101B, mint cond, with hand mic, £350. Jaybeam MBM46 70cm. Multibeam, mint cond, only four months old, £13. Tel Formby 77920

Multi vfo for 2m tx/rx, 45MHz rx output, 12MHz tx output, stability 300Hz/h or better, £40. G3XGP mini-dfm kit with 1MHz clock, £26.50. KW101 swr bridge, £9. HC6U xtals, 8·018, 8·026667, 8·041, 8·05416, 8·061, 9·0MHz. GW4AMW, QTHR. Tel 0222 387076.

BC221, with charts, good cond, £18. CT432 calibrator, 10MHz, 1MHz, 100kHz, mains, good cond. *Wanted:* Xtals for 80m band tx/rx (465kHz i.f.). G8ALM, QTHR.

Racal RA17L, rack-mounting version, £75. BC221 with charts, mains psu and spare valves, £20. Absorption wattmeter, type CT44, £5. G8ICK, 17 Beagle Lane, Cranwell, Lincs NG34 8EG.

Free xtals!—with TW4 4m tx/rx, vgc, £15. Carriage extra. G4BMM, QTHR. Tel Luton 35617.

4CX250B bases, uhf type, ex-equip, good cond, £5 each. SWR-50 swr/power meter, £6. Two new QQV06-40 valves, boxed, £5 each. Two blowers, snail type, silent, £3 each. Quality transformer, 450-450V, 350-350V, 70V2A, 6·3V 3·5A, ideal linear, £5. (buyer collects). Rest add post. G8IZI, QTHR.

Two commercial PSUs (a) 1,000V at 500mA, (b) 1,000V at 500mA plus 300V at 300mA, both have numerous low voltage supplies, £5 each. Also 200W modulator, TZ40s output, £5. Buyer collects. G3EHG, QTHR. Tel Sedgley 3827.

"Short Wave Magazine" 1965/70, *Electronic Engineering* Vols 27-28, *Practical Television*, Vols 1-23. Bound. *Radio Television Servicing* (E. Molloy and W. F. Poole), seven vols. *Transistor Manual* 660 pages, GEC. *Traders Service Sheets*, 1-1,900. Television service sheets, manufacturers, about 500. C. Sawyer, 210 Gordon Avenue, Camberley, Surrey. Tel Camberley (0276) 29460.

Yaesu FR50B, immac cond, only 11 months old, hardly been used, full 160m-10m coverage with xtal calibrator, in makers box, only £85. Details, tel Bookham 54266, after 5pm.

Heathkit mobile psu HP-13B, exc cond, £40 onco. 2 Marguerite Place, Foxdale, Isle of Man.

Ampex AG20 portable professional tape recorder, 3¾/7in/s full track (half-track block supplied), ni-cad batteries, mains/charger unit, plus second incomplete recorder for spares, full servicing manual, in exc cond, £75 ono. Eric Kirk, 66 Arnold Crescent, Isleworth. Tel 01-898 5124.

Trio TX599, £200. JR599, £150. Homebrew linear, six PL519, 2KW p.e.p. for 20m, style as 30L1 (heavy), £40. Most parts, twin 4CX250B linear, £5. Yaesu UD844 table mic, £10. Pye W15AM, low band, ok for 4m, £40. All ono. Buyers collect London area. Tel 01-858 1448 anytime.

FRDX400, 2m, 4m, spkr, exc cond, £160. Powerstay automatic voltage stabilizer, 198-264V input, variable 200-250V output, 35A, £20. HW17A dc psu, £30. G2DAF rx, slight att, £12. Stolle automatic rotator, £10. 70cm fm tx, £30. G8CXT, QTHR.

Robot sstv monitor type 70A, modified, exc working order, with manual, £200 ono. Del can be arranged. H. Burton, 149 Longfellow Road, Coventry. Tel 0203 455021.

Europa 2m transverter with c/o relay, £75. Heathkit GR98 air-band monitor, £25. G3URE, QTHR. Tel Wideopen 3044.

CRT, circuit bits for transistor scope, £8. Storno CQM13C, CQF13C with circuit, control boxes, cables, xtals, £11 each. Mains transformer, valves, semicons etc. Large professional valve psu, £5. Solartron dvm, £17. RA10 rx, £5. G8FWI, QTHR. Tel Welwyn Garden 24930.

18AVT, never used, £42. Microwave Modules 2m converters, 28-30MHz with 116MHz, £15; 4-6MHz, £8. Varactor tripler for 2 to 70, £14. J-beam 2m 8-el Yagi, £5. Tel Bedford 46213 evenings.

Woden transformer and choke sets. Weston mc meter. Latch relays, 2-0-2mV, 12V reset. Fixed vacuum capacitors. Hi-cap electrolytics. Hi-stab resistors. Indicator lamps. OC20s, BCY39s, SCRs. Mercer gauge 0·1 mils. Assorted components. Reasonable prices, going QRT, send large sae. Lists. GW3HEU, QTHR. Tel (0978) 4507.

FT101, TA32, quad, rotor, Telomast etc, plus hundreds of items. Equipment of the late G3YDJ. SAE for full list. G4BIZ, QTHR.

TW Phase II transverter, with matching psu, £60. Eddystone 888, £55. Creed 54 teleprinter, 220V with silence cover and perforator, £7.50. Pye off-air monitor tv, £6. G3WUW, 26 Alexander Road, Thatcham, Berks. Tel 0635 62007.

Redifon GR286 fm tx/rx, working on 2m, rx needs aligning, £15 ono. *Wanted:* Cambridge or similar high band fm, transistor, dash mount unit. Offers please. G8HAY, 39 Cross Street, Wombwell, Barnsley, South Yorkshire S73 0LJ.

Pye U450L, 70cm tx, fm, 5W. Boot mount Cambridge, a.m., clean, modified for 2m, offers or exchange for public address equipment (mics, amps, spkrs, w.h.y?). G8ECN, QTHR. Tel Framingham Earl 2025.

JR599 Custom (M), vgc, £150. Europa transverter, QQV03-25 pa, inc leads, £50. GEC RC700 10W base tx/rx, high band, £25. Ultra M5B8FB low-band 15W fm tx/rx, £30. G8FZH, QTHR.

Drake T4XC tx, £290. Magnum Six speech processor, suitable Drake Series Four txs and tx/rx, £45. G4CHP, QTHR. Tel Swainsthorpe 365.

Philips RH811: stereo tuner, amp, cassette, recorder, with matching spkrs, output 2 × 10W, DIN sockets for external recorder, pickup, mic, originally £145, no mic, with instructions, £100 ono. Also six-channel KP202 with accessories, £100. GW4CPZ, QTHR. Tel Cwmbran 67457.

FT101, not used for at least a year, looks and works as new, about £200. Also TAS engine generator (reg 800) approx 1kW, one year old and hardly used, £100. G4AOI, QTHR. Tel Bognor 25511 daytime, Middleton/Sea 3320 evenings.

Marconi TF329G Q-meter, £20. Avo electronic test set, £15. Sullivan capacitance bridge, £2. Advance 12V 1·25A dc psu, £2. Test set VOA, 1,000Ω/V, £2. G3KWK, QTHR. Tel Redditch 63817.

Expo Titan drill and 20 tools, little-used, ideal for PCBs and metalwork, offers around £10. Cann, 14 Falmouth Road, Truro, Cornwall. Tel Truro 6025.

Pye Vanguard AM25T, tunable rx, xtal 145·672, tx complete with control unit, cable, mic, spkr, £30. Tel Dalserf (Larkhall) 5204.

Pye Vanguard, tuned on 2m, rx tunable, £25. AM Cambridge, dash-mount, high band, good cond, £25. Labgear LG50 a.m. tx 80-10m, 40W, £25. G3WUN, 23 Sherwood Way, High Crompton, Shaw, Lancs. Tel Shaw 44205.

Complete 2m station. Telford TC9tx, TC7 rx band searcher, £100. Garex fm/a.m. Twomobile, £70. Garex psu, £12. Liner 2, £120; psu, £15. Pye base 20W tx, £15. Commercially-made pair 5-el quads, £20. Imported HB9CV, £10. G8DYC, QTHR. Tel Derby 43056.

18AVT/WB, £30. Hygain 40m beam, £70. 20m G whip, £7. Heath vtvm, £8. G3WJN, QTHR. Tel Astwood Bank 3339.

Trap dipole, G8KW type, with KW traps, complete except for coaxial feeder, £12. G4CKA, QTHR. Tel Macclesfield 25154.

Olympic T100 six-band 100W cw/a.m. tx, £25 ono. CR100 gen cov rx with noise limiter, £20 ono. BC221 with ac psu and charts, £18. Pi-tank atu with 4·5mm spaced high-power capacitors and ceramic variometer, £10 ono. Buyer collects. G4DNV, QTHR.

Trio JR500S rx, 10-160m, 100kHz calibrator, 100 and 400Hz cw filter, handbook, £50 ono. Tel 01-648 5895.

Trio 9R-59DE communications rx, manual, xtal calibrator, stabilizer spkr etc, mint cond, £50. Carriage extra. SAE with enquiries. G8JDU, "Sunnyfields", Lighthouse Road, St Margarets Bay, Dover, Kent.

Arac 102 rx, all mode, a.m., fm, ssb 2m, 10m, full coverage 28-30MHz, 144-146MHz, 12V dc operation, ideal Oscar 7, tracking as new, £70. No offers please. Going QRT. Tel Worcester 354679.

Spacemark sstv boards, demod, timebase board built up, eht supply and new tube etc, £20. Tel 984 2229.

Pye Ranger tx/rx, 10W a.m., 2m, 12V psu included, £10 ono. Pye boot mount Ranger, suitable 4m, QQV03-20 final, less control gear, £15 ono. G8IXH, QTHR. Tel 01-449 8658.

Racal RA17 Mk2 in correct Racal cabinet and like new with two spare vfo units, best sensible offer. BAY96s, £2.50. CXY11s, £1 each. *Wanted:* Any data on signal generator CT212, your price paid, can inspect and return against deposit. G3RNV, QTHR.

2m tx/rx, hi-band Pye base station with remote control unit, tulip mic etc, £30. 4m lo-band Pye base station less rcu and mic, £20. Both in Pye cabinets. Spare hi-band tx, £15. G3WXI, QTHR. Tel 074 15 2609.

Cubical quad, 20-10m (20m band trapped high-power traps), 13ft by 8ft bamboo spreaders, boomless centre, 1:1 balun, single 50Ω feed point, good swr all bands, buyer collects, £20 ono. G4CMF, QTHR. Tel 01-764 3881 (home), 01-920 8587 (office).

FR50B 10-80 rx, £70. Joymatch triple atu, £6. Stereo/mono headphones, £3. 3in dia spkr, £1. 100ft seven-strand wire, £1. *6th World Atlas*. £1. All above as new and unmarked. Brown Type F headphones, £1. G3PPH, QTHR. Tel 051-525 2162.

CR100 rx, good cond with circuit diagram and other useful information ssb, cw, a.m. noise limiter freq. 60kc/s—30mc/s, £13. Product detector also fitted. 42 Roumania Crescent, Llandudno, Gwynedd, N. Wales. Tel Llandudno 75214.

Gonset tx/rx, exc cond, 80m to 6m, 120W cw, 80W a.m., spare output valves, £60 ovno. For G3TTG who is re-equipping. G3JSY QTHR. Tel St Austell 3827 after 6pm.

KW Viceroy Mk3 ssb tx, 80-10m, £65. Also B40 RXs, C and D, £20 each. Buyer collects. G4BWF, QTHR. Tel 68877.

SB200, as new, £100 ono. AR88D, £35 (prefer buyer collects). 2m valve converter, 24-26MHz, £5. Codar PR30, £5. *Wanted:* Eddystone dial type 898. G3NOH, QTHR. Tel Watford 33351.

AR88, manual, spare valves, £20 ono. G8FZE, Chandos Hall, Granby Row, Manchester 1. Tel 061-236 5601.

VHF sale. Converters. mast sections. complete 4m station, scores of valves. SAE for price list. G5UM, QTHR.

Codar T28 rx, good cond with new headphones, £12. Also Brown Type F headphones, reconditioned, £2. Lubitel "2" camera, f4·5, leather case, new, £5. G8UA, QTHR.

Trio 9R-59DE rx with xtal calibrator, plus Codar PR30X, both modified but exc working order, £30, carriage extra. Adam, 23 Waterside, Hythe, Southampton SO4 6AD.

HW101 plus psu, requires repair of vfo, both units £120. Trio JR500S, £30. G3YZZ, QTHR. Tel Littlewick Green 2791.

Minimitter Top 2–7 tx, 20W cw/a.m. 160–80–40, £15. Buyer collects. G3ILL, QTHR. Tel 01-450 4883.
Pye Vanguard 2m tx/rx, tunable rx, xtal-controlled tx (six-channel, includes R5), tone burst, a.m., fm, fsk, spkr, £30 ono. Burgess spray gun VS646, £5. G8ISI, QTHR. Tel Liphook (0428) 723168.
RTTY sale. Creed 7ERP teleprinter, £25. Also Creed 6S auto-transmitter, £10. Both good order, delivery extra by arrangement. G3RDG, QTHR. Tel 01-455 8831.
Heathkit HP23-A psu for HW101, prof built, little used, immaculate, £30. GM3HBT, QTHR. Tel Larkhall 883306 after 6pm.
Lab clearance. AF signal gen, mains/batt, £10. 1kW RCA marine tx, only suitable for spares, contains many valuable components inc high-power tetrodes suitable for linears, £60 ono. Tel Bedford 56144 evenings.
1MHz xtal, B7G base, 0·001 per cent, £1.25 plus postage and packing. Superstarr 80 mic and long lead, cost £36.80, sell £20 or w.h.y. *Wanted:* TS700. Tel 01-989 6741.
Hygain 18AVT/WB, £40. Mosley Atlas trapped vertical, 10–40m bands, £12. Sentinel X 2m converter, 28–30MHz i.f., with built-in psu, £15. Maunder, 57 Lea Road, Dronfield, Sheffield S18 6SD. Tel Dronfield 412775.
KW202 rx, mint cond, fitted Burns fm discriminator, £155 ono. Roberts 707 portable, mint cond, £35 ono. 2 Rolleston Close, Petts Wood, Kent. Tel 467 5908.
AR88LF, manual spkr, recently revalved, professionally re-aligned, good cond, del 50 miles, £30 ono. *Wanted:* FRDX400S, any cond, price accordingly, cash waiting. K. H. J. Rainbow, School House, Pine Gardens, Surbiton, Surrey. Tel 01-399 8166 (home) or 01-580 4468 ext 5282 (office).
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WANTED

HQ1 or B24 with or without RK3. G3NSU, 140 Pudsey Road, Greenthorpe, Leeds LS12 3TZ. Tel 630661.
Manual for Hammarlund SP600 JX6 rx, purchase or loan. M. Beerling, "Highland", Staines Hill, Sturry, Canterbury, Kent. Tel Canterbury 710743.
HMV dog! Voight horn, early spkrs, valves, RXs, tx (especially spark), pre-war magazines, catalogues, books, components, for Vintage Wireless Museum. Douglas Byrne, "Alverstone", 32 Luccombe Road, Shanklin, IOW. Tel 098-386 2586.
Viscount hi-band xtal shift units. Also Rank Bush Murphy Mitres, portable 2m tx/rx, fm or similar, pref with manual. R. Perzyna, 93 Bromley Road, London SE6. Tel 01-697 7254.
Collins S Line. 75S3-B rx, 32S3 tx, plus psu, SM3 mic, must be in fb cond, good price paid, no mods. 25A Marshall Road, Mapperley, Notts NG3 6HS. Tel 0602 54047.
Circuit, alignment, operating details or manual for vintage Hallicrafters Super Sky-rider. Buy or borrow. 64 Creek Road, Eastoke, Hayling Island, Hants PO11 9RE.
FL50B tx, must be in perfect working order and complete with manual. Will collect. 223 Markfield Lane, Markfield, Leicester. Tel Markfield 2079.
Electroniques i.f. strip type IFA, 1·6 ssb, Mk2 with xtals. Also manual for CT381 sweep test set, either purchase or loan. G3GWH, QTHR. Tel 0752 776927.
Relatively modern communication rx, 160m-10m, very good all-freq rx acceptable. Exchange Decca Universal klystron power unit, metered, stabilized. Smith, "Briar Bush", Ivinghoe Aston, Leighton Buzzard, Beds LU7 9DJ. Tel Eaton Bray 220565 after 7pm or weekends.
CRT SE3AP31 Sylvania Thorn for Telequipment scope S32A, slight face burn acceptable. G8BIH, QTHR. Tel Alton 82739.
KW1000, in good cond, price to include delivery by Securicor. GM3OTF, QTHR. Tel Dunragit (05814) 247.
Hammarlund ssb adaptor SPC10. Heavy Post Office type key. Hammarlund SP600 cabinet, any cond. G8KPC, 69 Upperfield Drive, Felixstowe, Suffolk. Tel 6667.
CR100 rx in good cond and E-Z match atu, alternatives considered. G4DGF QTHR. Tel 09-33 77239.
KW2000A, dc psu, all replies answered. G3SVP, 38 Hailstone Close, Rowley Regis, Warley, West Midlands.
AT5, must have PSUs and be in mint cond. Write giving full details and price. Also require BC348. All letters answered. Will collect 50 mile radius. Rhodes, 23 Whitby Avenue, Brentwood, Essex.
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Pair of 27MHz a.m. walkie-talkies for 10m conversion. Please state cond and price required. L. K. Harling, 9 Barden Road, Eastbourne, East Sussex BN22 7EF.
Heath SB-401 or SB-400, also SB-200 linear in good cond for ready cash. GI3GTR, 3 Rhanbuoy Park, Craigavad, Holywood, Co Down, N Ireland. Tel Holywood 3890.
Tiffin Boys School, Kingston, Surrey, recently formed amateur radio society requires hf listening equipment to become operational. Can anybody help please? Offers of assistance with the club would also be appreciated. Ted Morrey, G8KYD, at school address. Tel 01-546 4638.
Copy or buy handbook for Furzehill model 168D scope, any expenses paid. Ledex assembly 283203, fitted trimmers and coils for three channels tx/rx 2m in Pye Vanguard AM25T. GM4BVU, QTHR. Tel Hamilton 23121.
HC-25/U fundamental, parallel. 8,200·0, 8,501·5, 8,700·0, 8,725·0, 8,750.0, 8,775.0, 8,875·0, 8,900·0, 8,925·0, 8,950·0, 8,975·0kHz, advise qty, cost. Also 144 mobile amp, all mode, 100/150W output or w.h.y? *For sale:* 18AVTWB, special varnish protection. G3BKL, QTHR. Tel 0980 862489 after 1800.
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Heath HWA 17-2-FM adapter. GW8FII, QTHR. Tel Aberystwyth 3591.
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Drake T-4XC and psu, good price paid for mint cond. Aitken. Tel 0342 21221.
Teleprinter terminal unit, model SRD1 or Spacemark model TTU or similar. G3ZOG, QTHR. Tel 0783 280080 6-8pm.
Heathkit HR-10B amateur bands rx or similar (gen cov rx accepted if good amateur bandspread, such as trio 9R59DS etc), must be mint cond, will pay around £50, Cannot collect unless local. Dave Austin, 13 Ridgehill Grove, Intake, Sheffield.
Mobile dc psu for FT200 or any make considered. GW4DTQ 90 Grosvenor Road, Prestatyn, Clwyd, LL19 7TS. Tel Prestatyn 7119.
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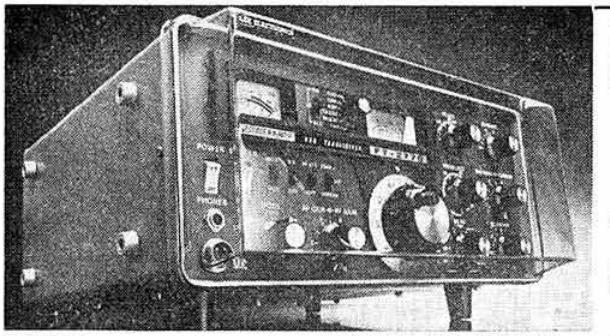
SP101B spkr. Video recorder. FL2100B linear amp. YC355D digital frequency meter. YO100 monitor scope. Pye Pocketfones. 70cm converter, any i.f. 4m converter, any i.f. G4DYY, QTHR. Tel 021-588 2043 (West Bromwich).
70cm high-Q break. 70cm beam. 2m 8XY or 10XY beam. QQV06-40A, QQV07-50. 160m and 40m G-Whip loading coils. *For sale:* 4m transmit converter, £10. G3OHC, QTHR. Tel 021-308 2512.
Manual for Pye W15U Westminster. To buy or borrow (postpaid). Also good rechargeable batteries for Pye IPF1 Pocketfone tx and rx, Pye part Nos FB01266 rx, FB01265 tx. G8KBZ, QTHR. Tel 01-579 3958 evenings.
KW1000 or SB200 linear. Reasonable offers to G3ABJ, QTHR.
TX/RX 2000A, FT200, Trio 510, or similar. Also hamband or gc rx with amateur bandspread. *For sale:* Solatron db scope 1014 with manual. Solatron 513 with manual. Advance constant-voltage transformer. Audio oscillator. Can collect and deliver. G3VXS, QTHR. Tel 502158.



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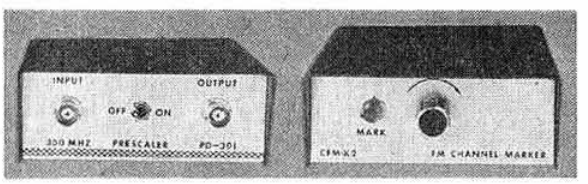
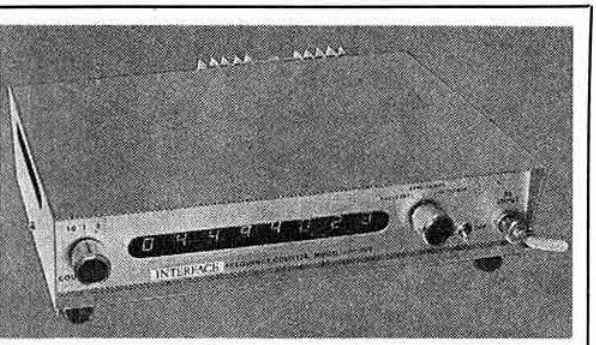
CFM-K2	25kHz channel marker	£20.00

The PD301 (left) and CFM-K2 (right)





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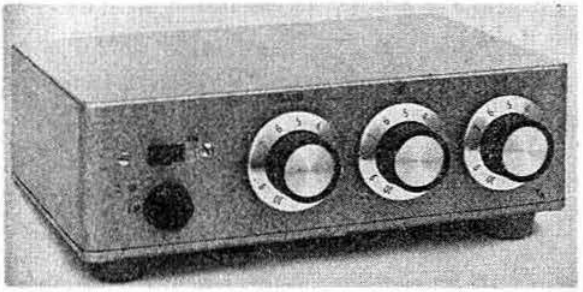

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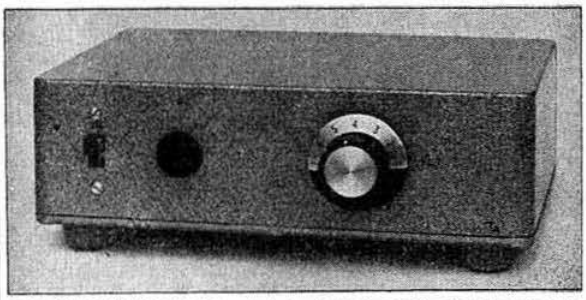

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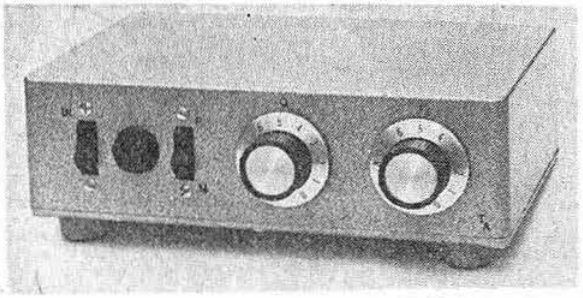

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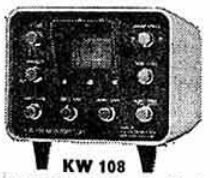

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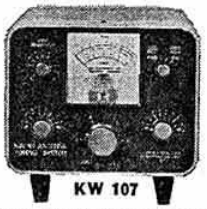

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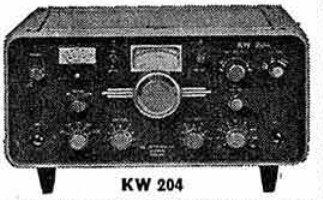

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It sounds fantastic but it's true, with Model FL1 in circuit you can simply forget about heterodyne interference (audio whistles). In its automatic notch mode the filter continually searches for whistles in the audio output from your receiver. As soon as it finds one it removes it, usually in less than one second. To the user it's as simple as that. No more fiddling with manual notch filters, the advanced Datong circuitry does it faster and better and *automatically*.

So far as we know this is the first-ever device with this capability. It has to be heard to be believed.

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Not quite so spectacular, but just as revolutionary, Model FL1 in its band-pass mode for the first time puts you in complete command of your receiver pass-band for cw and ssb. Compare these features with any other audio filter:

- ★ Flat-topped response for ease of tuning of CW, and for effective SSB filtering.
- ★ Continuously variable bandwidth (20Hz to 1000Hz) for perfect matching of selectivity to prevailing conditions and CW sending speed.
- ★ Continuously adjustable centre frequency (250 to 3000Hz) so you can put the pass-band precisely where *you* want it.
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- ★ No audible ringing on CW.
- ★ Light emitting diode tuning indicator for CW.

The Frequency-Agile Filter installs simply by connecting to the loudspeaker or headphones jack on your receiver. It contains its own two watt amplifier for driving an external loudspeaker and includes eight integrated circuits, six transistors and two LEDs, all mounted on two glass-epoxy PC boards together with three control potentiometers and five push-button switches. Power comes from either an internal PP9 battery (not supplied) or an external supply between 6.5 and 15 volts DC.

For the full story send for our new data sheet. The filter will be available from mid-January providing that our component suppliers keep their promises. **Price in the UK: £47.50 plus 25% VAT** (p.p. included).

Sorry, no photograph until next month. When you see it we think that you will agree that the appearance matches the performance. The elegant case is white with brushed aluminium panels lettered in black. Controls comprise three solid aluminium knobs, five black push-button switches and two LEDs.

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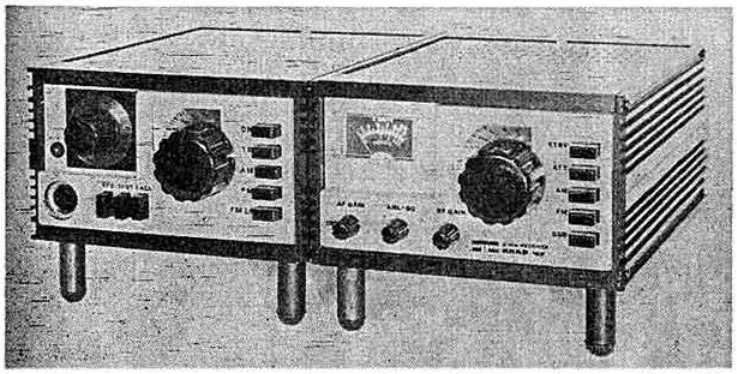

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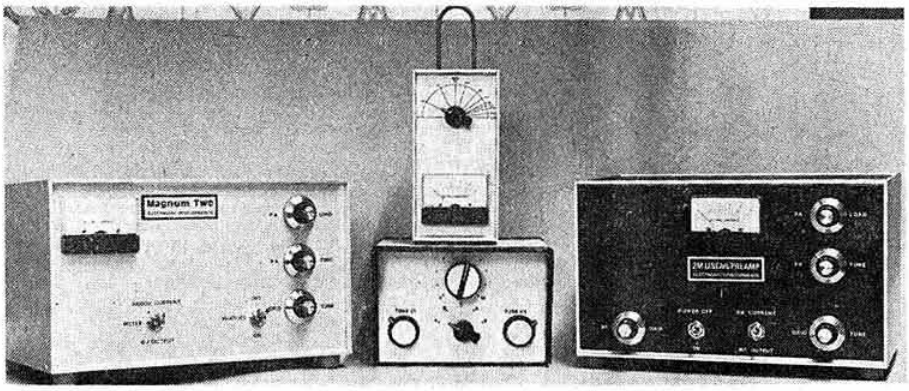

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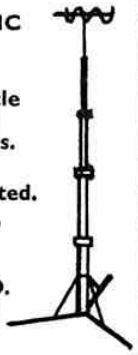

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144·030 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	c
144·4/433·2 ..	a	b	a	b	b	b	b	b	b	b	b	b	b	c
144·480 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·600 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·700 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	c
145·000 ..	a	a	a	a	a	a	a	a	a	a	a	a	a	c
145·050/R2T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

PRICES: (a) £2.00 (b) and (c) £2.50.

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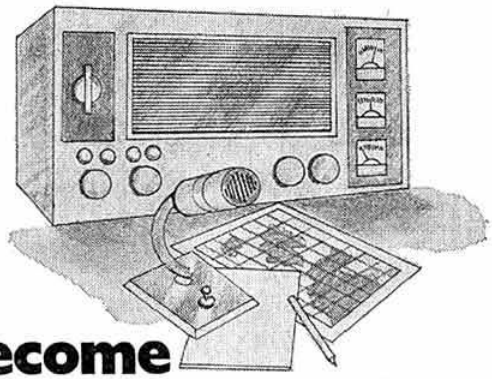

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Index to Volume 51—January to December 1975

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Contests, df *(Rules in italic)*

Contests, hf (overseas) *(Rules in italic)*

Contests, hf (UK) *(Rules in italic)*

Contests, vhf/uhf *(Rules in italic)*

Irregular features

Licensing and band plans

"Microwaves" technical items

Miscellany

New equipment and products

Non-technical articles

Oscar

Reviews, equipment

Reviews, publications

RSGB affairs

Technical articles

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