JANUARY 1973

RADIO COMMUNICATION

1913 - When RSGB began

From *Wireless World* August 1913:

"London has hitherto been without a wireless club, but at a meeting held on July 5 an association was formed under the title of 'The London Wireless Club' having for its object 'the bringing together of all amateurs interested in wireless telegraphy and telephony'. At that meeting, Mr R. H. Klein, of 18 Crediton Road, West Hampstead, NW, was elected Hon Secretary *pro tem*. The next meeting will be held in September, and in the meantime amateurs intending to join the club should communicate with Mr Klein. We are glad to learn that already sufficient support has been given and promised to ensure the success of the club."

Among those present at the meeting of 5 July were R. H. Klein (seated), L. F. Fogarty (left) and L. McMichael (centre). F. Hope-Jones (right) became chairman of the club at a meeting held two months later when its name was changed to "Wireless Society of London"; later to be changed yet again to "Radio Society of Great Britain"

RSGB Diamond Jubilee Year

1913 – 1973

Journal of the Radio Society of Great Britain

JANUARY 1973

RADIO COMMUNICATION

Volume 49 No 1 Price 30p

CONTENTS

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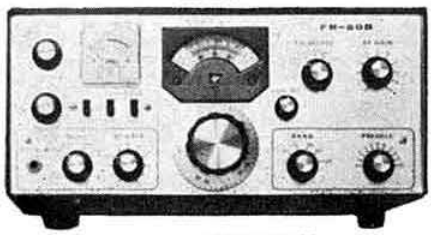
YAESU RECEIVERS

FR-50B



This **AM/CW/SSB double conversion receiver** offers first class value for money. This comes complete with built-in speaker, crystal calibrator and WWV band at £63.
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* Facilities for Sidetone monitoring.
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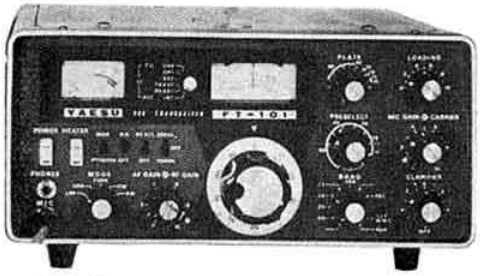

EXAMPLES OF HIRE PURCHASE

Model	Deposit	Monthly Repayments over: 1 Year	1½ Years	2 Years	3 Years
FR50B	£7	5@ £6, 7@ £5	16@ £4, 2@ £3	2@ £4, 22@ £3	11@ £3, 25@ £2
FR400SDX	£16	6@ £14, 6@ £13	9@ £10, 9@ £9	12@ £8, 12@ £7	18@ £6, 18@ £5
FT/FP75	£12.50	3@ £11, 9@ £10	3@ £8, 15@ £7	16@ £6, 8@ £5	6@ £5, 30@ £4
FT/FP200	£18	5@ £15, 7@ £14	3@ £11, 15@ £10	1@ £9, 23@ £8	32@ £6, 4@ £5
FT101	£26	6@ £22, 6@ £21	2@ £16, 16@ £15	22@ £12, 2@ £11	27@ £9, 5@ £8
FT401	£23	5@ £20, 7@ £19	12@ £14, 6@ £13	19@ £11, 5@ £10	33@ £8, 3@ £7
FT-2FB	£9	7@ £8, 5@ £7	6@ £6, 12@ £5	6@ £5, 18@ £4	4@ £4, 32@ £3
FT-2 AUTO	£15	3@ £13, 9@ £12	12@ £9, 6@ £8	20@ £7, 4@ £6	36@ £5
YC-305	£9	2@ £8, 10@ £7	1@ £6, 17@ £5	1@ £5, 23@ £4	35@ £3, 1@ £2
YC-305D	£12	4@ £10, 8@ £9	11@ £7, 7@ £6	6@ £6, 18@ £5	31@ £4, 5@ £3
FL-2100	£15	6@ £13, 6@ £12	14@ £9, 4@ £8	22@ £7, 2@ £6	3@ £6, 33@ £5

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100KHz
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Selectivity: 2·3 kHz (—6dB), 4·5kHz (—60dB).
Audio o/p 9 1·8w.

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Response: ± 3dB., 40-2,700Hz.

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Size: 210w. × 80h. × 300d. m.m. Weight- 3·8 kg.
Current drain:

	AC	DC
Standby	50w	1·4 amp.
Heaters on	50w	3·5 amp.
Transmit	80w	5·5 amp

Microphone included and 4 crystals (3760, 7060, 21250; 28550 kHz. Our FT-75's have a crystal on 14200 at £2.20 extra if required. Other frequencies stocked for our customers are 3737, 3780, 7030, 7050, 14140, 14200, 21240, 21300, 21400, 28490, 28600. Or we will obtain any frequency you wish from Yaesu.

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NEW:—FT2FB. Similar to FT2F but with more efficient transmitter, tone for repeater triggering and improved receiver filter. Takes less current!

The FT-2F opens the door to noise—free broadcast quality two metre FM operation. It is a highly advanced all solid-state unit complete with an automatic toneburnt signal. Channel capability of 12 simplex or duplex frequencies. Three channel frequencies included. Advanced cct design protects automatically from damage of transistors caused by antenna trouble or reverse connection power supply. Portable or home base operation can be achieved with the addition of the optional FP-2AC/B power pack which provides regulated DC power for the transceiver and charging voltage for the leak proof re-chargeable colloidal type batteries, Spec. frequency 144-148 MHz., 12 channels, Frequency modulated, power drain, Rx 0·5A Tx 2A. Dimensions 6¾" × 2½" × 10". Weight 4lb. Standard accessories, Dynamic mic., and mobile mount. Transmitter RF power 10 or 1w. o/p Stability. ± 0·001 per cent.

Ex Stock
£146

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2m. FT-2 AUTO SCANNING TRANSCEIVER

The receiver automatically scans the 8 channels and will indicate on which one there is a signal. Power output: DX, 10w. Local, 1w. Frequency coverage: 144-146 MHz. Weight: 4·2 kg. Size: 210w. × 95h × 270d mm. Mode: F3. Power requirements: AC, 100, 110, 117, 200, 220, 230V. DC, 13·5.

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VHF FM POWER AMPLIFIERS

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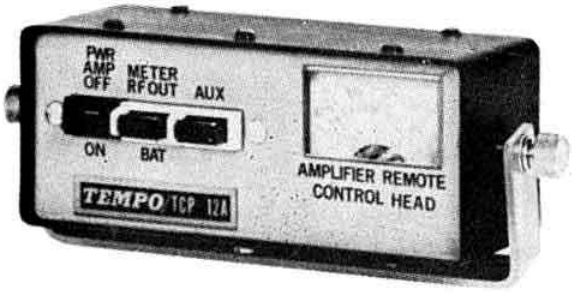
All circuitry is of micro-strip technique for stability and broadband characteristics. Additional features of the micro-strip techniques include extreme mechanical stability and ease of servicing.

Antenna switching is accomplished through the use of specially selected PIN diodes and printed quarter wave micro-strip transmission lines. These PIN diodes are activated by an RF sensing circuit consisting of a printed omni-directional coupler and amplifier. Thus when as little as ·5 watt of RF power is applied to the input of the amplifier this circuit is activated causing the PIN diodes to switch this RF power through the RF power amplifier. During receive the antenna by-passes the amplifier and is fed through the PIN diode switch to the transceiver. Also of note is a reverse voltage protection diode. In the event the amplifier is connected to the wrong polarity, the diode will protect the power transistors from destruction.

All RF and DC cables are supplied along with a detailed instruction manual describing installation, circuitry, and service. All of the units are very simple to install and fool-proof to operate. With proper care these amplifiers will give you a lifetime of dependable service.

Commercial, type-accepted equipment is available for slightly higher prices. Those amplifiers include commercial quality filtering. All commercial orders should include a frequency range to which the amplifier should be tuned.



TEMPO TCP 12A

This unit offers the user continuous monitoring of the power output of his amplifier. Power is read directly in watts on the meter. This head is plugged into the control jack of any Tempo amplifier. It can be mounted in any convenient location, away from, or next to the amplifier. It then offers the user not only power output monitoring but also the ability to turn the amplifier off and on. The control head can also monitor the battery voltage. Power is detected in the amplifier by a printed circuit directional coupler which is built into all Tempo TPL VHF power amplifiers.

TEMPO 2 METER FM AMPLIFIERS.

MODEL	DRIVE POWER	OUTPUT POWER	CURRENT	PRICE
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TCP 12A CONTROL HEAD				£17.85

All the amplifiers operate on 13.8V. dc.

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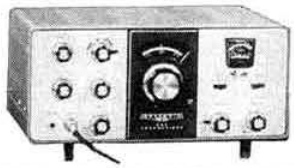

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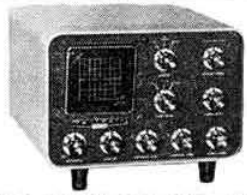

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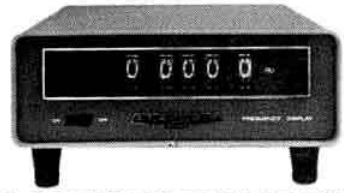

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HAPPY NEW YEAR

Yaesu Equipment

Yaesu Equipment:

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FV101 VFO	£38	SP400 Speaker	£10
SP101 Speaker	£10	Fldx400 80–10	£146
FL2100 Linear	£148	FL2000B Linear	£148
FT200 80–10m	£134	YC355D 220MHz Counter	£111
FP200 AC psu/speaker	£38	FT2FB 2m FM	£89
DC200 DC psu	£46.50	FT2AUTO	£143
FV200 VFO	£38	FR50B 80–10	£59
FT401 80–10m	£230	FL50B	£68
SP401 Speaker	£10	FV50B VFO	£27.50
FV401 VFO	£38	SP50B speaker	£5
FT75 80–10	£99	DC75 DC psu	£22.50
FP75 AC psu	£22.50		
FV50C VFO	£27.50		

Yaesu Accessories

FT101 modification kit to improve I.M. performance. If any of our customers are interested, we will give details on request.
FRxd400 2m or 4m converters **£12.50**
FT101 fans **£8.** FT101 CW filters **£15.**
FT101 AM filters see filter list.
FT401 CW filters **£15.** 100 kHz crystals **£2.50**
11 pin accessory plugs **45p**
Manuals: FT200, FT101, FT2F, FT401, FT560, FT75, YC305, 65p each.
Log Books: Nice glossy jobs produced by Yaesu 45p each.
2m crystals: The FT2AUTO and FT2FB supplied by us are fitted 144·48, 144·60 and 145·00MHz as standard. Extra channels available at £3.20 per channel are 144·30, 40; 80; 145·20; 40; 60; 80 and of course the repeater channel (145·15/75)

NEW ITEMS

Yaesu SIGMASIZER	200 channel 2m FM transceiver. Complete coverage of 2min 10kHz steps by frequency synthesis.
Yaesu FT501:	80–10m digital readout. 560W p.e.p., mostly transistor, but a 6BZ6 r.f. amplifier is used and a 6U8A first mixer to ensure the best S/N ratio without degrading I.M. and cross mod. performance.

VHF Equipment

In addition to the popular Yaesu 2m FM equipment we also stock the following:

Liner 2	2m SSB transceiver fully tunable, both Rx and Tx which in addition has RIT) over 145·25 to 145·49MHz. 20W p.e.p. input. All transistor. Crystal synthesis ensures unconditional stability. Requires 12–16 vdc and so is ideal for mobile	£138
Inoue IC21	Base station or mobile	£130
	Matching VFO	£35
Braun SE600 DIG	The complete 2m station. AM/FM/SSB with digital readout	£535
Braun SE600	As above but without digital readout	£460
Braun SE280	80 channel 2m FM. Ideal for all European repeaters	£198
Braun DGTC22	2m converter 28–30MHz IF.	£20
Braun DGTC 1702	70cm converter (2m IF)	£36
Braun LVV 270	Varactor tripler 2m/70cms	£35
Braun TTV 1270	2m/70cms transverter	£24
Braun CWF 02	Active CW filter	£15

Weir 2m Mosfet converter. Extremely good value for money 28–30MHz I.F. **£13.65**

The Dycomm Range of FM Amplifiers

Type	E	ES	1–10–0	C	D	10–0	35–0
Input W	1–2	1–2	1–2	4–12	9–12	7–15	25–40
Output W	20–25	35–45	100+	15–30	45–55	80–125	80–110

These amplifiers have RF VOX and can be remotely switched. Ideal for mobile or fixed station—choose from the wide range the model which suits you best.

Station Accessories

SWR Meters: Hansen single meter **£4.70**; Asahi twin meter **£7.20**
PL259 plugs to suit 30p. Reducers 10p
Kuranishi Wattmeters. Dummy/load wattmeter 5" × 5" × 10", switched 20 or 120 W f.s.d. flat 50 ohms to 500 MHz. Not to be confused with frequency conscious so called power meters. This is an accurate, direct reading instrument. **£32.00**
Headphones, low impedance padded, **£2.75**
Microphones. The handsome Yaesu YD844 desk mike at £12 or the very popular YD846 at **£5.**
Katsumi EK9X electronic keyers **£8.20**
CW practice oscillators **£2.20**
An extra solder dispenser—fastens on to the soldering iron and dispenses solder automatically. By combining the solder and iron in one hand, you have a hand free. **£3.75**
Digital Clocks: Copal 222 **£7.50**; Copal 227 (alarm) **£8.50**; Copal 601 **£14.25**
PL259 plugs 30p, reducers 10p, sockets 30p, connectors 75p
Special: 4CX250 bases complete with chimneys **£2.95**
Books: World's Short Wave and Medium and Long Wave Radio Stations and FM and TV listing **35p**
Comprehensive Radio Valve Guide Books, 1, 2 and 3 **30p** each
Transistorized Test Equipment and Servicing Manual **25p**
Transistor Equivalents and Substitutes **40p**
Handbook of Radio, TV and Industrial Tube and Valve Equivalents **40p**

Filters

Mechanical

900Hz, CW **£12.50**; 2·4kHz SSB **£10.50**; 5·3kHz AM **£7.50**; 20kHz FM **£7.50.**
Carrier crystals: 453·5 and 456·5kHz, **£2.00** each

Crystal 9MHz

2·4kHz SSB **£14** and **£18** complete with carrier crystals
3·75 or 5·0kHz AM **£16**
0·5kHz CW complete with carrier crystal **£16.00**
Other Frequencies:
SEI QC 1246AA 5·2MHz
SSB filter **£16.20** carrier crystals **£2.00** each
SEI 3·2MHz AM (5kHz) specially made for us for the FT101 **£18.00.**

Coaxial Cable

UR43 52 ohms 5·1mm dia. 4·33dB/100ft attenuation at 100MHz. **8p** yard.
UR70 72 ohms 5·8mm dia. 4·65dB/100ft attenuation at 100MHz. **10p** yard.
UR67 (RG8/U) 52 ohms 10·2mm dia. 2·2dB/100ft attenuation at 100MHz. **22p** yard.

Balanced Twin Feeder

Type 302 75ohm 2·9dB/100ft attenuation at 50MHz. **5p** yard
Type 306/B 300ohms 1·0dB/100 ft attenuation at 50MHz. **5p** yard

Rotator Cable

4 core for AR22 etc. **15p** yard
12 core for TR44 and Ham-M. **30p** yard.
This is heavy duty cable, well above minimum requirements for trouble free service.

PLEASE NOTE THAT POSTAGE IS EXTRA ON ALL CABLE.

Baluns

Either 1 : 1 or 1 : 4 in stock.
Improve your antenna system.
HZP 2H 1 : 1 for dipoles **£4.80**
HZP 1B 1 : 1 for beams or quads **£4.80**
HZP 1C 1 : 4 for folded dipoles **£4.80**
Kirk 5075B 1 : 1 for beams rated 2KW **£7.50**
Kirk 5075D LF 1 : 1 specially for 160, 80 and 40 rated 2KW **£7.50**

Antennas

Fixed Vertical
Echo 8G-40-10 trap vertical **£18.50**
Diamond KB103 80 and 40 trap vertical **£26**
Diamond KB104 20, 15 and 10m trap vertical **£17.50**
Diamond KB105 80, 40, 20, 15 and 10m trap vertical **£34.50**

Multi-Element Beams

Asahi full size 3 element 20m beam **£60**
Asahi full size 3 element 15m beam **£32**
Asahi full size 4 element 15m beam **£40**
Asahi full size 4 element 10m beam **£33**
Asahi full size 3 element 10m beam **£18**

Carriage paid on fixed antennas.

Quads

New from the States—the Polygon fibreglass quad 2 element 3 band. Write for details.

Mobile Antennas

Tavasu base loaded 160 to 10m complete set **£14** post paid.

G-Whips

Tribander (20, 15 and 10m) **£10.50**
Ranger 160m **£8.00**
Duobander (160 and 80m) **£9.00**
Multimobile 71 (20, 15 and 10m) **£12.50**
160, 80 and 40m loading coils for Tribander and Multimobile, **£4** each. Top whip section for loading coils **£1.00**.
Base section for all G-Whips **£1.45**.
Carriage. The whips are too long to go by mail, so we send them British Rail costing 50p. We can, if you wish send them Securicor for **£1.85**.

'J' Beams

2 Metre Aerials

2/4Y	4 element folded dipole yagi with 1" boom	**£2.90**
2/6Y	6 element folded dipole yagi with 1" boom	**£3.50**
2/8Y	8 element folded dipole yagi with 1" boom	**£4.20**
2/10Y	10 element "Long Yagi" with 1½" boom and 45 braces	**£9.00**
2/14Y	14 element yagi with 1¾" boom and 45 braces	**£12.00**
2/10XY	Crossed 10 element Yagi with 1½" boom	**£12.10**
2/14P	14 element "Parabeam" with 1¾" boom and 45 braces	**£14.30**
2/8	Double 4 slot-fed yagis with 1" booms	**£5.10**
2/12	Double 6 slot-fed yagis with 1" booms	**£6.75**
2/16	Double 8 slot-fed yagis with 1" booms	**£8.40**
2/HO	"Halo" mobile aerial, head only	**£1.35**
2/HM	"Halo" mobile aerial, with ⅜" mast	**£1.65**
2/XD	Crossed pair of centre fed dipoles c/w harness	**£4.60**
2/OV	Omnidirectional or Bidirectional Dipoles	**£7.15**
PM2/2	Coaxial harness to match and phase two 2m aerials	**£2.90**
PM2/4	Coaxial harness to match and phase four 2m aerials	**£6.10**
Plus 2 unit	2 metre add on 2 unit	**£0.85**
Plus 4 unit	2 metre add on 4 unit	**£1.65**

NOTE: Please state nominal impedance required 50 or 75 ohms.

Antenna Rotators

AR-22R for 2m beams or similar **£25**
TR44 for bigger arrays **£45** and the Ham-M for full size heavy beams **£70**
All items carriage paid unless stated otherwise.

Valves

6AH6 **80p**	6BZ6 **40p**	6CB6A **42p**	6U8A **80p**
6CL6 **50p**	6AN8 **74p**	6EW6 **75p**	6EH7 **45p**
6BM8 **50p**	6AW8A **£1.15**	7360 **£2.10**	12BY7A **70p**
EF183 **45p**	6GK6 **92p**	6146B **£3.00**	6JM6A **£1.25**
6JS6C **£1.75**	6KD6 **£1.75**	6JB6A **£2.00**	572B **£8.00**

CARRIAGE BY SECURICOR £1.85

Second Hand Receivers

HA 350	**£50.00**
Sommerkamp FR500	**£95.00**
Collins URR390 in Excellent Condition	**£250**
Hallicrafters SX110 crystal filter very good condition	**£40**
Trio 9R59D a popular general coverage receiver with amateur bandspread	**£35**
AR88D Good condition (Callers only)	**£45**
Hammerlund HQ170A VHF	**£75**
Hallicrafters SX111 80-10m	**£65**
Eddystone EC10 AC p.s.u.	**£45**
Trio JR500S	**£50**
Eddystone 730/1A	**£75**
Sommerkamp FR100B	**£80**

Transmitters

Codar AT5, AC and DC psu's (home brew but good) control unit	**£25**
Heathkit SB400 80-10m	**£80**
FL200B 80-10m SSB/CW rig with built in p.s.u.	**£80**
FL200B same as above immaculate	**£85**
KW Vanguard AM/CW Tx (Ringmer Agent)	**£25**
Hallicrafters HT37	**£60**
KW Viceroy III AC p.s.u.	**£55**

Transceivers

Yaesu FT-75, AC p.s.u. used very little	**£105**
National NCX5 Mk2 with AC p.s.u. Digital readout 80-10m	**£175**
KW2000B matching AC p.s.u. Excellent condition	**£160**
KW 2000A matching AC p.s.u. Excellent condition	**£150**
Swan 500 complete with 230 XC p.s.u.	**£150**
Heathkit HW 12A 80m Single Bander no p.s.u.	**£40**
Drake TR3 AC p.s.u. Remote VFO	**£165**
Heathkit HW32A, calibrator and DC p.s.u.	**£55**
TW Topmobile	**£30**

Sundries

M.L. Transistor Analyser	**£35**
Cossor Oscilloscope CDU 110 + 111 25 MHz. Dual trace plug in	**£150**
Codar PR30	**£3,50**
USM-240 10MHz scope complete all probes etc. and manual	**£37.50**

Service

You may be lucky—your rig may never go wrong. You may never ever require a hard-to-get spare in a hurry. But should anything ever at any time go wrong, you'll be glad you got your gear from us, because all you have to do is pick up the phone and tell us. We arrange collection, repair your rig and return it to you within a very short space of time—average total elapsed time less than four days (excluding weekends of course), although on many, many occasions, we have repaired the rig and returned it the same day as received, making the total elapsed time 48 hours. This service is a result of years of experience of Yaesu, years of experience in communications equipment generally, top quality test equipment and an extensive stock of spare parts. This service is, we are convinced, the best in the country and it is for OUR customers. If you bought gear elsewhere, we will do our best to fit you in but quite clearly OUR customers MUST come first.

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B * *

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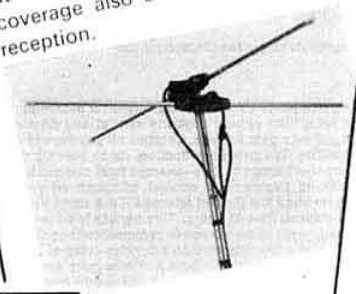
NEW CROSSED 2 Metre Dipoles Type 2/XD

A pair of centre-fed diploes stacked at 90 to give omni-directional coverage also suitable for satellite reception.



Antennas and accessories for the amateur enthusiast

NEW SQUARE HALO

A broad-band halo type antenna with no capacity loading and a correct gamma match to coaxial termination.

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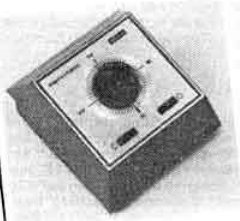

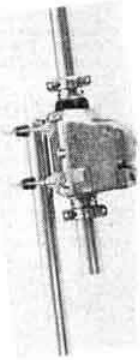

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RADIO SOCIETY OF GREAT BRITAIN

35 DOUGHTY STREET, LONDON WC1N 2AE

FOUNDED 1913 — MEMBER SOCIETY

INCORPORATED 1926 — INTERNATIONAL AMATEUR RADIO UNION

PATRON: HRH THE PRINCE PHILIP, DUKE OF EDINBURGH, KG

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Current Comment

CLUB NEWS

At its meeting on 28 November 1972, the Council accepted a recommendation of the Membership & Representation Committee that for a trial period of one year the "Club News" section would only appear in *Radio Communication* in alternate months.

This recommendation was made on the grounds of economy. Members will have noted that since early in 1972 alternate issues of *Radio Communication* have consisted of 64 pages while the intermediate issues have had 80 or more pages. The cost of posting the former is 3½p per copy (UK) while for a copy of 68 to 96 pages it is 5½p, the latter being the cost of posting the previous normal number of 72 pages per month. As a result, under the new system, while the average number of pages remained unchanged the average postal charges per month were reduced by 1p per copy per month, equal to a saving of some £2,000 per year.

In recent months, however, this system had resulted in a reduction in the number of pages available for technical articles while maintaining the number available for news and other topical items in each 64-page issue, so that the content has become unbalanced.

By omitting "Club News" from 64-page issues a better balance will be achieved, and it is hoped that with the co-operation of club secretaries any adverse effect can be eliminated. If club secretaries advise Regional Representatives of their programmes for two months instead of one, coverage can continue as in the past.

Those clubs which do not submit programmes but have had an unchanging entry will not be affected by this change, but it has also been decided that unless Regional Representatives are kept informed that these particulars are still correct they may be withdrawn until validated.

The first issue from which "Club News" will be omitted will be that of April 1973. It is emphasized that there will be a trial period of one year and during that time members who wish to comment on the new scheme are invited to write to the chairman of the M & R Committee or to the editor.

QTC AMATEUR RADIO NEWS

Reciprocal licensing

A reciprocal licensing agreement with Poland is now in force. Applications from UK licence holders for facilities in Poland should be sent to: The Director of Radiocommunications Department, Ministère des Postes et des Télécommunications, Republique Populaire de Pologne, Warsaw, Poland.

Ample time should be allowed for the processing of the application for which there is normally no charge.

Affiliated Societies

Please add the following two societies to the list given in the 1973 edition of the *RSGB Amateur Radio Call Book:*

Dunstable Downs Radio Club; hon sec, C. G. Powell, G8BPK, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury, Bucks.

Farnborough & District Radio Society (G3XCH, G8DIZ); c/o A. L. Stretton, G8BVM, 10 Sinhurst Road, Camberley, Surrey.

HF awards

In order to simplify the fulfilment of applications for hf bands awards, all claims should be sent direct to the awards manager, C. R. Emary, G5GH, and *not* to RSGB headquarters. The address of G5GH is Westbury End, Finmere, Buckingham, Bucks.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at 31 October 1972:

Class A 14,404	Class B/M 806
Class B 3,669	Television 227
Class A/M 2,832	

Oscar 6—power warning

Oscar 6 does not need more than 80 to 100W of erp in order to obtain access to the 2m to 10m translator. 25W of rf fed to a four-element Yagi aerial is sufficient. High power desensitizes the translator and discharges the batteries.

Radio Amateur Old Timers' Association

The next reunion of the Radio Amateur Old Timers' Association will be held on Friday 18 May 1973 at The Bonnington Hotel, Southampton Row, London WC1.

Membership of RAOTA is open to all persons who have held a United Kingdom transmitting licence for a period of not less than 25 years at the time of their application. Details of membership can be obtained from the Hon Secretary: Miss May Gadsden, 79 New River Crescent, London, N13 5RQ. Tel 01-882 1272.

UK FM Group (London)

The UK FM Group (London) is holding a convention on 24 February 1973 at Brooklands Technical College, Weybridge, Surrey.

The convention will be opened at 1430 by the Society's VHF Manager, Geoff Stone, G3FZL. The convention will include lectures on "Getting going on 70cm", "Getting going on 3cm" and "Using repeaters"; frequency and deviation checks, and a surplus equipment sale.

Tea will be served during the afternoon and a buffet supper will be available from 1830 onwards. The convention will be followed at 2000 by the group's first AGM.

Anyone interested is invited to attend. Tickets at 20p (convention only) and £1 (convention and buffet) are available from G8CKT QTHR. Cheques should be made payable to "UK FM Group (London)".

Talk-in will be available on 70·48MHz, 144·48MHz, 145·00MHz, 433·20MHz.

A message from Dr J. A. Saxton

RSGB President for 1973

IT is a great honour, which I much appreciate, to be President of the Society again, this time for this important Diamond Jubilee Year. The Council is encouraging celebrations of the event mainly on a regional basis to give the maximum number an opportunity to participate: it is hoped that all members will seize this opportunity to refresh their enthusiasm and strengthen their support of the Society in the pursuit of its objectives.

While we can look back to much solid achievement over the past 60 years, we now live in times when a good history alone does not provide a sufficient foundation to guarantee a satisfactory future. Thus, as cannot be emphasized too often, the climate for our use of the spectrum is certain to continue to be a difficult one, and it is frequencies above 30MHz which present the greatest problem. While it is true that we still have the confidence and support of the UK Ministry of Posts & Telecommunications, it was clear at the World Administrative Radio Conference (Space Communications) of 1971 that amateur radio is not regarded nearly so favourably in many other countries. It is therefore vital that we continue to deserve the confidence of the MPT. Amateur radio is truly a great hobby, but in this world of rapidly expanding communications and incessant pressure for frequency allocations, no matter to what extent the spectrum is extended for exploitation, we as amateurs must seek continuously to contribute significantly to the development of techniques and the study of propagation. This is the only sure way to preserve our life-blood—our frequencies.

The RSGB is very active in its participation nationally, and internationally through the IARU, in the work of the CCIR and the ITU, so adding strength to the amateur radio cause. I believe the Society can justifiably expect the wholehearted support of all its members, and it would be a great help if more members would be prepared to serve with enthusiasm on the various committees of the Society through which the technical work is organized.

Let us all, therefore, determine in this Jubilee Year to dedicate ourselves to laying the foundations for many prosperous and successful years ahead.

RSGB publications

Because of a large increase in the number of book orders received in November and December, it has not been possible to despatch orders as quickly as usual. The Society regrets any inconvenience caused by non-receipt before Christmas.

Kettering Radio Club

An attempt is being made to re-form the Kettering Radio Club and Mr D. Scotney, G4AIV, 9 Spencer Street, Rothwell, Kettering, Northants, has been issued with the call G5KN for it. He is anxious to obtain the original design of QSL card used by the club and would be grateful for a card for copying and return.

Component supplies

Mr W. S. Poel, G8CYK, "Little Croft", Mill Hill, Brentwood, Essex, and Mr P. L. A. Burton, G3ZPB, 20 Thornton Crescent, Old Coulsdon, Surrey, CR3 1LH, advise us that they are able to supply certain Toko ICs and filters, Plessey ICs and other items.

Can you help?

Mr R. J. Selby, 20 Cromwell Road, Worcester Park, Surrey, KT4 7JP, would like information on, or the loan of a circuit of, the AM Osc/Unit Type No 76 (VHF) tropical ref No 10V/150, especially the type of valves used, one of which is the VR66 main oscillator. Expenses reimbursed.

Pavel Branis, OK1JAX, Postovni ul 427, Krupka, Czechoslovakia, wishes to contact someone with whom he can exchange amateur radio magazines to assist with his hobby and his learning of English.

Mrs Maria De Forest showing her husband's first audion and first triode valves to Bill Welsh, W6DDB, of the LERC Amateur Radio Club (W6LS)

The G3TDZ portable 2m transmitter/ receiver, Mk 4

by J. R. HEY, Tech(CEI), MSERT, G3TDZ*

THE circuit of this practical, lightweight, 2m portable is simple and uncluttered in its design, yet capable of excellent results. A tunable i.f. based on the well-known TAD100 ic described by G8ENN [1] is preceded by a fairly conventional converter or front end, leaving only a handful of other components to complete its circuit.

No common circuitry is involved between transmitter and receiver so that constructors may, if they wish, build only one half without fear of spoiling either. The transmitter has only four transistors and produces 1·5W from a 72MHz crystal.

History

The author's idea of portable equipment is something which can be operated while being carried by one person. The first serious attempt along these lines was a self-contained unit with a single conversion receiver [2]. This worked very well but the urge to go double conversion and at the same time try ICs prompted the design of the Mk 2. This used a TAD110 as tunable i.f. with a Mullard LP1175 ceramic filter at 470kHz shaping the second i.f.; the whole transceiver being packed into a box 6in by 4in by 1¾in.

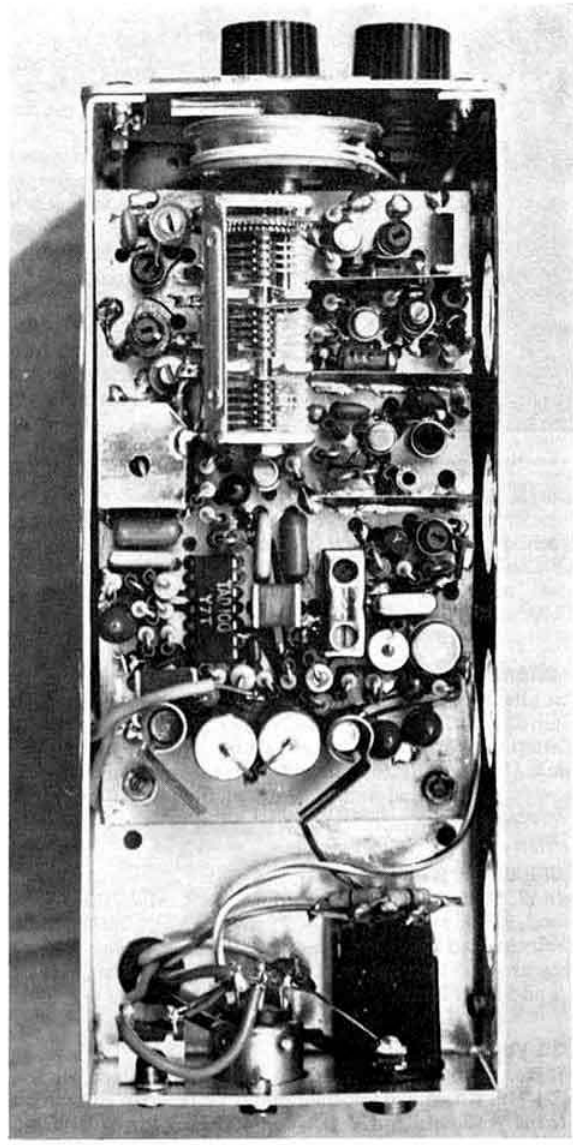
The front end had a fet cascode rf stage with a bipolar mixer—this choice was for no technical reason other than the fact that these items were readily to hand. Performance was good despite the poverty in the design; the only real drawback was the separate battery pack and badly located control knobs detracting from its ultimate portability.

Portable operation on 2m having proved to be a workable proposition and an enjoyable branch of amateur radio, a Mk 3 was then planned which was more robust, with internal rechargeable batteries.

Instead of retaining the well-tried circuit, however, a new ic was used as tunable i.f. with a stage of gain at first i.f. Results were disappointing, with current too high for sustained portable operation. A poor signal-to-noise ratio and cross-modulation due to the second mixer being easily overloaded clearly indicated that a rebuild was the only recourse.

Being off the air while equipment is undergoing a rebuild is annoying—something had to be done very quickly, so the more familiar TAD100 was resorted to and a new receiver design tackled. It took just two days from sketches on graph paper to the first QSO.

In retrospect, the one good feature of the Mk 3 was its fm detector which used a TBA120A ic, resolving distant fm stations excellently. See [3] for circuit.



Receiver layout

* 8 Armley Grange Crescent, Leeds LS12 3QL.

The equipment described below is the Mk 4 unit, on which, at the time of writing, 250 stations have been worked, the greatest dx being almost 200 miles. On "receive", current consumption is 30mA with almost 0·5A on "transmit".

The receiver

The receiver's theoretical circuit is shown in Fig 1. Diodes D2 and D3 conduct only when receiver ht is applied, coupling the aerial to L1. On transmit, forward bias is removed and the diodes, then being back-to-back, block transmitter energy from reaching the receiver rf stage. A protected dual-gate mosfet forms the rf stage; provision is made on the pc board for components to forward bias Gate 1 but these were omitted in the working model as gain seemed adequate without.

A junction fet is employed as mixer with oscillator injection to its source from a centre tap on the doubler coil. Injection is derived from a 63MHz overtone oscillator TR3, its output frequency doubled by TR4. A divider network, R10 and R11, provides about 0·5V out of the 0·6V necessary to turn TR4 on, making life easier for the oscillator, that is, producing a healthier output.

L5 and L6 are critically coupled, forming the tunable i.f. of 18-20MHz, ganged to the vfo, TR5 and TR6, which works on the high side. The reason for the choice in i.f. is that this is the lowest frequency at which direct harmonics of the oscillator are spaced wider than 2MHz; the seventh and eighth harmonics come outside the 2m band, eliminating the necessity for elaborate screening.

This dictates the crystal frequency:

$$\frac{144\text{MHz}}{7} = 20{\cdot}571\text{MHz}$$

$$20{\cdot}571\text{-}455\text{kHz} = 20{\cdot}116\text{MHz}$$

$$144\text{MHz-}17{\cdot}795\text{MHz} = 126{\cdot}205\text{MHz},$$

$$\frac{126{\cdot}205}{2} = 63{\cdot}102\text{MHz}$$

$$\frac{146\text{MHz}}{8} = 18{\cdot}250\text{MHz}$$

$$18{\cdot}250\text{-}455\text{kHz} = 17{\cdot}795\text{MHz}$$

$$146\text{MHz-}20{\cdot}116\text{MHz} = 125{\cdot}884\text{MHz}$$

$$\frac{125{\cdot}884}{2} = 62{\cdot}942\text{MHz}$$

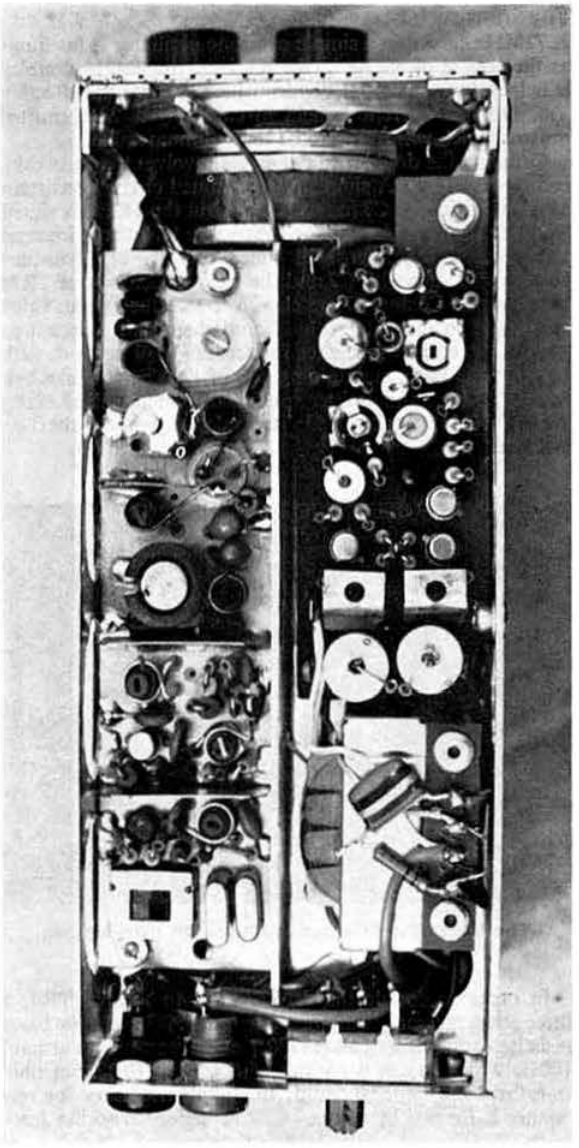
Crystal frequency limits to avoid "birdies" in the band are thus 62·942MHz and 63·102MHz; a 63·000MHz would be fine.

A three-gang tuning capacitor of 17 + 17 + 20pF is the main receiver tuning. A simple Clapp vfo with an emitter follower, TR6, is remarkably stable without any special techniques being involved; C28, C29 and C30, the critical capacitors, were all readily available ceramics.

A five-turn link coil, L7, wound over L6, couples the signal to the ic. Within the TAD100 is mixer (oscillator not used), IFS, detector, agc, and audio up to driver level; only two af output transistors being necessary.

To shape the i.f. response, a single ceramic filter by Toko, type CFT455C, is employed. This filter is electrically similar to the well-known Mullard LP1175 only much smaller.

Biasing diode D1 is soldered under the pc board to simplify its design; the diode could be almost any germanium



Transmitter layout

pnp transistor, base and collector strapped to form the cathode, its emitter forming the anode.

The ic requires about 6V which is obtained from the simple stabilizer TR9 with zener Z1 as reference. The capacitance of C26 is magnified by the gain of TR9, C27 is included to overcome noise which sometimes occurs in such circuits.

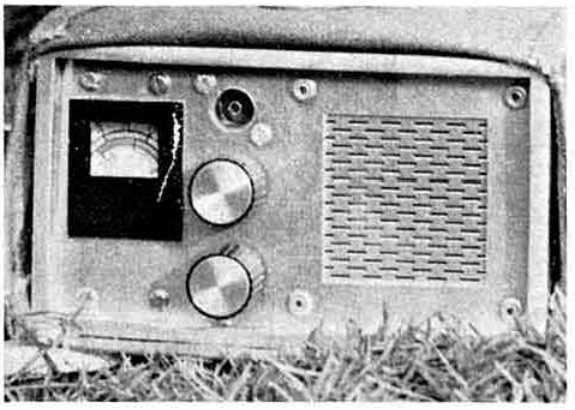
A phone jack was included for quiet listening. In the working model a stereo jack was in fact fitted so that the more comfortable phones could be worn, R34 being duplicated, one in each channel. This type of jack has a lever contact which disconnects the speaker when the phones are inserted.

Should a phone jack not be desired, some economy is possible; R25, R34 and C24 may be omitted, the loudspeaker replacing R25, and C25 replacing C24.

The transmitter

A 72MHz crystal in a simple overtone oscillator is favoured as the source of rf. As in the receiver, the 2N918 doubler is helped by a potential divider which reduces the effective V_{be}. Doubler current is held in check by a 22Ω emitter resistor which was found to be the optimum value.

Coupling the doubler to the driver involves two networks connected as one. A simple parallel-tuned circuit consisting of L2 with C6 and C7 in series picks out the 145MHz signal from the doubler. As overlay transistors have large internal capacitances, these must be tuned out at vhf. Two-turn coil L3 resonates with C7 and the base capacitance of TR3; the values of C6 and C7 are chosen so that their series value is suitable to resonate with L2 and their ratio selected to present the correct reactance for forming a pi network with L3 and TR3 base, maintaining a Q of 12. The rf choke between TR3 base and emitter consists of three turns of 28swg on an FX1115 ferrite bead; its leads must be as short as possible.



The transmitter/receiver in its canvas carrying bag

In order to couple the driver, TR3, to the pa, TR4, a three-stage network is lumped together. TR3 collector has a resistive component of about 180Ω and a reactance of around 100Ω, which means a pi-tank with a Q of 10-12 can only transform the impedance up; the 7·8pF necessary for resonance is formed by C9 and C10 in series. Working back from TR4 base with its low resistance and almost equal reactance, a pi network of similar Q calls for another two-turn coil resonated by 22pF. The value of C10 thus established means C9 should be 12pF to satisfy the first requirement. It has been shown then that both pi networks have transformed their loads up, but the inequality of these while maintaining an appropriate Q demands a capacitive divider.

A similar situation arises when coupling the pa to the aerial load, only this time a resistive termination of 75Ω is assumed. A pi-L network first transforms the low collector resistance of TR4 up to a higher figure where the capacitance required for resonance of the first section and that for the second section are added to form 7·8pF, CT1, and then down to 75Ω; the Q of the two sections being 10 and 15 respectively. The loading capacitor CT2 is set to 28·5pF.

There are effectively six tuned circuits at signal frequency in order to utilize manageable component values, but these have the advantage of not allowing rubbish to pass into the aerial.

Diode D1, in series with both the rf and dc paths from TR4, conducts rf into the aerial when dc is flowing. On "receive", where no dc flows through D1, its high resistance separates the pa tuned circuits from the receiver rf input.

Driver and pa emitter leads should be no longer than 2mm and RFC4 kept short as previously mentioned.

Most transmitter designs display a profusion of trimmer capacitors in such positions as C6, C7, C9 and C10, but in this design, for reasons of economy in cost and space, fixed capacitors of standard values fill these positions and the inductors are varied in value by means of slugs. Only L6 and L7 have no slugs as even the best vhf ferrites occasion a slight loss, especially in power circuits. Two trimmers only are therefore employed in this design: CT1, the pa tuning responds fairly sharply, clearly indicating resonance, while the loading trimmer CT2 is more broad in its adjustment.

From C12 termination point and earth on the pc board a short length of coaxial cable or screened wire connects directly to the aerial socket on the front panel.

Because of feedthrough power in transistor transmitters, it is necessary to modulate the driver also. Audio is tapped off to feed the driver and the two diodes D2 and D3 endeavour to lift the drive level on positive modulation excursions in order to overcome the tendency for gain to decrease at current peaks. It is possible to omit these without any noticeable deficiency at the receiving end.

Double sided pc board is again favoured for the transmitter; the printed wiring layout being shown in Fig 5 with component locations indicated in Fig 6. No actual wiring takes place on top of the board as this is used only for earths. Clearances are made where wires pass through holes, and as these are obvious no layout or drawing is necessary.

Modulation

Those who read [4] will recall the circuits suggested for a modulator of a small transmitter. This unit is just such an application where an ic would be well suited.

In the Mk 4 prototype, however, a modulator using discrete devices was built, due to a delay in delivery of the necessary ICs. The actual modulator circuit is shown in Fig 13 for those readers who prefer not to risk their money on ICs. A straight-forward Class B complementary configuration pinched from the hi-fi world needs no special consideration. Its very low quiescent current is an advantageous feature in portable equipment where every milliamp counts. A pre-set to adjust quiescent current (and hence crossover) is not included as modulator service signifies large signal excursions where minor crossover distortion is inaudible.

A pre-set is fitted to adjust the mid-point or centre-line voltage as equal clipping, that is balanced half cycles, ensures realization of maximum power. Series negative feedback from output to TR6 emitter helps in linearizing the main amplifier section, producing a very good waveform.

The single stage microphone pre-amplifier produces sufficient gain for the magnetic microphone used and would have good reserve if a crystal type was desired. An rf choke

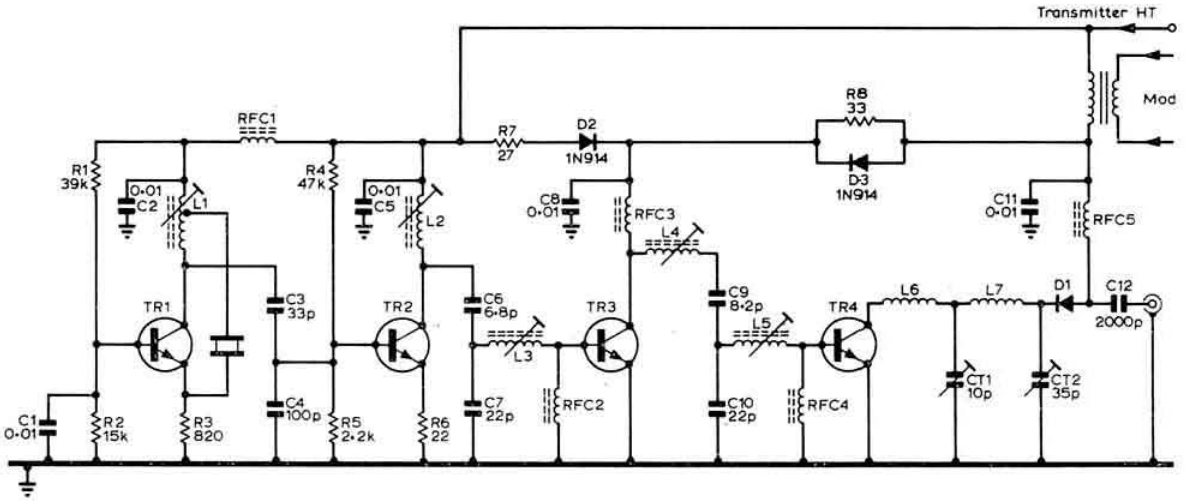
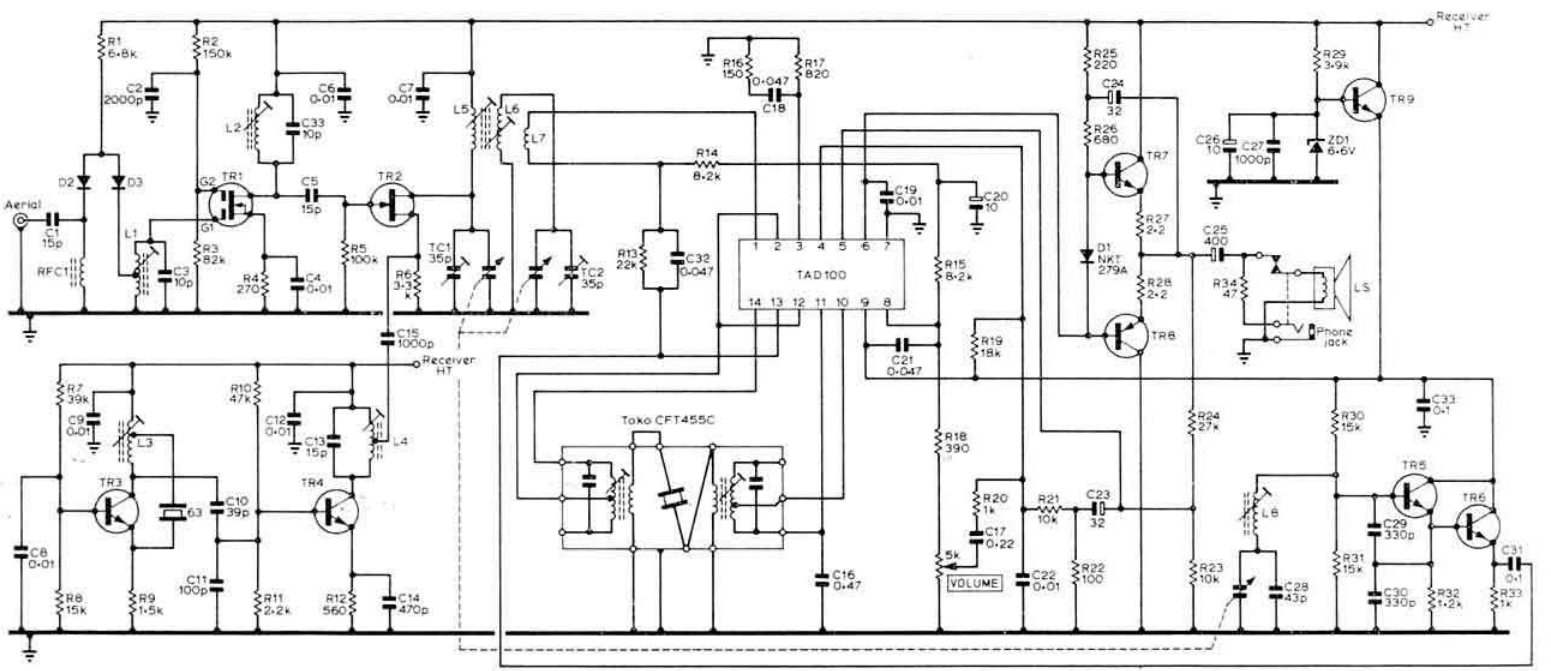


Fig 2. Transmitter theoretical circuit

Fig 1. Receiver theoretical circuit



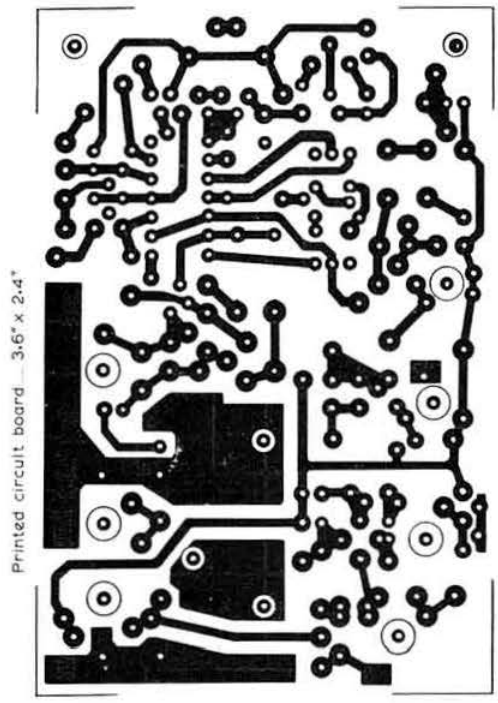


Fig 3. Receiver printed board underside

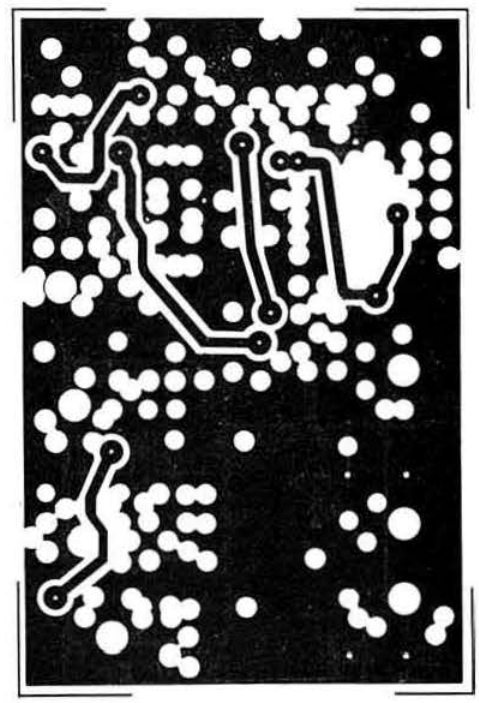


Fig 4. Receiver printed board top side

in the emitter with a small capacitor between collector and base prevents rf from causing mischief in the speech quality.

A modulation-depth control in the form of a pre-set on the pc board is placed between TR5 and TR6. It is suggested that a better idea would be to replace TR5 by a fet, then by rectifying part of the output waveform and applying a negative voltage as avc to its gate, the modulation-depth control could be dispensed with (some compression could be an advantage in a low-power rig). This has not yet been tried by the author; the circuit shown is as wired in the Mk4 unit.

Perhaps the only part of the whole circuit so far to create dismay could be the modulation transformer. Many amateurs are deterred by the idea of winding their own transformers, so the following may be of some help. A core whose centre limb has a cross-sectional area of 0·25in² or over is required. Such cores are to be found in old tv line or frame blocking transformers or microphone transformers etc.

Strip off the old windings, carefully preserving both bobbin and laminations. Take a spool of 28 or 30swg enamelled wire, and measure out about 20yd. Continue unwinding back along the length of wire, to produce two lengths of wire, side by side, and repeat the operation to finish with four lengths of wire, each 20yd long. Push one end of the wires, dealing with the four strands as one, through the inside hole of the bobbin, leaving sufficient working length, and wind all the wire on to the bobbin.

All four wires are wound on together to form a tetrafilar winding. The length of wire described should provide about 120 turns. If the spool is already full up, cut off surplus, if not, keep winding until either the end is reached or the bobbin is full. Cover completed winding with brown paper tape and restack the core.

Three of the four windings should now be connected in series making sure phase relationship is continued; the end of winding 1 connected to the start of winding 2, and the end of winding 2 connected to the start of winding 3. This triple winding forms the secondary with the single winding the primary.

In point of fact a 3: 1 winding ratio is not strictly necessary. Theoretically a 2: 1 plus a little extra to compensate for the voltage dropped across the transistors, say 2·4: 1, is sufficient, but one would need to know the spool's winding capacity beforehand in order to calculate the number of primary and secondary turns. It is considered that the benefit of close coupling with low leakage inductance plus ease of construction completely outweighs the effect, if any, of a slight mismatch. In practice the transmitter will be fully modulated before the amplifier flat-tops, the only expense being a rise of 20 per cent in modulator power demand which is well within circuit capability anyway.

Plastic power transistors are the modern answer, although a pair of germanium transistors would make an economical and simple modulator. Compression, series modulation and speech clipping are all ideas worthy of consideration but, like the new receiver ics now being introduced, must wait for the Mk 5!

Construction

The receiver pc board layout is shown in Figs 3 and 4; these may be used directly for photographic purposes. If hand-drawn printed wiring is undertaken, the underside plan,

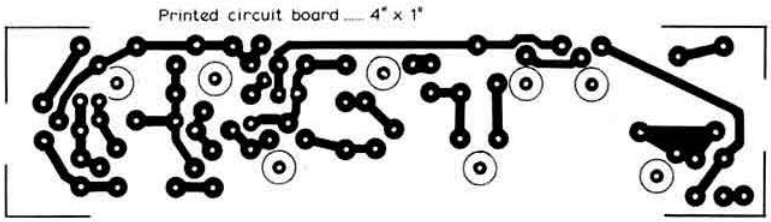


Fig 5. Transmitter printed board layout

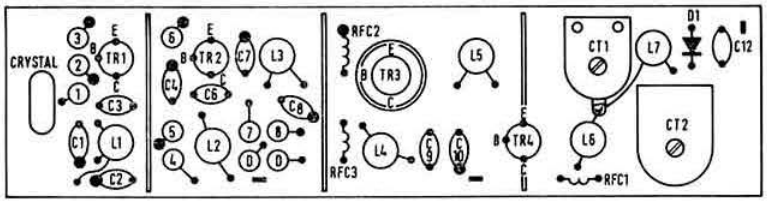


Fig 6. Transmitter component location diagram

Fig 3, should be cut out and stuck to a blank piece of double-sided board with Sellotape. All component-wire holes are drilled with a No 60 drill; those holes marked with a double ring indicate that a larger drill should be used. The three holes used for mounting the three-gang are $\frac{1}{8}$in as are the two mounting holes at the rear edge. All coil-mounting holes are drilled $\frac{3}{16}$in.

Using the holes as guides, fill in the printed wiring track with a solution of shellac and preferably with a draughtsman's pen. When dry, examine the reverse side and study Fig 4. Taking care to leave sufficient clearance, in other words missing the holes, draw in the few conductor tracks. Fill the remainder of the top side with acid resist shellac leaving a small space alongside the conductors previously drawn and allow to dry.

One word of warning: if the shellac is too thin and applied too liberally, it will trickle through the holes on to the other side and could spread, spoiling that side.

After etching in a solution of ferric chloride, cut a clear circle about every hole through which component wires pass, using a $\frac{1}{8}$in drill (see Fig 4). It would be wiser, if in doubt, to clear each hole as reached during wiring.

Component positions are shown in Fig 7. Earthy ends of resistors and capacitors are bent over and soldered to convenient spaces on the upper copper surface. Some wires are soldered to both top and bottom conductors, TR7 collector is one example, while some ends are soldered only to top conductors, for example R14 and R19 (although holes are provided for guidance). Only one component is fitted to the underside: D1 between bases of TR7 and TR8. A short length of screened wire used to couple the doubler output to the mixer's source is soldered under the board for convenience.

Pieces of tin plate $\frac{1}{2}$in tall are soldered to the upper copper surface to form screens and are shown as three double lines in Fig 7.

A $1\frac{1}{4}$in drive drum is fitted to the three-gang and a paper disc glued to its end to form the dial scale which shows through a hole in the front plate. After calibration, described later, a thin celluloid or Perspex window is glued across the hole. On the rear of this a line has been scored with some sharply-pointed instrument and a red felt-tip pen applied. Ink from the pen is absorbed by the scored line leaving the remainder clear. From the front only a thin

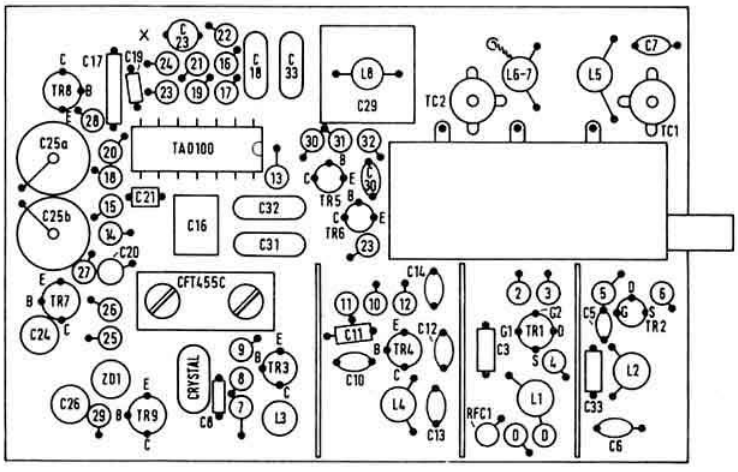


Fig 7. Receiver component location diagram

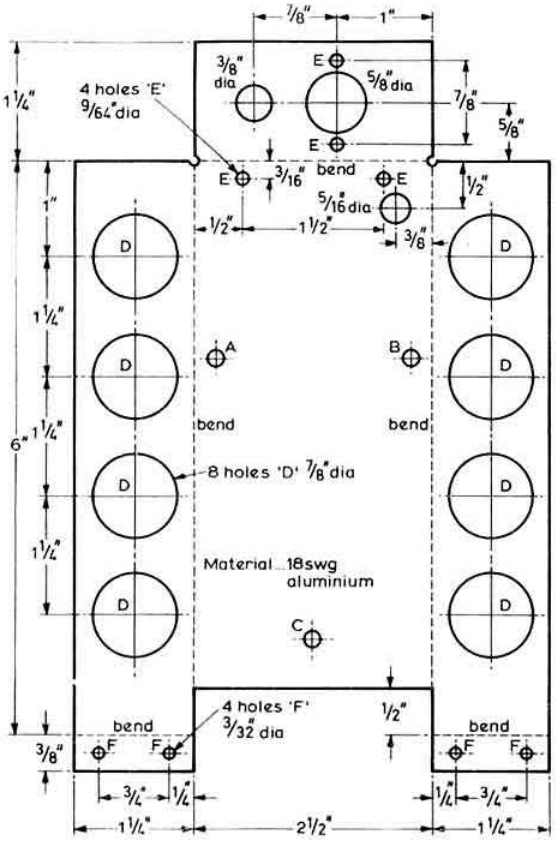


Fig 8. Receiver sub chassis

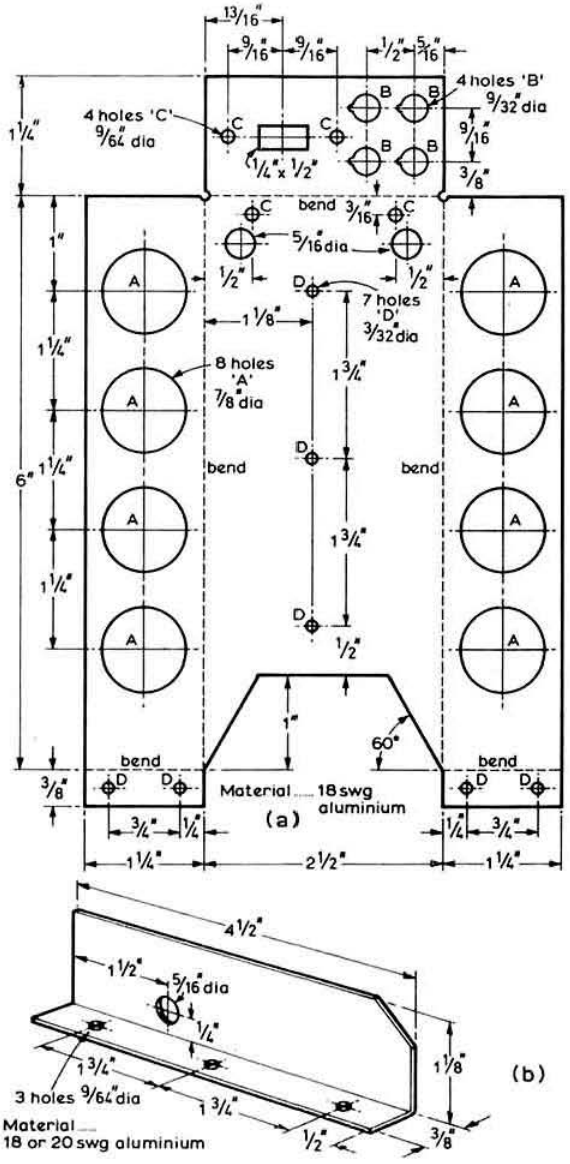


Fig 9. Transmitter sub chassis; (b) screening plate

red line is seen indicating scale position. On top of the window, the escutcheon, previously painted black, is finally fixed to present a professional appearance.

It will be seen from Figs 8 and 9 that receiver and transmitter chassis sections are much the same; the method of assembly is shown in Fig 12. The completed receiver board is fitted to its chassis by 6BA screws and nuts on $\frac{3}{8}$in spacers with one front-mounting screw common to the three-gang fixing.

Holes for mounting the loudspeaker are not indicated as these will depend upon the particular one chosen. In the actual working model a $2\frac{1}{2}$in, 8Ω Philips speaker is fitted and performs excellently.

One end of C1 is soldered to the aerial socket centre pin, while a short piece of plain pvc wire is joined from its other connection and taken to the receiver pc board at the aerial switch: diode D2.

The coil formers make a tight fit into the $\frac{3}{16}$in holes but a spot of cellulose dope may be added for safety. Coils L5, L6/7 and L8 should be wound before fixing into place, but it has been found easier to fit L1, L2, L3 and L4 formers first, then drop the previously-formed coils on to the formers, guiding their ends into the holes, and finally solder.

When fitting the filter, to avoid difficulty in earthing its can, pass a piece of clean wire through the holes along with the can's earth legs and solder to both top and bottom of the board.

Down the centre of the transmitter chassis a screening plate is fitted to keep rf out of the modulator. Little other detail is given as constructors may choose their own form of modulator in preference to the one outlined earlier. It should be pointed out that the transmitter rf strip must be mounted with its crystal oscillator towards the rear and pa to the front.

When etching the underside of the transmitter board, its top side should be completely protected with acid resist. After etching, the component wire holes are cleared as described in the receiver section. Screening plates are

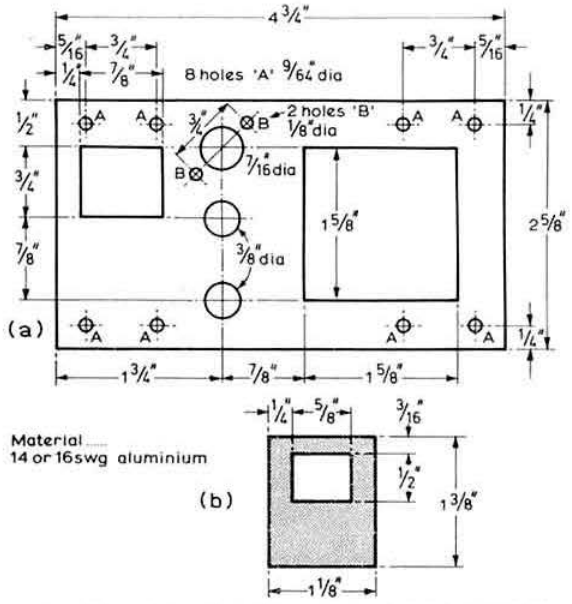


Fig 10. Chassis front plate; (b) receiver dial escutcheon

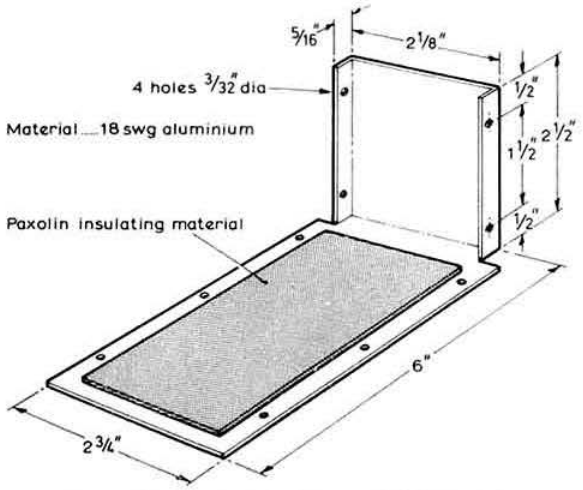


Fig 11. Rear bracket and bottom plate assembly

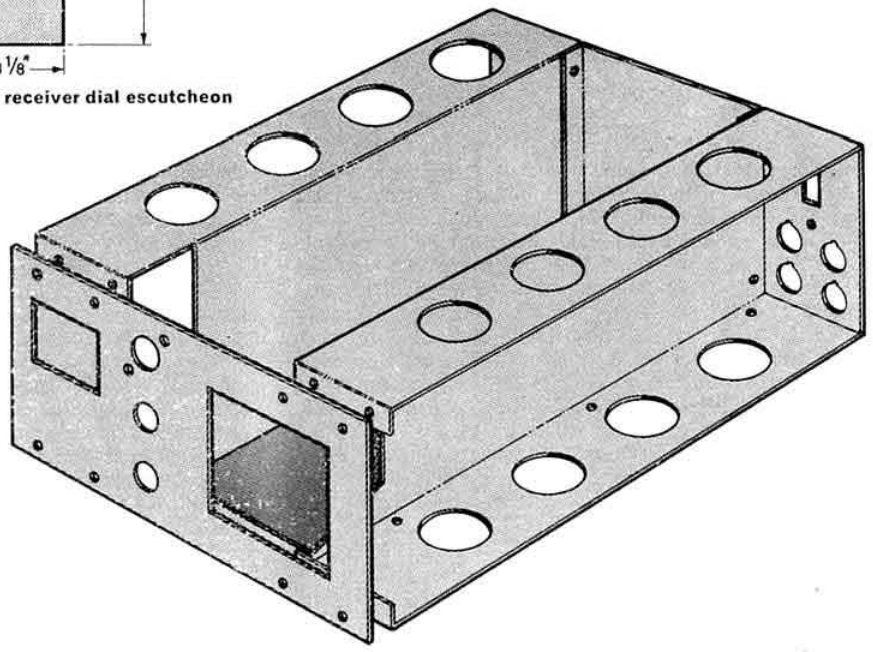


Fig 12. Method of assembly

soldered across the top side of the board where indicated on the component layout (Fig 6).

The pc layout allows either a TO5 pa transistor such as BLY33 or a nut and stud fixing type like the 2N3375 to be fitted. With this latter, a screen can be arranged to cross the transistor, connecting with its emitter pin, as can be seen in the photograph.

In assembling the chassis sub-sections, some choice is offered in the method adopted for mounting the rear plate and battery compartment bottom. This lower plate may be separate from the rear plate, bent as in Fig 12 or flat as in Fig 11; one method looks neater while the other is easy to fit.

A piece of insulating material such as Paxolin or blank pc board should be fixed to the bottom plate of the battery compartment to prevent the battery cans from shorting via the metal.

It is suggested that the front plate, Fig 10, be made of heavier gauge aluminium such as 14 or 16swg to give an appearance of solidity. Expanded or punched aluminium grille behind the square speaker cut-out is not only pleasing aesthetically but affords worthwhile protection to the speaker cone.

Weight-reduction holes along the sides of both receiver and transmitter chassis pans allow easy access for servicing and soldering. In the rear wall of the receiver chassis two

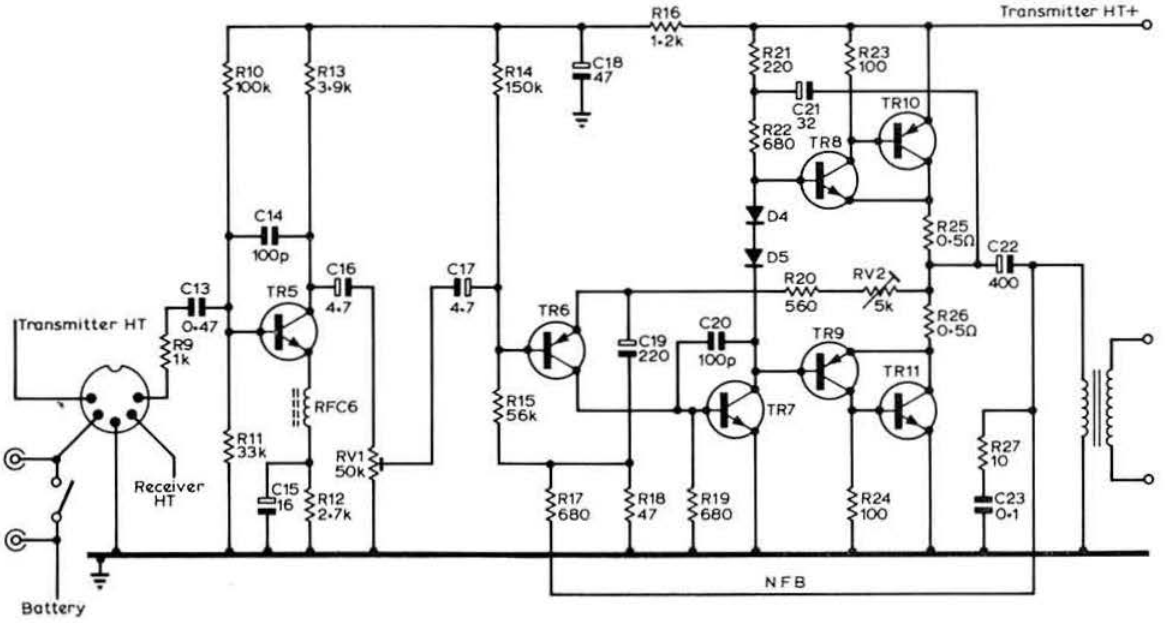


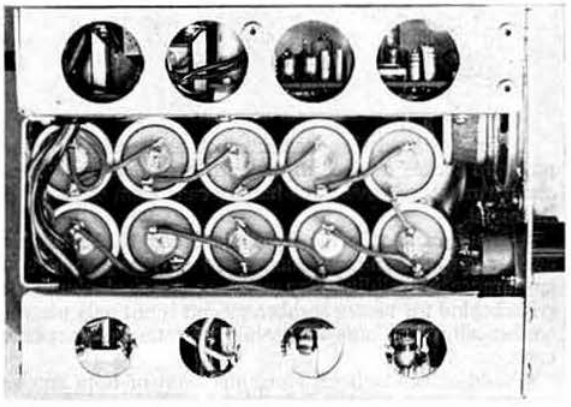
Fig 13. Modulator theoretical circuit

holes are shown: the ⅜in hole for mounting the jack may have to be made ½in for some makes of jack. A five-pin DIN socket fits into the ⅝in hole for the microphone.

A ready-made multicore cable was not easily obtainable at a sensible price so a home-made one was devised. The inner core and insulation were extracted from 1yd of low-loss coaxial cable leaving the outer braid and insulation. Through this a thin single screened wire and three stranded pvc wires were carefully threaded. The screened wire braid connects to the DIN plug's centre pin and its inner to one of the outer pins; this leaves three spare pins. As it matters little which is used for which, one is made ht positive connecting to the on/off slide switch mounted to the transmitter chassis' rear wall. A push-button micro-switch is fitted into the microphone case, and the ht wire connects to the switch's common terminal; the remaining two wires feed either receiver or transmitter. The outer braid of the original coaxial cable connects to the metal shell of both DIN plug and microphone.

The upper of the two ⅜in holes in the front plate houses the volume control with the tuning-drive spindle fitted into the lower hole.

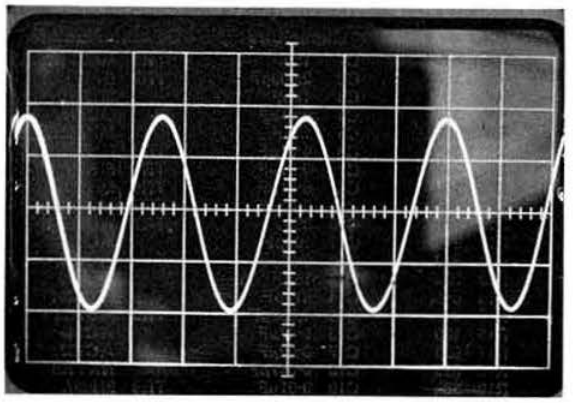
Provision is made next to the slide switch for four wander-plug sockets but these may be replaced by a single multi-plug or DIN socket. One pair connects directly to the batteries so that charging can take place with the set on or off; the other pair connects into the set to allow an external power supply to be used when at the home QTH. The slide switch bridges the two sets of sockets, acting as an on/off switch and allowing both charging and operating to take place together.



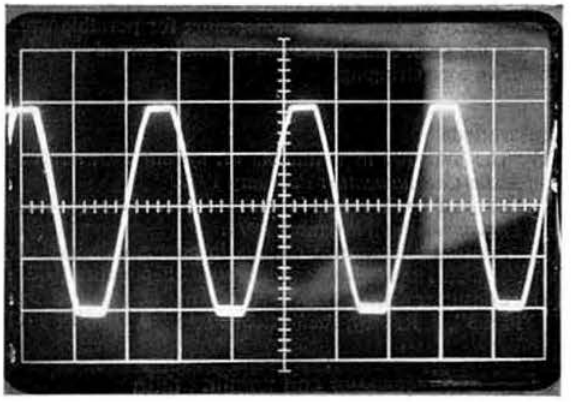
Battery pack layout

Receiver alignment

Receiver i.f.: set generator to 455kHz and attenuator to −40dB. To its output lead, attach a coupling coil made with, say, five turns of pvc wire and place over L6/7. (It is presumed that the circuit has been checked out electrically beforehand and is displaying normal voltage readings.) The generator's modulated tone will be clearly heard in the speaker as only a touch is required on the filter slugs to peak to maximum. **Tunable i.f.:** set generator to 18MHz and back off a further 10-20dB. Connect output to TR2 gate. Adjust L8 slug until signal is heard. Before tuning up L5 and L6, swing the generator gently either side to establish which side the oscillator is running. If on the high side, as it should be, a response will be heard just below 19MHz. If, with three-gang closed, the response occurs at just above 17MHz, withdraw L8 core until this moves up to 18MHz. Now adjust L5 and L6 for maximum signal, then fully open the capacitor. Setting the generator to 20MHz, the upper point will be heard and



Waveform at modulation transformer secondary, f = 1,000Hz



Waveform showing equal clipping, modulator adjusted correctly, f = 1,000Hz

CT1 with CT2 may be adjusted. No oscillator tracking is necessary as the values have been calculated to produce almost exact coverage.

At this stage it is not necessary to repeat this alignment as exact frequencies depend upon the crystal and will require correction later.

Crystal chain: an rf probe, fitted with a two-turn pickup coil, and fed into a meter or vvm, is required. Set to low range (1·5V) and place coil over L3. Slowly adjust the slug, watching the meter; commencement of oscillation will be clearly indicated by an almost full-scale reading on the vvm. Transfer the pickup coil to L4 and tune the core for maximum reading. Retune L3 then L4 again for maximum; the next highest meter range may have to be employed.

RF and mixer: set the generator to 145MHz, the three-gang to half mesh, the attenuator to −80dB and attach the lead to the aerial socket or by a two-turn link to L1. Swing the generator until a signal is heard; a little higher output may be needed at first. Tune L2, then L1, then repeat, backing off generator as required.

Final alignment: set the generator to 144MHz, fully close the three-gang and tune L8 until signal is heard; peak L5 and L6 for maximum output. Open the three-gang and adjust generator to 146MHz, listening for signal. When tuned in, peak CT1 and CT2 for maximum; then backing off generator to produce weakest possible signal, peak L3 and L4. Receiver alignment is now complete; coils L1 to L4 may be hotted up on a received station about mid-band (145MHz).

Transmitter alignment

Connect a 75Ω resistor across the aerial socket and equip an rf probe with a two-turn pickup coil. Set the meter to low range (1·5V), place the pickup coil over L1 and switch to transmit. Slowly adjust L1 slug until oscillation starts, indicated by an almost full-scale deflection, and set to maximum reading. Now transfer the coil to L2 and adjust for maximum reading then re-adjust L1. It may be necessary to switch to next highest meter range (5V).

Remove the pickup coil and fit the point back into the probe and connect to the aerial. A slight reading should be observed although it may be necessary at this stage to switch back to a lower meter range. Adjust L4 for maximum, then L3 likewise. Slowly rotate CT1, where a sharp rise in reading will indicate resonance. Switch up the meter ranges as required. Adjust L5 for maximum, then rotate CT2 which will tune smoothly. Return to beginning and re-peak all circuits in order: L2, L1, L3, L2, L4, L3, L5, CT1 and CT2, when a reading of some 14V should be noted. An 8·5V, 0·15A bulb will glow brightly if connected in place of the resistor load.

If, when switching off and on, the crystal oscillator seems reluctant to start every time, readjust L1 slightly.

Modulator adjustment

Connect an oscilloscope across either modulator transformer primary or secondary and apply an audio generator set to 400Hz or 1,000Hz to the microphone input.

Before advancing RV1, measure the voltage at the centre-point of the power amplifier stage and check that RV2 can vary this, setting the reading to half supply voltage — about 6V. Set the generator to approximately 15mV and advance RV1 until clipping begins. Clipping should be equal top and bottom as shown in the oscillogram, but if not, re-adjust RV2 to a setting where this occurs.

Replace the generator by a microphone and speak at a normal level and distance observing the waveform on the oscilloscope. Adjust RV1 so that slight clipping only occurs on speech peaks. It may be found easier to set up the audio section with the rf not operating, most easily achieved by misaligning L1 temporarily.

Batteries

The battery compartment is sufficient to house 10 U11-sized ni-cad cells. These would be 1·25V at 1·6Ah and will together reach 13·8V maximum when fully charged. It is normal to charge at one tenth of the amp/hour rate, a simple constant-current charger employing one transistor being all that is necessary.

Conclusions

For the author the most difficult part of a project such as this is the chassis construction. Bending was done using blocks of wood in the bench vice, including the wrap-round

case. Tools extended to a needle and thread to tailor the canvas carrying bag and shoulder sling for portable work. In fact the most difficult part of assembly turned out to be the drive cord stringing.

References

[1] "The TAD100 as a tunable i.f. system", D. A. Tong, *Radio Communication* February 1972.

[2] "So you can't afford a receiver", J. R. Hey, *Radio Communication* November 1971.

[3] "Consumer integrated circuits in amateur design, Part 2", J. R. Hey, *Radio Communication* September 1972.

[4] "Consumer integrated circuits in amateur design, Part 3", J. R. Hey, *Radio Communication* October 1971.

Receiver coil winding data

L1 4t, 22swg tinned copper, tap 1t up
L2 4t, 22swg tinned copper
L3 5t, 22swg tinned copper, tap 1t from cold end
L4 4t, 22swg tinned copper, centre tap
L5 20t, 32swg enamel, close wound
L6 20t, 32swg enamel, close wound
L7 5t, 26swg enamel, close wound over L6
L8 19t, 30swg enamel close wound
All coils are wound on $\frac{1}{4}$in formers (known as 4mm); vhf slugs. Slight variation in gauge of wire is permissible, without noticeable effects: eg L1-4, 20-24swg; L5-6, 30-36swg

Transmitter coil winding data

L1 5t, 22swg tinned copper, tap 1t from cold end
L2 4t, 22swg tinned copper
L3 2t, 20swg tinned copper
L4 11t, 26swg enamel, close wound
L5 2t, 22swg tinned copper
L6 10t, 26swg enamel, close wound, no slug
L7 12t, 26swg enamel, close wound, no slug
RFCs1-5 2-3t, 30swg enamel on FX1115 ferrite beads.
Modulation transformer, 120 × 4, see text. Core minimum area 0·25in²

Transmitter parts list, including modulator

Resistors (Ω)		Capacitors		Semiconductors	
R1	39k	C1	0·01μF	TR1	BF220
R2	15k	C2	0·01μF	TR2	2N918
R3	820	C3	33pF	TR3	2N3553
R4	47k	C4	100pF	TR4	BLY33, 40290
R5	2·2k	C5	0·01μF		
R6	22	C6	6·8pF	TR5	BC109
R7	27	C7	22pF	TR6	BC178
R8	33	C8	0·01μF	TR7	BC108
R9	1,000	C9	8·2pF	TR8	BC108
R10	100k	C10	22pF	TR9	BC178
R11	33k	C11	0·01μF	TR10/TR11 pairs:	
R12	2·7k	C12	2,000pF	BD131/132,	
R13	3·9k	C13	0·47μF	D42C2/C43C2	
R14	150k	C14	100pF	BC441/461,	
R15	56k	C15	16μF 10V	2SA473/2SC1173	
R16	1·2k	C16	4·7μF 25V		
R17	680	C17	4·7μF 25V	D1	1N4003, 10D2
R18	47	C18	47μF 16V	D2	1N914, 1N4148
R19	680	C19	220μF 10V	D3	1N914, 1N4148
R20	560	C20	100pF	D4	1N914, 1N4148
R21	220	C21	32μF 10V	D5	1N914, 1N4148
R22	680	C22	400μF 10V		
R23	100	C23	0·1μF		
R24	100				
R25	0·5				
R26	0·5				
R27	10				
RV1	50k				
RV2	5k				

Receiver parts list

Resistors (Ω)		Capacitors		Semiconductors	
R1	6·8k	C1	15pF	TR1	40673 (RCA)
R2	150k	C2	2,000pF	TR2	BFW10, 2N3819, UC734, MPF102 etc
R3	82k	C3	10pF		
R4	270	C4	0·01μF		
R5	100k	C5	15pF		
R6	3·3k	C6	0·01μF	TR3	BF220
R7	39k	C7	0·01μF	TR4	2N918
R8	15k	C8	0·01μF	TR5	BF220
R9	1·5k	C9	0·01μF	TR6	BC109
R10	47k	C10	39pF	TR7	AC128, AC142
R11	2·2k	C11	100pF		
R12	560	C12	0·01μF		AC153,
R13	22k	C13	15pF		AC188
R14	8·2k	C14	470pF		NKT281
R15	8·2k	C15	1,000pF	TR8	AC176, AC141
R16	150	C16	0·47μF		AC187, NKT781
R17	820	C17	0·22μF		
R18	390	C18	0·047μF		
R19	18k	C19	0·01μF	TR9	2N697, BC301
R20	1,000	C20	10μF 16V		BC441, 2N3053 etc
R21	10k	C21	0·047μF		
R22	100	C22	0·01μF		
R23	10k	C23	32μF 10V		
R24	27k	C24	32μF 10V	IC	TAD100, TAD110
R25	220	C25	400μF 10V		
R26	680	C26	10μF 16V		
R27	2·2	C27	1,000pF	D1	NKT279A see text
R28	2·2	C28	43pF		
R29	3·9k	C29	330pF	D2	BA141, BA102
R30	15k	C30	330pF		
R31	15k	C31	0·1μF	D3	BA141, BA102
R32	1·2k	C32	0·047μF		
R33	1,000	C33	0·1μF		
R34 (if reqd) 47Ω see text				ZD1	6·6V zener

Capacitor C21 must be miniature to fit 0·15in spacing on board between TAD100 pins 8 and 9. C16 is a Siemens polycarbonate to fit 0·3in space. C28 should be 5 per cent or better, or no greater than 45pF. C25 is actually two 200μF or 220μF, 10V, in parallel; see Fig 7.
Trimmers CT1 and CT2 are 35pF max rotary ceramic (dia approx $\frac{3}{8}$in). Three-gang tuning capacitor: 17 + 17 + 20pF vhf.

The RSGB News Bulletin Service

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

SCHEDULE

Time	Frequency (MHz)	Location and coverage (hf) or beam heading (vhf) of station
0930	3.6	Bromley, Kent (SE England)
1000	3·6	Cheltenham (SW England)
	145·8	Aberdeen (NNW)
	145·095	Farnham, Surrey (NE)
1015	3·6	Belfast (N. Ireland)
	145·8	Bangor, Co Down (N)
1030	3·6	Derby (N. Midlands)
	144·337	Weston-super-Mare (NW)
	145·8	Aberdeen (SW)
	145·89	Bishop Auckland (N)
	145·3	Sutton Coldfield (NW)
1045	145·89	Bishop Auckland (E)
	145·095	Farnham, Surrey (SW)
1100	3·6	Bridlington (NE England)
	144·3	Sutton Coldfield (SW)
1130	3·6	Motherwell (S Central Scotland)
	145·5	Bradford (NE)
1200	145·5	Bradford (SE)
	3·6	Aberdeen (NE Scotland)

AMATEUR BANDS IN THE UK

Effective 1 January 1973, the following schedule applies:

Amateur (Sound) and (Sound Mobile) Licences

Footnote No	Frequency bands (MHz) (See (A))	Classes of emission (See (B))	Power	
			Maximum dc input power (See (C) and (D))	RF output p.e.p. for A3A and A3J emissions only (See (D))
1 and 5	1·8—2		10W	26⅔W
2	3·5—3·8	A1, A2, A3, A3A, A3H, A3J, F1, F2 and F3	150W	400W
	7—7·10 14—14·35 21—21·45 28—29·7			
1 and 3	70·025—70·7		50W	133⅓W
1 and 4	144—145		150W	400W
	145—146			
1, 7 and 8	430—432	A1, A2, A3, F1, F2 and F3	—	—
1 1 1 1 1 1	432—440 1,215—1,325 2,300—2,450 3,400—3,475 5,650—5,850 10,000—10,500	A1, A2, A3, A3A, A3H, A3J, F1, F2 and F3	150W	400W
2 and 9	24,000—24,050		—	—
1 and 9	24,050—24,250			
1 and 6 1 and 6 1 and 6	2,350—2,400 5,700—5,800 10,050—10,450	P1D, P2D, P2E P3D and P3E	25W mean power and 2·5kW peak power	—

Footnotes

1. This band is allocated to stations in the amateur service on a secondary basis on condition that they shall not cause interference to other services.

2. This band is shared by other services.

3. This band is available to amateurs *until further notice* provided that use by the licensee of *any* frequency in the band shall cease immediately on the demand of a Government official.

4. The following spot aeronautical frequencies must be avoided *whenever* this band is used: 144·0, 144·09, 144·18, 144·27, 144·36, 144·45, 144·54, 144·63, 144·72, 144·81 and 144·9MHz.

5. The type of transmission known as Radio Teleprinter (RTTY) may not be used in this band.

6. Use by the licensee of *any* frequency in this band shall be only with the prior written consent of the Minister.

7. This band is not available for use within the area bounded by 53°N 02E, 55°N 02E, 55°N 03W and 53°N 03W.

8. In this band the power must not exceed 10W erp (effective radiated power).

9. Use by the licensee of any frequency in this band shall only be with prior written consent of the Minister and such consent shall indicate the power which may be used, taking into consideration the characteristics of the licensee's station.

(A). Artificial satellites may not be used by stations in the amateur service except in the bands 7–7·10MHz, 14–14·25MHz, 21–21·45MHz, 28–29·7MHz, 144–146MHz, 435–438MHz, 24,000–24,050MHz.

(B). The symbols used to designate the classes of emission have the meanings assigned to them in the Telecommunication Convention. They are:

Amplitude modulation

A1 Telegraphy by on-off keying without the use of a modulating audio frequency.

A2 Telegraphy by on-off keying of an amplitude-modulating audio frequency or frequencies or by on-off keying of the modulated emission.

A3 Telephony, double sideband.

A3A Telephony, single sideband, reduced carrier.

A3H Telephony, single sideband, full carrier.

A3J Telephony, single sideband, suppressed carrier.

Frequency (or phase) modulation

F1 Telegraphy by frequency shift keying without the use of modulating audio frequency, one of the two frequencies being emitted at any instant.

F2 Telegraphy by on-off keying of a frequency modulating audio frequency or on-off keying of a frequency modulated emission.

F3 Telephony.

Pulse modulation

P1D Telegraphy by on-off keying of a pulsed carrier without the use of a modulating audio frequency.

P2D Telegraphy by on-off keying of a modulating audio frequency or frequencies or by on-off keying of a modulated pulsed carrier—the audio frequency or frequencies modulating the amplitude of the pulses.

P2E Telegraphy by on-off keying of a modulating audio frequency or frequencies or by on-off keying of a modulated pulsed carrier—the audio frequency or frequencies modulating the width (or duration) of the pulses.

P3D Telephony, amplitude modulated pulses.

P3E Telephony, width (or duration) modulated pulses.

(C). DC input power is the total direct current power input to (i) the anode circuit of the valve(s) or (ii) any other device energizing the aerial.

(D). As an alternative, for A3A and A3J single sideband types of emission, the power shall be determined by the peak envelope power (p.e.p.) under linear operation. The radio frequency output peak envelope power under linear operation shall be limited to 2·667 times the dc input power appropriate to the frequency band concerned. This column gives the maximum power determined by this method which may be used.

Decimal point switching on DFMs

by J. D. DIPLOCK, GW3UZS*

HAVING decided to build a digital frequency meter as an improvement on his existing Class D wavemeter, the author looked at various circuits, particularly the dfm by G3TVU and G8BDO [1]. He decided that the dfm should have a resolution down to 1Hz, mainly because of the need of an accurate standard at low frequencies to plot filter response curves etc, rather than the resolution of 1Hz at high frequencies.

The dfm built followed more or less the same design as [1], including the extended time-base selection circuit, using the SN7400/7430 combination as rf switches, but with the exception of the 100Hz resolution circuitry. This rf switching circuitry requires a single-pole five-way switch to switch the dc voltages on to the SN7400s. Owing to the lack of space, a very small switch had to be used and an ex-rt channel-selection switch was found, giving a 10-way single-pole with a $\frac{3}{16}$in shaft.

Construction

After building most of the dfm, the problem of shifting the decimal point arose. The numerical tubes obtained from RS Components Ltd had integral left- and right-hand decimal points fitted. One way to accomplish this task would be to have another switch ganged to the time-base switch to connect the required decimal point to the negative ht/earth line. As mentioned earlier, the lack of space required a very small switch, so this approach to the problem had to be abandoned. Another suggested method was to use light emitting diodes in series with 200Ω resistors as decimal points, in place of the 1kΩ pull-up resistors associated with the time-base switch. This arrangement would require five LEDs, one for each of the five time-base positions.

From the author's point of view it was essential to maintain the five time-base positions, because the output from the eight-input Nand gate to the control circuitry in the prototype unit was also taken to an external socket. This provides an accurate switched standard for other use. It was decided to reject this method because of the relatively high cost involved in providing the five LEDs. After much thought into this problem the following ideas emerged.

From the extended time-base circuit, Fig 1, a binary output is available at points a,b,c,d and e. Table 1 gives binary outputs for SN7441 bcd-to-decimal decoder driver with its decimal outputs connected to the appropriate decimal point as shown in Fig 2. The output from point e, when the selection switch is in position 5, is not required. Table 2 shows the decimal output from the SN7441 bcd-to-decimal decoder driver, for each of the five time-base positions, with the time-base selection switch calibrated as shown in the table in Fig 2.

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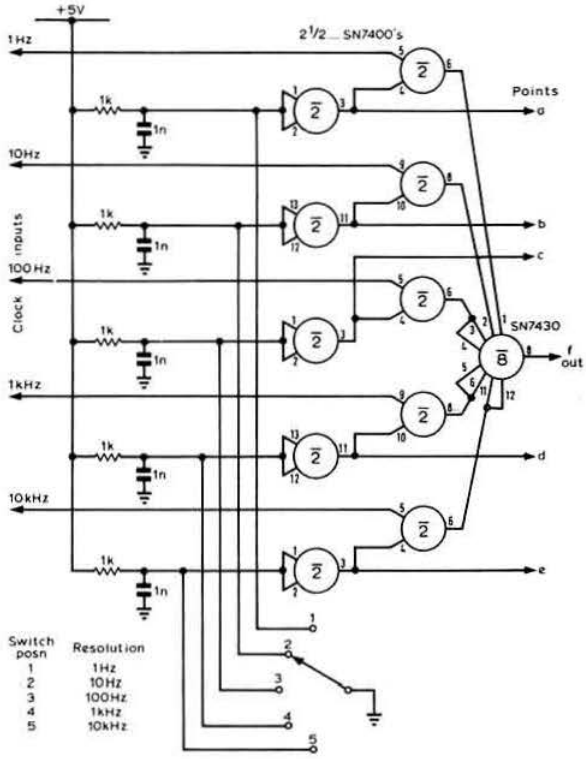


Fig 1. Time-base selection circuitry

The SN7441N bcd-to-decimal decoder driver is designed to drive numerical tubes in which one cathode glow is established, therefore their non-ignited cathodes only rise to about 50-60V. The SN7441N decoder driver is equipped with output transistors of sufficient voltage rating for this purpose.

This condition is found in tubes with integral decimal points, such as the type used by the author, but may not be met if separate decimal point neons are used. Some indicator neons, especially the older type, may require to be driven by transistors with a voltage rating of up to 250V. Should LEDs be used as separate decimal points, driven from

Table 1. Time-base outputs truth table

Switch Positions	Outputs at points a	b	c	d	e
1	1	0	0	0	0
2	0	1	0	0	0
3	0	0	1	0	0
4	0	0	0	1	0
5	0	0	0	0	1

Table 2. Truth table showing SN7441 bcd-to-decimal decoder inputs and outputs

Switch Positions	Inputs D	C	B	A	Dec output	Num readout	Dec places
1	0	0	0	1	1	kHz	3
2	0	0	1	0	2	kHz	2
3	0	1	0	0	4	kHz	1
4	1	0	0	0	8	MHz	3
5	0	0	0	0	0	MHz	2

Table 3. Sensitivity measurements with and without the modification

Frequency (MHz)	Minimum input to operate (mV) double amplitude peak	
	Straight instrument	56pF added
1	70	250
2	65	150
4	120	100
6	150	70
8	150	100
10	150	80
12	160	70
14	200	100
16	280	130
17	350	150
18	400	130
19	350	130
20	300	200
21	380	250
22	500	260
23	480	220
24	500 max F	280
25	—	280
26	—	240
27	—	200 max F

the circuit described, care should be taken to ensure that the output rating of the SN7441N is not exceeded. The output transistors in these devices will sink around 7mA at 2·5V in the "on" state.

Conclusion

The instrument functioned to above 27MHz after slight modifications to the input amplifier described by G3TVU and G8BDO [1] had been carried out.

Adjustments with various resistor and capacitor values were tried, with the final values as follows: (a) the 10kΩ resistor 12R3 was parallel with an 18kΩ resistor, giving a final value around 6·5kΩ; (b) a 56pF capacitor was connected from the positive input on pin 3 of 1P1 to earth. When these modifications had been carried out, the sensitivity of the instrument was improved, and its maximum frequency limit increased from about 20MHz to above 27MHz. The only disadvantage, as mentioned in the article [1] is that a least significant figure of 1 appears with no input to the frequency meter.

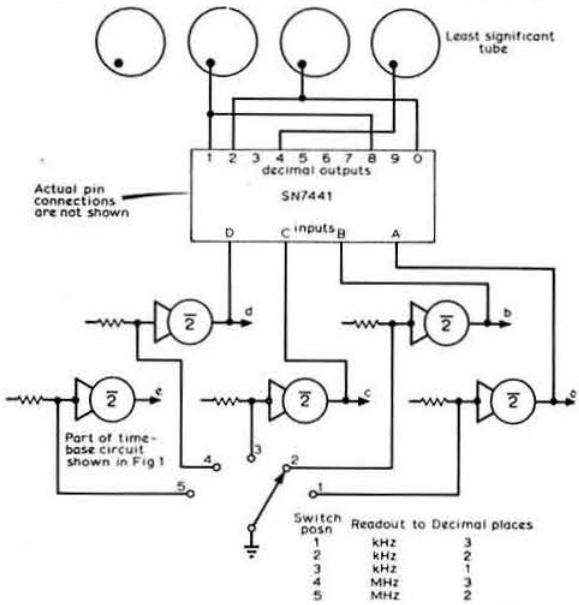


Fig 2. Readout tubes showing left-hand decimal points and bcd-to-decimal decoder driver connections

Due to a lack of instruments the author was not able to compile actual sensitivity measurements with and without the modifications. However, G3TVU has provided some very useful information on the reasons for this improved sensitivity, and has compiled a sensitivity chart. This may prove very useful for other constructors of this type of instrument.

The mechanism of this improvement in sensitivity follows; it shows a useful increase in sensitivity at hf and an extension of the hf limits.

The 710 amplifier is wired as a Schmitt trigger with positive feedback from the output to the amplifier's + input. This amplifier exhibits a maximum propagation delay of 40ns which has the effect of changing the positive feedback to negative feedback at about 12·5MHz (ie feedback is delayed by a half cycle and opposes the input instead of aiding). This means that the sensitivity of the instrument decreases with increasing frequency.

Addition of the 56pF capacitor decouples the feedback path at hf, so instead of a Schmitt trigger we have a limiting amplifier. Table 3 shows sensitivity measurements on an instrument front-end with and without the additional capacitor. Minimum sensitivity occurred on the unmodified instrument at 18MHz, with a further reduction hump at the top end of the range due, probably, to delays at the top end of the logic space.

Reference and acknowledgement

[1] "A 20MHz digital frequency meter using ttl integrated circuits", by I. D. Brown, G3TVU, BEng, AMIEE, and S. L. Norman, G8BDO, BTech, AMIEE, *Radio Communication*, July/August 1971.

The author would like to thank G3TVU and G8BDO for providing the initial ideas on the time-base circuitry and for reviewing this article before publication.

Product Information

Mini-Products miniature beams

These are the products of a USA manufacturer and comprise a range of compact beam and vertical aerials for the hf bands. Typical of the range is the B24 2-element beam for 10, 15 and 20m. This has an element length of 11ft, a boom length of 5ft and a weight of 11lb. Claimed forward gain referred to a dipole is 3·6dB and a back-to-front ratio of 8dB. The price of the B24 (excluding carriage) is £32.95. The small size of these beams, it is claimed, will assist with any planning problems. Full details of the range are available from the European distributors: Waters Electronics, 8 Gay Bowers, Hockley, Essex.

From the same source are available the Neosid ferrite ring cores type 4324R/1 referred to in the article "Practical braid-breakers using stock materials" by G3OHX which appeared in the November 1972 issue of *Radio Communication*. The price of these rings is 16p each.

EQUIPMENT REVIEW

The Barlow Wadley XCR-30 Mark 2 receiver

by P. SIMPSON, G3GGK

and

B. ARMSTRONG, G3EDD

THE subject of this review is a portable receiver. The reason that there is a somewhat fuller review than might be expected for this apparent class of receiver is that as a portable receiver it is highly unusual. One normally thinks of the Japanese as synonymous with portables, but this particular one is designed and manufactured in The Republic of South Africa. It was loaned for review by Gurney's (Radio) Ltd, Southall, and the price is £89.50.

General description

The unusual feature of the XCR-30 is that it uses the Wadley loop principle, providing continuous coverage from 500kHz to 31MHz without a band-change switch and with the stability of a single tunable oscillator in the 3MHz region. The Wadley loop principle was patented after the second world war and was looked at with interest, but with grave suspicion, by a number of radio communication equipment manufacturers. The company that decided to stick its neck out was Racal who used the principle to produce the RA17 receiver which became a world beater and put Racal firmly on the road to profitable success and expansion. The suspicion was due to the combination of one crystal-controlled and two variable oscillators which together could be considered to be a potential source of birdies and limitless spurious responses. It is fair to report that Racal had considerable problems in this area and the story goes that they were near the point of admitting defeat when someone had a stroke of genius and attacked a die-cast chassis with a hacksaw. This action stopped the offending chassis currents and cleared the problem. The particular prototype involved, complete with saw cut, can be seen in the entrance hall of the company in Bracknell.

Fig 1 shows a simplified arrangement of the mixer/oscillator arrangement as used in the XCR-30. The full circuit includes an rf amplifier in which the input tuned circuit is interesting. The front panel aerial tuning knob controls a ferrite slug which passes through the centre of a former on which are wound three coils to cover the bands 0·5 to 2, 2 to 8 and 8 to 30MHz. A cam on the knob shaft operates two micro-switches which switch in the coils relevant to the knob position.

The main tuning controls are edge-controlled with 2 : 1 slow-motion gearing. This is sufficient for tuning in a.m. signals, but on ssb it is necessary to use the clarifier control for fine tuning. The other controls are the volume control and mode switch.

A telescopic aerial is used with a socket for a high impedance external aerial in parallel. A second socket on the top surface is for an earth connection. Two sockets on the left-hand side provide for connections to headphones and an external battery.

The plastic case is covered in black rexine material, the front panel having a black and silver "camera" finish. Under the stout fixed carrying handle is mounted a rotatable panel giving the main details of broadcast and amateur bands. This panel can also be used to note any information on

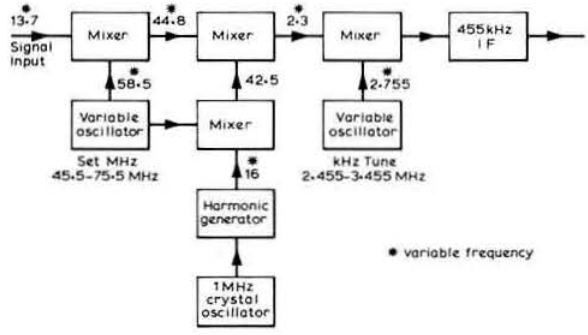


Fig 1. Simplified oscillator/mixer arrangement. The frequencies shown are when receiving a 13·7MHz signal. It will be seen that drift in the "set MHz" oscillator is cancelled out in the mixing process, and since the crystal oscillator may be considered perfectly stable, the only effective drift is in the "kHz tune" oscillator

printed cards, which are supplied. An S-meter is provided, calibrated in five arbitrary units.

The complete circuit, mounted on a single printed circuit board, contains 18 bipolar transistors. Six U2 or similar batteries are used and the supply is arranged for positive earth. The external dc supply socket has a germanium diode in series for polarity reversal protection. Since an internal series regulator is used, the external supply can be between 6 and 12V.

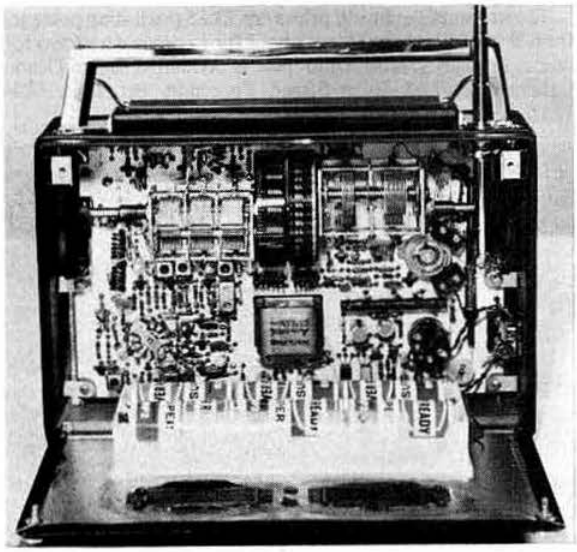
Piezo ceramic filters are used for the main selectivity—one for ssb and the other for a.m. The bfo frequency is switched in order to provide reception on both usb and lsb; no compensating "side swipe" is applied to the main vfo so that the calibration alters with side band. However, since the kilohertz dial is marked at 10kHz intervals this is of no great importance.

Tests

Signal to noise ratio and sensitivity

No specification claims are made and the results cannot be compared directly with previous tests due to the high impedance rf input. Both telescopic aerial and external aerial socket are taken to the top end of the input tuned circuit through 47 and 4·7pF respectively. For the purposes of the test, the output of a Marconi Instruments TF2002 was connected directly to the collapsed telescopic aerial. This will no doubt have the purists reaching for their pens and dipping in vitriol, but does give a reasonable indication.

Frequency (MHz)	Signal to noise ratio (dB) (Generator setting 2μV)	
	A.M.	SSB
1·5	5·5	11·5
3·5	22·0	18·5
7·5	26·0	20·0
12·5	26·5	21·5
17·5	20	23·5
32·5	19	24·0
30·5	22	23·5



Rear view with back open

The 2μV input is emf from a 50Ω source impedance which means that with this crude method of test the actual pd would be considerably in excess of 1μV across a damped input circuit. By current standards the results are good. The specification sensitivity claim of better than 1μV for 50mW was exceeded by a wide margin even making plenty of allowance for the mismatched input.

S-meter

As has been mentioned before, the S-meter is not calibrated in S points but has five scale marks. The measurements were taken at 15·5MHz, but a quick check on other frequencies showed the results to be typical.

Meter reading	dB rel 2μV emf
1	0dB
2	+9dB
3	+21dB
4	+50dB
5	not reached

AGC

Again this was measured at 15MHz.

Input rel 2μV emf	Audio o/p rel to that at 2μV emf
+20	+3½dB
+40	+5dB
+60	+5dB
+80	Blocking

It was discovered during this test that the receiver blocked on signals in excess of 1mV, but up to this point the age was very good.

Spurious responses

The reviewers mentioned in the preamble that the Wadley loop system can give serious potential spurious response problems. However, the XCR-30 solves its own problem by blocking above 1mV where the spurious responses are. So the receiver does meet specification.

Selectivity

The specification figures are 6kHz on a.m. and 3kHz on ssb and cw. These are at −6dB, and the measured figures were very close to specification. Although no claims are made for skirt selectivity, the response curves shown on the circuit diagram show ±7½kHz at −40dB on a.m. and approximately ±5kHz at −40dB on cw and ssb. Measurements show that these figures were also closely approached.

Unwanted signal handling

Attempts to evaluate cross modulation were masked by blocking which, as mentioned above, started at 1mV. The effect of a strong signal was not only that the audio level suffered a severe reduction, but also one of the internal VFOs became microphonic.

Frequency stability

In previous reviews the frequency of the vfo has been measured directly, so for a change it was decided to feed in a Marconi Instruments TF2006 Signal Generator at such a frequency to obtain zero beat on ssb and monitor the signal generator frequency with a counter. The results are tabulated below. Since the signal generator incremental frequency control is a wire wound potentiometer, the curve, if plotted,

would not be smooth due to the slight jump in generator frequency as the wiper moved from turn to turn.

Time from switch on (minutes)	Frequency drift (Hz)
1	0
2	−40
3	−30
4	−20
5	−20
10	−20
15	−30
20	−60
25	−50
30	−80

The results are good by any standards.

Dial accuracy

It was not easy to carry out this test due to the coarse nature of both control and calibration marks. The maximum error recorded from 0 to 500kHz was 3kHz, and from 500 to 1,000kHz, 4kHz.

Clarifier range

The specification claim for the clarifier range is ±1·5kHz. During listening tests it was found that the clarifier was very asymmetric about its mechanical mid-point. This was confirmed by measurement which showed +5 and −1·2kHz.

Birdies

The only birdies worthy of comment are on each megahertz and are no doubt due to harmonics of the 1MHz crystal oscillator getting into the front end. They were certainly strong and would swamp weak signals.

In use

Using the built-in telescopic aerial, the results were very good, but rather depended on the environment. For instance, using the receiver in a conventional brick house the results were very good, with plenty of dx. However, the building where the bench tests were carried out is made of reinforced concrete and the results were very disappointing. For a.m. reception the tuning was adequate, but on ssb it was found almost essential to use the clarifier as a fine tuning control which is the intention anyway. One had to remember to keep the clarifier knob in the centre of its travel when tuning with the main control, otherwise, due to the law of perversity, the clarifier was always at the limit of its travel in the required direction. Audio quality was good. At the higher frequency end of the range, the aerial tuning control was rather critical. The particular model received had a fault on the cam-operated microswitch, but this was a simple matter of re-adjustment and not a design fault.

Ancilliaries supplied

The XCR-30 is well packed in moulded foam polystyrene, and mating connectors are supplied. The service manual has particularly good layout diagrams and a small operating instructions booklet is supplied in addition. A rather nice "free" gift in the pack is a World Radio and TV Handbook.

Conclusions

The Barlow Wadley XCR-30 Mark 2 is no cheap and cheerful "transistor". It is a highly unusual communications receiver. Although of questionable performance with a large external aerial, with the telescopic whip its performance is surprisingly good.

Product Information

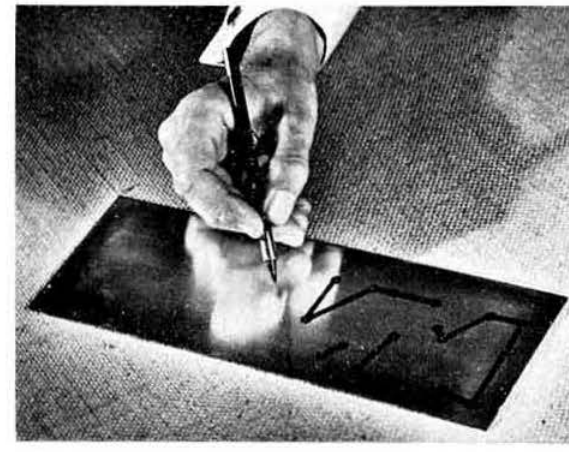
Mazda pocket data booklet

The 1972–73 edition of the Mazda data booklet is now available from booksellers and radio and television dealers price 21p. This pocket-size booklet contains 168 pages of information concerning current and obsolete picture tubes and valves. Also included is a valve substitution section and an eight-page section giving details of Mazda uhf aerials. An invaluable source of data for both dealer and enthusiast.

PCB marking pens

The Decon Dalo pcb marking pen, hitherto sold in dozens, is now available in half-dozens and single units, making it suitable for prototype and home-construction use. Model 33PC is a nylon-tipped marker pen that applies an etch resist to copper laminated board in line thickness down to $\frac{1}{32}$in. A spare tip can be trimmed for even finer work. With this pen no masking or taping is necessary. Simply draw the desired circuit and after a few minutes drying time the ink tracks are impervious to ferric chloride and all normal etchant solutions. The body shell of the pen is filled with ink, not simply an ink soaked wick. Special measures have been taken to minimize evaporation when the cap is left off. The thick lines in the photograph are shown for clarity only; normal line thickness starts at $\frac{1}{32}$in.

The new small quantity prices are £3.85 (including postage) for a box of six pens; £1 post-paid for single orders (cwo for one off). The Decon Dalo pen is available from Decon Laboratories Ltd, Ellen Street, Portslade, Brighton, BN4 1EQ.



MICROWAVES—1,000MHz and up....

by DAIN EVANS, G3RPE*

A new world record on 15mm

In setting their new world record for the 21GHz band on 12 November, G3BNL and G3EEZ exchanged nbfm signals over the well-worn path between Cleeve Common near Cheltenham and Clee Hill in Shropshire. The distance, 45 miles (72km), exceeds by a handsome margin the previous record of 27 miles held since 1964 by W2UKL/2 and WA2VWI/2. Both transmitters had an output of about 10mW, feeding dishes 10in in diameter. The phone signals were about S7.

The equipment used was part of a comprehensive solid state transceiver which covers the five amateur bands between 13cm and 15mm. Its design is shown in block diagram form below. It consists of two main parts: the 1,152MHz driver, shown in Fig 1(a), which has an output of 6W, and a second part in which other frequencies are generated by different multiplying chains, as shown in Fig 1(b). Interconnections between the various units are made via coaxial links. Band-pass filters are used at a number of points throughout the equipment to minimize spurious outputs.

The 1,152MHz driver is based on a Mullard design (No 91) but modified for frequency modulation. This is followed by three stages of amplification to produce 20W of rf, which is used to drive a BAY96 varactor tripler to 384MHz, followed by a Motorola 5149 varactor tripler to 1,152MHz.

For transmitting, the output of the equipment is connected to an appropriate aerial, the tone or speech modulation level being adjusted to provide a deviation of ±5kHz on each band.

For receiving, the output is connected via attenuators, where necessary, to a separate receiver head for each band, the crystal being changed to produce an i.f. in the range 28 to 30MHz. Each receiving head has its own mosfet preamplifier. The tunable i.f. has a bandwidth of 15kHz, and the stability of the whole system is such that signals at even the highest frequencies will remain within this pass-band for 30min.

On the 6cm, 3cm and 15mm bands, the local oscillator is injected via cross directional couplers. On 9cm and 13cm hybrid ring mixers with Schottky barrier diodes are used.

This remarkable equipment has been developed over the last few years, and during this time has been used in many tests and contests producing numerous contacts on the microwave bands (the writer can testify to several). This latest success is the fitting culmination of a fine effort over a long period.

Spare klystrons

Following the request in the November column for sources of klystrons, G8PN (Birmingham) and G3KSU (IoW) both offer several of the 723A/B type. Anyone *genuinely* held back by the lack of a klystron should contact these two—sae please.

G3WBT (Workington) has a redundant signal generator type 108 going free to a good home. This contains a CV35 klystron (nominally 100mW at 2,970-3,095MHz) and an attenuator. The psu is complete but the transformer is probably 400Hz.

Standard for circularly-polarized signals

G8DNF of Nutley in Sussex proposes, with G4BIA, to experiment with helical aerials on 1,296MHz. These, of course, radiate circularly-polarized signals which can have either a left-hand or right-hand "thread". No doubt having in mind the problems of "cross-threading" experienced in the initial setting up of the Goonhilly station, and by that well-known character Dick, he is interested in finding out if there is a standard thread.

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

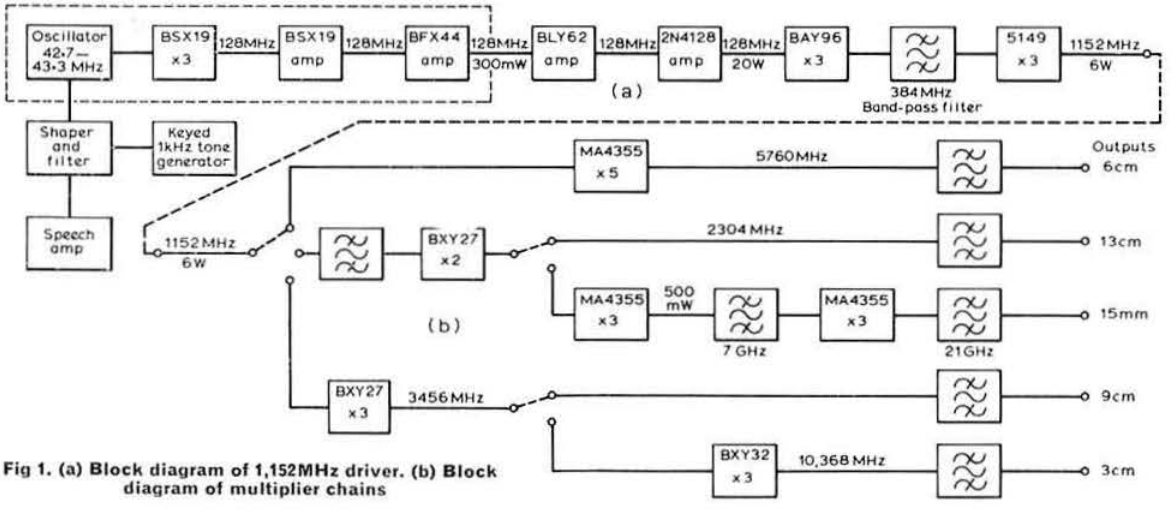


Fig 1. (a) Block diagram of 1,152MHz driver. (b) Block diagram of multiplier chains

TECHNICAL TOPICS

by PAT HAWKER, G3VA

THE start of another year—another chance to show that "Amateur Radio" still means rather more than just the amateur operation of radio equipment. Sixty years ago, in January 1913, an enthusiastic 22-year-old radio amateur drew up and had witnessed by a notary public the layout plans and diagrams of an entirely new type of receiver he had built and used for his amateur experiments. This was the first receiver ever to use regeneration: the young amateur was Howard Armstrong who, before his tragic death in 1954, was to have shown himself as perhaps the single most important inventor in radio engineering, largely responsible not only for regeneration but also for practical superhets, for super-regeneration and for the development of fm techniques. This year is also the Jubilee Year of the Society—how many potential Armstrongs are working in January 1973 on new ideas and new techniques?

Balanced fet mixers

In *TT* November 1972, we drew attention to a most useful application note "FETs in balanced mixers" by Ed Oxner of Siliconix. Since then we have been studying this note in rather more detail, and find that it does indeed put forward a powerful argument for using what are virtually power FETs in this manner, and failing these high-cost devices then FETs of more normal small signal characteristics can still be quite useful. This is not a new idea. An advanced hf receiver by William Sabin, W0IYH (*QST* July 1970 and noted in *TT* October 1970 and *ART4*) used a pair of 2N4416s in a wide-band balanced mixer; and an all-balanced vhf converter by G. Tommassetti was noted in *TT* June 1970 using a pair of TIS88s. We have stressed several times recently that improved mixers, of wider dynamic range, are seen as the key to the "new look" all-semiconductor receivers. We understand that Ed Oxner is currently preparing a further note covering the design of double-balanced mixers using fet devices. An interesting summary of basic mixer considerations is given in Tables 1 and 2, reproduced from the Siliconix note (though this does not cover the further differences between devices operated in switching modes and in continuous non-linear modes).

As might be expected, the note emphasizes the advantages of using a U310 device, and we should perhaps have made it clear last time that this device (with its dynamic range of 100dB) is virtually a power fet rather like the Teledyne Crystalonics devices described in *TT* August 1971 and *ART4*), and is a relatively high cost device. However, Ed Oxner points out that where cost is a major consideration, there are a number of other FETs which can give quite useful results, see Table 3.

Table 1. Basic mixer arrangements

Characteristic	Single-ended	Single-balanced	Double-balanced
Bandwidth	several decades possible	decade	decade
Relative Intermodulation Density	1	0·5	0·25
Interport Isolation	Little	10–20dB	>30dB
Relative Oscillator Power	0dB	+3dB	+6dB

Table 2. Device comparisons

Device	Advantages	Disadvantages
Bipolar transistor	Low noise figure High gain Low dc power	High intermodulation Easy overload Subject to burnout
Diode	Low noise figure High power handling High burn-out level	High L Osc drive Interface to i.f. Conversion loss
Jfet	Low noise figure Conversion gain Excellent im performance Square-law characteristic Excellent overload High burn-out level	Optimum conversion gain not possible at optimum square law response level High L Osc power
Dual-gate mosfet	Low im distortion AGC Square law characteristic	High noise figure Poor burnout level Unstable

Power for a linear

Last month we reproduced the "Skinnier Linear" based on a single 6LF6, and it was mentioned that the PL509 was possibly the most potent available European "sweep tube" for linears. A few days later we came across the details of a design by Karl-Heinz Scheidel, DL8TO, in *Old Man* (Nr 11 1972) although we believe it originally appeared in *DL-QTC*. This uses two PL509 valves in parallel to provide a 400W p.e.p. linear for 3·5MHz and can be driven by a 3W transistorized exciter.

Table 3. FETs as mixers (Siliconix types)

Typical characteristic	U310	2N5397 E300	2N4416 E304	2N3823
g_m	14k	6k	5k	3·5k
I_{DSS}	40mA	15mA	10mA	10mA

Table 4. Performance comparison (50-250MHz wideband)

Characteristic	Jfet	Schottky	Bipolar
Intermodulation intercept point	+32dBm	+28dBm	+12dBm†
Dynamic range	100dB	100dB	80dB†
Desensitization level (level for unwanted signal when desired signal first experiences compression)	+8·5dBm	+3dBm	+1dBm†
Conversion gain	+2·5dB*	—6dB	+18dB
Single-sideband noise figure at 50MHz	7·2dB	6·5dB	6dB

Notes: Jfet figures refer to U310 balanced mixer.
* Conservative minimum. † Estimated.

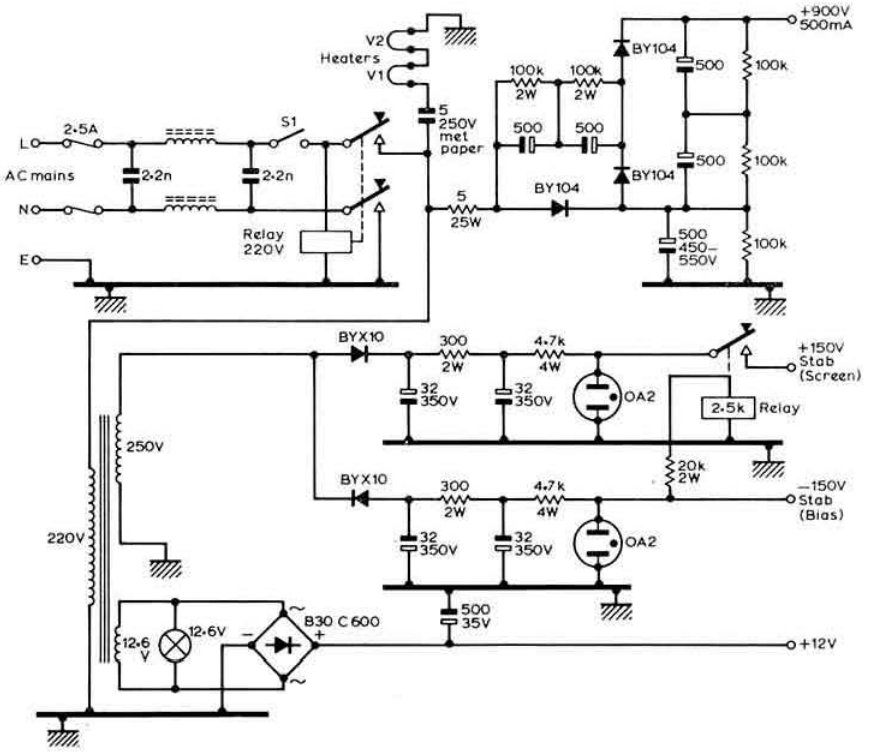


Fig 1. Power supply for the 3·5MHz linear using two PL509 valves. Note mains-connected chassis technique

We were particularly interested to note that DL8TO had tackled the problem of providing the two 40V, 0·3A heater supplies by connecting these in series and then connecting them across 220V mains through a 5μF "capacitor" voltage dropper using a metallized paper capacitor along the lines suggested in *ART*. This does subject the heaters to a high switch-on surge, and it would seem a sensible precaution to add a tv-type thermistor in series with the heaters to overcome this problem. It will be noted from Fig 1 that DL8TO has adopted the still controversial *mains-connected chassis* technique; and it is most important that the full safety implications of this system be realized. But provided suitable precautions are taken (and DL8TO's design makes cunning use of a relay with double-pole switch), the system can result in an inexpensive, compact and lightweight solution to the power requirements of a high-power linear.

Aligning phasing-type ssb exciters

In *Break-in* May 1972, Fred Johnson, ZL2AMJ, describes a delightfully simple but effective method of aligning phasing-type ssb exciters such as the Tucker-Tin Mk 2 unit (*TT* July 1972). "Receivers, oscilloscopes, spectrum analyzers and other test gear are not needed; the method is inexpensive, accurate and quick," he writes. In fact, apart from a pair of high impedance phones, a resistor and two capacitors, the only requirement is the (built-in) 1kHz tone generator and a dummy aerial. It may be recalled that the Tucker Tin had an output of about 4W p.e.p. so that it is comparable with many ssb exciters. ZL2AMJ seems to have come up with a long-wanted solution to getting phasing-type exciters into good shape: the various pre-set controls

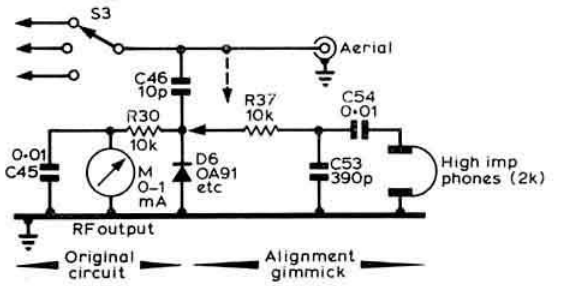


Fig 2. Simple alignment device for phasing-type ssb exciter

can be set up while listening to audible beat notes in the phones with the objective of the elimination of the notes while maintaining output.

To appreciate the operation it is necessary to think of the spectrum produced by a.m. and ssb transmitters modulated by a 1kHz note, with the set-up shown in Fig 2. With a fully-modulated a.m. signal there will be the carrier and the two equally spaced beat notes, and one will hear the 1kHz beat between the sidebands and the carrier. But if the carrier is removed, we hear instead the beat between the two sidebands spaced 2kHz apart, so one hears a 2kHz beat. Now if one of these sidebands can be removed without reintroducing carrier, there will be no beat note.

Thus we have an arrangement which tells us whether the carrier is present (1kHz tone), unwanted sideband (2kHz

tone) with the loudness of these tones providing an indication of the amplitude of the unwanted signal component(s).

Thus the exciter can be aligned by achieving maximum output on the meter (M) while eliminating the beat notes in the phones—this will then show that we have maximum sideband output without a carrier or a second (unwanted) sideband. ZL2AMJ makes it sound as simple as that.

In practice, he also provides detailed procedures for the Tucker Tin Mk 2—but it is hoped that the above brief notes will at least introduce this handy idea.

200MHz scaler

A reasonably low-cost scaler that will extend the range of an existing digital frequency counter to about 200MHz is the sort of constructional project that is arousing a good deal of interest these days—particularly when the scaler uses only three integrated circuits and two transistors, and yet can be used with practically any counter with a top limit of more than 2MHz.

Such a design is presented by Jamieson Rowe, VK2ZLO/T, editor of *Electronics Australia*, in his October 1972 issue. Output from the scaler is about 4·5V peak-to-peak with low output impedance. This modern design (Fig 3) is much simpler than comparable scalers of a few years back because of the availability of high-speed ecl logic devices. Basically it consists of two cascaded decade divider stages; the first using the high-speed ecl ic and the second divider using ttl devices. Actually, if the counter is already capable of handling 20MHz then the second decade divider can be omitted.

The key device is thus the ecl ic, which is a Fairchild 95H90 or Philips/Mullard GHJ121—though one must point out that these are not cheap devices. The 95H90 uses medium scale integration with four high-speed JK flip-flops available: with more elaborate circuits this can have a top speed as high as 300MHz, but the arrangement shown is more than adequate for the 144MHz band and up to about 200-210MHz. The ecl device is protected from excessive inputs by the back-to-back diodes; a dc bias control is adjusted for maximum input sensitivity—and the decoupling of this part of the circuit (ferrite bead/rf choke) prevents degradation of performance as a result of spurious coupling.

The second decade divider uses two ttl devices: a 9001 with 7490, 9390 or FJJ141. The 9001 is used to increase the counting rate of the stage from about 10MHz to about 50MHz to ensure that the final limitation is that of the first divider stage. Interface between the devices involves a level translator, using a 2N4258, and a buffer transistor stage is used at the output end.

Tags for plug-in integrated circuits

A year ago (*TT* December 1971), we drew attention to an Application Note by W1DMU describing a method of providing low-cost terminal boards for integrated circuits to eliminate the need for the relatively high-cost ic sockets. Another economy approach to this problem was noticed recently in one of the trade journals; special tags for plugging in dual in-line ics. It was stated that the tags are available in strips, in brass or bronze, tin- or gold-plated; the pins are claimed to provide adequate mechanical support for plastics packages, yet providing the plug-in facility which is useful for servicing and more especially for ready use during the development of new circuits and equipment. We have no information on the quantities in which these can be obtained, or any personal experience of them—but it sounds a useful idea and details can be obtained from Molex International, 14 Yeading Lane, Hayes, Middlx (phone 01-561 0066).

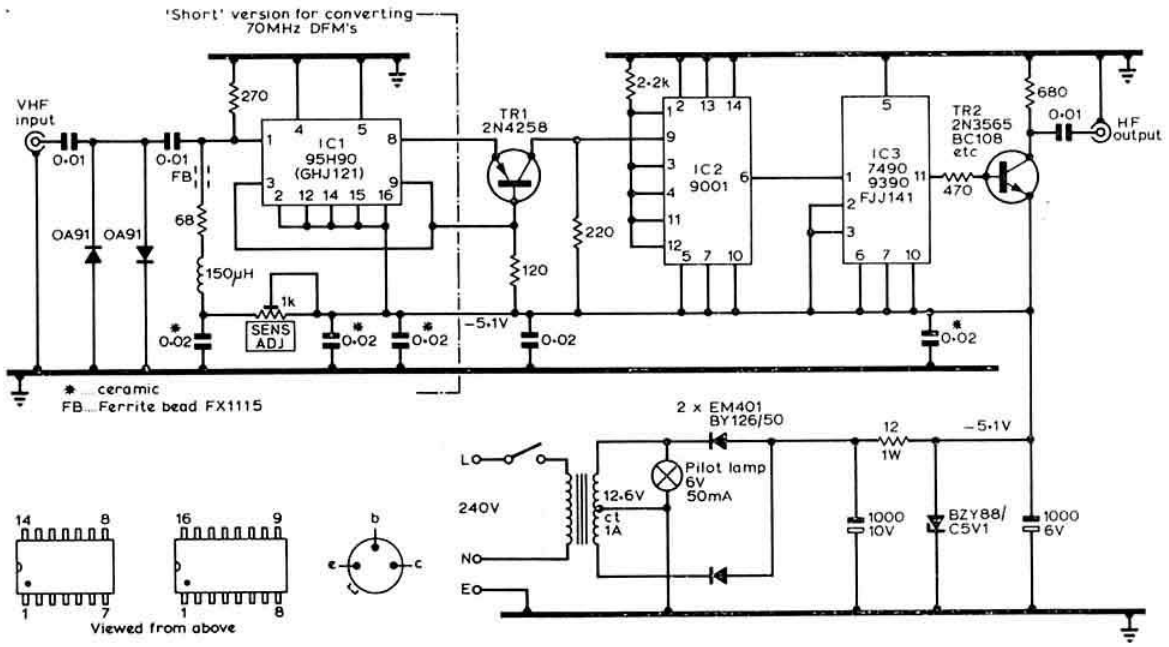


Fig 3. Circuit of the *Electronics Australia* 200MHz digital scaler using three integrated circuits and two transistors

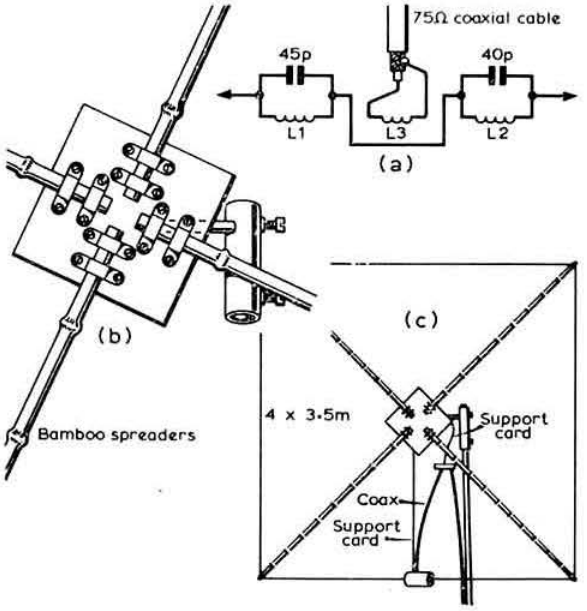


Fig 4. The three-band (14, 21 and 28MHz) single-element quad of PA0HTR based on the multi-resonance technique. The single trap inductor is wound on a former 8cm long with diameter of 3·7cm, L1 7 turns, 1·6cm long; L2 5 turns, 1·1cm long; L3 4 turns, 1cm long. L1 resonates at 17MHz, L2 on 23MHz. Constructional details show how the element is formed and supported

Three-band single-element quad

Last month we included some notes on multiband vertical aerials based on the multi-resonance technique where the traps are both at the centre of the aerial. Looking through some old copies of *Electron* recently, we came across (No 12 1968) an example of this technique in a single-element three-band (12, 21 and 28MHz) quad described by H. A. Kanon, PA0HTR.

L1, L2 and L3 are all wound on the same former, making the whole construction look quite simple: see Fig 4. Capacitors must be high-voltage types up to 10kV, and the trap-system waterproofed etc. Weight of the traps is supported from the centre board.

Thoughts and facts on chordal hop

A couple of months ago, Martin Harrison, G3USF, drew attention to some recent work on transequatorial propagation to which I added my own long-standing belief that tep is only one of a number of forms of paired injection/ejection situations which give rise to supermode or chordal hop propagation. Indeed, as long ago as November 1967 I stuck my neck out by writing: "Most amateurs will be able to recall many occasions when, out of an apparently dead band, dx signals can be heard steadily and at strengths not readily accounted for by the usual multi-hop propagation theories," and later drew attention to a challenging article in one of the IARC yearbooks: "Can hams make contacts above the classical muf," by Dr Bruno Beckmann, which listed many of the less well-known modes of propagation which usually get left out of consideration.

This, in fact, is in part the answer to the points raised last month by G3USF in his letter to the editor, in which he rightfully commented on the pessimistic nature of conventional ionospheric predictions when these are applied to amateur operation. In this connection, I would fully support his comments, adding that, for example, I worked over 60 Japanese stations during the past summer on 21MHz cw using a simple long-wire aerial, the majority of them at times when the forecasts published in *Radio Communication* would have suggested that the path was closed.

So this month I would like to draw attention to yet another piece in this fascinating jigsaw puzzle—experimental evidence that shows beyond question that chordal hop propagation occurs almost every dawn at frequencies higher than those which would support conventional multi-hop propagation.

Admittedly this still refers to a certain specific and atypical geographical relationship, but it is all part of the growing evidence that amateurs should not allow themselves to be hamstrung by conventional propagation theory, if you will excuse the ghastly pun.

The new reference is "The influence of chordal paths on signals propagating to the near antipode of an hf radio transmitter," by Gary E. J. Bold of the Radio Research Centre, University of Auckland, New Zealand (*IEEE Trans on Ant & Prop*, November 1972, pp 741-746). The antipodes are the two places precisely opposite one another on the surface of the earth, so that hours and seasons are exactly reversed. Unfortunately exact antipodes of the UK (as for many densely populated areas) turn out to a virtually blank stretch of the South Pacific south of New Zealand.

This paper is based on studies of the reception of the "Voice of America" relay station at Tangier at its antipode in New Zealand. A striking feature of the morning records (around 2000gmt) is the large (up to 30dB) and relatively rapid (over about half an hour) increase in signal strength; and this occurs *at times when the critical frequencies are too low to support multi-hop propagation at 15MHz.*

These large and sudden pre-sunrise increases in signal strength were thus not in accordance with computer predictions based on multi-hop ray theory with some allowance made for random scattering; on the other hand it is shown that the results can be readily explained when chordal propagation supported by longitudinal ionospheric tilts are included in the computer programme.

It will be recalled that Hans Albrecht, who coined the term chordal hop, based his theories on the times of arrival of amateur signals from Europe in Australia, showing that many of these "openings" could not be explained by conventional multi-hop theory.

If we are prevented by topography from taking advantage of this work on antipodes, there remain other possibilities: for example, the twilight girdle. Many years ago EMI produced a device called the Fisk Solariscope that was intended to provide amateurs with a simple guide to local times of sunset and sunrise and the twilight paths. I do not think they sold many, and it is a long time since I have seen one. But Fig 5 and Table 5 will provide a useful working approximation.

Is all this of real importance to amateur dx operating? I may have a bee in my bonnet, but I have long been convinced that it is. For example, the consistent results of Norman O'Brien, G3LP, on his daily 3·5MHz schedule with ZL4IE at times around local dawn in the UK coupled with his

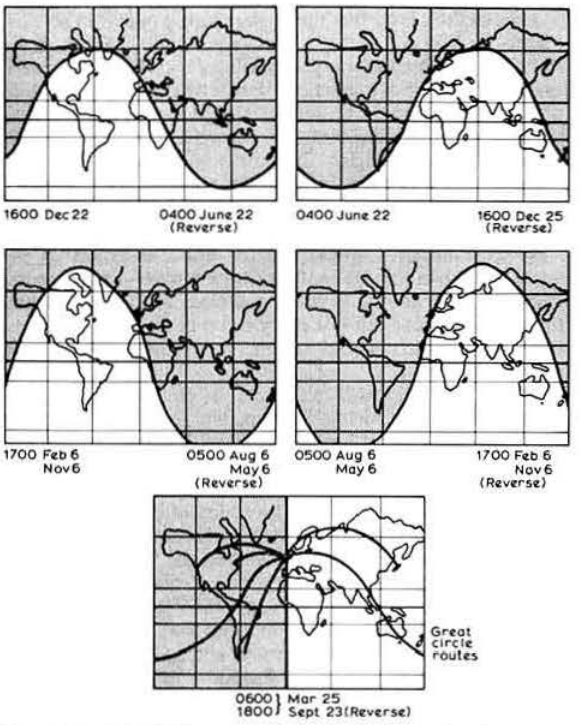


Fig 5. The twilight boundary between light and darkness for different seasons of the year. Times are gmt for UK

observation that at least some of these contacts do not appear to depend on intermediate reflections (see *Wireless World* October 1972 p 494).

What we need to do is to encourage more of these regular observations—and to include 21 and 28MHz observations through seasons when the bands might be expected to be dead. And for this type of work do not take too much notice of those conventional ionospheric forecasts—useful though these are for entirely other purposes.

Speech processing

Several months ago we promised to include in *TT* some further comments on speech processing for ssb; but so far have dodged the issue, partly because this is a subject in which it is so easy to lose one's way in the forest of conflicting views. But we feel that we can vacillate no longer—so here goes, first with some views of B. G. Tew, G3WFF, who has tried to put a few things in perspective.

He believes that the ideal for speech processing for ssb would be to totally remove the amplitude information and transmit only the frequency information. This can be done: (a) audio processing with a *very fast* attack and decay time; (b) infinite clipping.

Many of the audio processing circuits which have been published are merely slow agc systems which allow the operator to modulate the transmitter when speaking at varying distances from the microphone; they certainly cannot be classed as efficient signal processing systems. To attempt true syllabic rate systems which would follow the amplitude of each part of the speech waveform would be very difficult

Table 5. Local time of sunset chart

When used in conjunction with a time zone chart the time of sunset of any place may be found in gmt

Northern hemisphere	Lat. 0	Lat. 10	Lat. 20	Lat. 30	Lat. 40	Lat. 50	Lat. 60	Southern hemisphere
Jan 1–Dec 12	1800	1745	1730	1700	1630	1600	1445	June 10–July 3
Jan 21–Nov 22	1800	1745	1730	1715	1645	1615	1515	May 21–July 24
Feb 8–Nov 3	1800	1745	1730	1715	1700	1645	1600	May 1–Aug 12
Feb 17–Oct 26	1800	1745	1745	1730	1715	1700	1630	Apr 22–Aug 22
Feb 28–Oct 14	1800	1800	1745	1745	1730	1730	1700	Apr 11–Sept 2
Mar 13–Oct 1	1800	1800	1800	1800	1745	1745	1730	Apr 1–Sept 15
Mar 21–Sept 24	1800	1800	1800	1800	1800	1800	1800	Mar 21–Sept 24
Apr 1–Sept 15	1800	1800	1800	1800	1815	1815	1830	Mar 13–Oct 1
Apr 11–Sept 2	1800	1800	1815	1815	1830	1845	1900	Feb 28–Oct 14
Apr 22–Aug 22	1800	1800	1815	1830	1845	1900	1930	Feb 17–Oct 26
May 1–Aug 12	1800	1815	1830	1845	1900	1915	2000	Feb 8–Nov 3
May 21–July 24	1800	1815	1830	1845	1915	1945	2045	Jan 21–Nov 22
June 10–July 3	1800	1815	1830	1900	1930	2000	2115	Jan 1–Dec 12

(*Wireless Direction Finding* by A. W. Keen

to achieve, owing in part to problems of overshoot, instability, etc in the feedback loop.

So (b) infinite clipping seems a more promising approach, provided that we dismiss audio clipping since if this is increased to where it could be really effective it must introduce objectionable distortion. About 30dB of clipping would appear to be a good compromise, and can be achieved by rf clipping techniques, provided that the "second" ssb filter remains a very good one to prevent degradation of carrier and sideband suppression.

G3WFF also refers to the importance of the alc system, believing that the majority of existing alc systems do very little for compression or for tvi. In part he considers this is because many alc systems are slow-acting and will allow the first loud syllables through the system so causing splatter and other forms of interference. He believes that any flat-topping in linear amplifiers, or indeed in any circuitry after the sideband filter, is to be deprecated, thus differing from the body of opinion that feels that some degree of flat-topping can be tolerated. He is convinced that the main limitation on clipping is distortion and this can be avoided with rf clipping techniques.

A rather different point is emphasized by Peter Waters, G3OJV. He built the speech processor described by DJ4BG in the May 1972 issue of *Radio Communication* and has used it for several months. He writes: "It seems to be the most effective circuit that I have tried and over the air reports suggest that it has very low distortion even at high clipping levels. However, I was not happy with the frequency

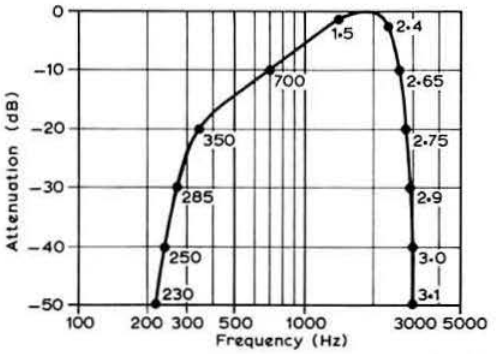


Fig 6. Speech-processor response curve used by OH2CD. An optimum slope of 12dB/octave below 1·4kHz is obtained with two RC networks (see *Ham Radio* February 1972)

response and am not convinced that the 2kHz peak is correct for ssb, although it may be satisfactory for a.m. or fm where wider receiver bandwidths are used.

"On ssb the signal is already short of low frequencies because it has passed through narrow bandwidth filters in the transmitter and receiver. Reports indicated that most of what was being gained by the clipping process was being lost by poor intelligibility. Raising the input impedance by using an fet pre-amp made no difference, and finally I had to increase the value of C3 from 270pF to 1nF, but even this was not enough for many operators and the value can be increased to 10nF with very satisfactory results. The optimum value probably depends on the microphone in use and the voice characteristics of the operator."

It will be remembered that the DJ4BG unit was based on audio clipping and since it appeared originally in *VHF Communications* was presumably not initially designed for ssb operation.

This letter reminded me that some useful comments on pre-emphasis and audio-response shaping for af-type processors for ssb transmitters were given by V. Aumula, OH2CD, in *Ham Radio* February 1972. This particular system was claimed to permit up to 20dB clipping and 6·9dB improvement in speech intelligibility when used with a 10W transceiver, though we have some doubts as to whether the results would be *pleasant* to listen to.

As a basis for his design, OH2CD adopted the conclusions reached in a paper by Thomas and Niderjohn, "The intelligibility of filtered-clipped speech in noise", published in *Journal of the Audio Engineering Society*, Vol 18 No 3 1970. The response (without clipping) of the OH2CD processor is shown in Fig 6 and will be seen to be fairly close to that used by DJ4BG (see *Radio Communication* May 1972 Fig 3 page 293)—but not identical.

However, a check with the original Thomas and Niderjohn paper showed that all their research was concerned with speech communication in very high ambient noise levels (for example, in factories) and one must be a little careful in applying the results directly to radio communication, although sometimes there is a very close similarity! One difference which should perhaps be considered is that ssb is often received as frequency-shifted speech.

And now a final controversial comment from Harold Chadwick, G8ON, arising out of the points put forward by his son, Peter Chadwick, G3RZP, in *TT* July 1972.

He writes: "Getting down to basics, the essential of any communication system is that a parameter shall be varied in correspondence with the information to be transmitted. If there is no correspondence then there is distortion.

"The amount of information transmitted within unit time is proportional to the rise- and fall-time of the system (which is why morse is so efficient with its very short rise- and fall-time). Any compression of a signal will reduce the rise in voltage per unit time, ie dV/dt will be reduced: this suggests that nothing but attenuation is achieved with signals below the 'clip level' when clipping follows the compression.

"If clipping, or compression/clipping is used, we will have some intervals in the transmission when there is a 'flat-top'. During these intervals, dV/dt is zero and *no* information is being transmitted. Harmonics must occur in such a system (unless Fourier has it all wrong) and in fact we are transmitting Ao.

"Now Ao will produce a higher reading on the anode meter of a transmitter or the S-meter of a receiver—a meter which normally never reaches true peak value due to inertia in normal operation can do so during a flat-top.

"If the audio harmonics generated during flat-top periods are really filtered out, we will be left with a compressed version of the original waveform. It is easy for sending and receiving operators to be influenced by the 'obvious' improvement of their meters. But if signals are transmitted outside the reception bandwidth, power is being wasted. And if breath-levels and room noises are not clipped while speech peaks are clipped, the system is increasing the redundancy.

"One often hears it said of ssb that 'one has to get used to listening to it'. Why? On trunk landlines G3RZP comes through here as he does on ssb when nobody is trying to tune up on top of us. And that is as it should be.

"I suspect that in many cases speech clipping only sounds better because of increased needle wag. If so, one could readily obtain perfect reception by merely turning up the sensitivity control of the S-meter."

Well, we promised you a controversial comment!

NBFM and a high-C oscillator

In the course of developing a multi-mode (a.m., dsb, ssb, cw and nbfm) top-band transceiver, Bill Bond, G3XGP, ran into an electronic tuning diode problem that he feels has not been sufficiently emphasized in the literature—but one that can be overcome quite simply.

He wanted to add the nbfm facility by frequency modulating a free-running Vackar oscillator used to produce a 455kHz i.f. signal. For optimum stability it is desirable to use a good deal of capacitance with this type of oscillator, rather than high inductor values. This meant that one of the plastic 1N4000 Varicap diodes would not provide an adequate frequency shift, and two were considered necessary to obtain up to a 9kHz shift at 1kHz/V. But it was found that just putting two diodes in parallel (Fig 7 (*a*)) did not work as the smaller capacitance appeared to dominate. G3XGP, however, found that the full capacitance swing of both diodes together can be achieved by supplying the diodes through separate resistors and using separate series capacitors to the oscillator tuned circuit: Fig 7 (*b*).

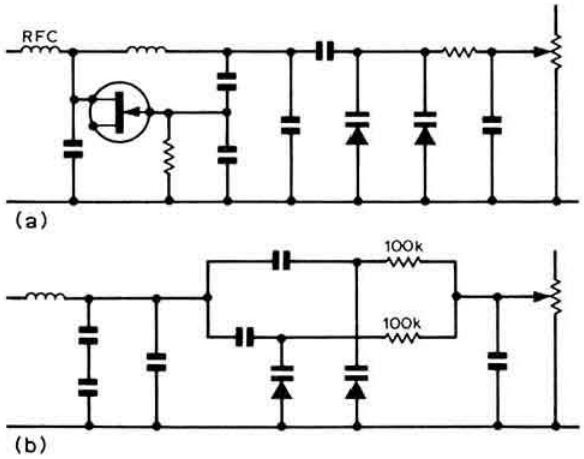


Fig 7. How G3XGP overcame a problem. (a) Use of two varicap diodes in parallel to obtain additional frequency swing on high-C oscillator proved ineffective; (b) good results achieved by separately feeding the two tuning diodes

FOUR METRES AND DOWN

by JACK HUM, G5UM*

Retrospect and Prospect

Some metre-wave years seem to stay static. Others surge forward on a tide of new technology and new operating processes; 1972 was one of them. If for nothing else it will be remembered as the Repeater Year, when translation devices, Oscar and GB3PI, set new dimensions to the vhf/uhf scene that are likely to be in view for a goodly time to come. On the socio-political front much was done at the IARU conference last May to "internationalize" still further the various member-societies of Region 1, to us in the UK an appropriate development as our own integration into the EEC approached.

Fears that full conformity with the IARU proposals would disrupt the UK band plan proved groundless, to the relief of the generality of metre-wave operators whose sense of order and fair play has preserved the geographical plan down the years, if not intact at least capable of bending without breaking.

Part of the "bending" has been the accommodation of special services within the band plan as a whole, which is good because you know where to look for them, less good because it tends to reduce the amount of that intercommunication which is the life blood of amateur radio. Sidebanders segregate themselves around 145·41 and avoid a.m. areas because they cannot talk to a.m. stations who have no bfo-*on* switches. And a.m. stations find they cannot talk to sidebanders who have no bfo-*off* switches. Even sadder, in our view, has been a tendency for segregation of fm from a.m.

A resolve for 1973 could be: "Use the mode suitable for the moment". If you want dx that means A1 or A3J when conditions are normal. For the rest, a.m. and fm, intercommunicating together within the four geographical zones of 2m, meet the requirement.

Secondly, noting that "conditions are normal for most of the time" (not "rock bottom", please, just normal, and dx a bonus) can we honestly say we make best use of the quasi-optical bands which are available to us? To be content with cosy local chats throughout the year is no demonstration of the self-training clause in the licence. To try new bands and new modes, to us, is.

One obvious direction (it has been indicated before and no apologies for indicating it again) is: Transfer much of the local traffic from 2m to 70cm. It seems prodigal of precious frequency space to chat to a chap a dozen miles away on 2m at S9 when you can do exactly the same thing on 70cm with less chance of QRM from others, and infinitely less chance of QRM from *you* into local tv sets.

If this comes to pass, along with a breakthrough into the *incommunicado* blocks of mode-orientated men on 2m, then 1973 will itself be a year to remember.

* Houghton-on-the-Hill, Leicester LE7 9JJ

Parchment annual

The complete table of Four Metres and Down Award holders has its annual airing in this issue. The year was notable for the issue of only the second-ever Supreme Award to G5NU: Bill Lord was one of three who achieved also the difficult 432MHz Senior.

Another tough nut, the 70MHz Senior, was cracked only by one member, G3KSU/P, during 1972 and on 2m four "Seniors" were won. On microwaves, two more awards for 10GHz (does nobody want 23cm certificates?).

Standard awards went to five 70MHz stations, no fewer than 47 for 2m and four for 70cm. Only three certificates went to receiving members, two for 2m, one for 70cm. It seems to us that there is scope here for more activity and more claims by the enthusiastic contributors to Bob Treacher's *SWL News*.

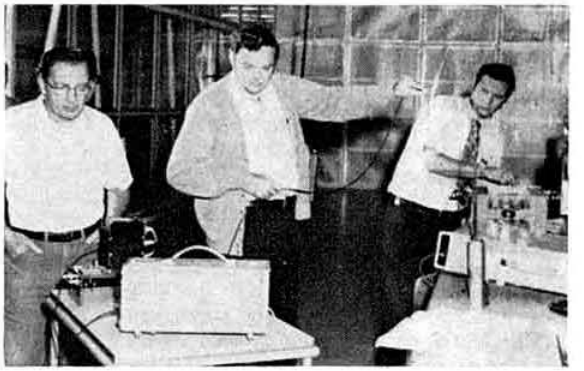
In all, then, 70 additions to the annual table—and to members' radio room walls.

Oscar items

Last month's suggestion by GW3FSP that cw and ssb directed at Oscar 6 should be separated in frequency is endorsed by HB9QQ, who agrees "Listen for cw 29·450–29·500 and for phone 29·500–29·550". Another thought: contacts over short distances are now no longer of interest and should not be made (h'm, there is always the chap who has never made a through-Oscar contact at all, and to whom *any* QSO is better than none . . . even so the principle will be accepted by many).

One in the eye for the high power saturaters: PA0PVW can hear his signals on 10m when he uses only 0·5W output on 2m.

If you hear HB9HB coming through on 29·55MHz do not be surprised. Its 145·985 signal beamed north will register with Oscar at certain elevations, and its Pye-box pumping out



Perry Klein, K3JTE (right, over the Oscar package) runs a compatibility test with the ITOS-C command receiver

Picture transmitted by WA9UHV by sstv and received by him through the Oscar 6 translator. WA9UHV reports that the minimum elevation angle required for 8s frames is 40°

10W from a site 4,600ft up has already activated the satellite on a number of occasions.

What aerial for the 10m out-signal? Various operators have various ideas, as our note last month reported. At G6RH, trial and error evolved what can best be termed a "semi-ground plane". Bob Holmes writes: "One lunch time I speedily rigged up a vertical dipole of wire at 20ft, centre fed. When the bottom half of the dipole was taken away at an angle of 45°, reception of 10m signals from Oscar was considerably improved."

Successful in working across the Atlantic several times, G6RH notes that Americans with "watery" signals have remained audible after Europe has dropped out and the predicted time of orbit has passed. He attributes this to the 29·5MHz signals bending or reflecting even though the satellite emitting them has passed beyond the radio horizon.

Something similar is reported by G3COJ. When he was heard by ZE7JX on Orbit 283 the satellite was over southern Libya, just out of range for Salisbury, Rhodesia " . . . so perhaps the ionosphere was helping", as Brian Bower says. He gets useful information from the telemetry on the 435·1 channel, and notes that a change of mode in the emissions from the 70cm sender sometimes coincides with the moment when the 2m to 10m translator comes on.

The first two-way amateur slow-scan television contact via Oscar was claimed on 18 October by W9NTP and WA9UHV. Now 'NTP seeks transatlantic contacts via the satellite on 29·49MHz, translated from 2m input. He would like to meet UK stations on 14,230kHz at 1130gmt Wednesdays or 1800gmt Saturdays with a view to arranging via-Oscar QSOs.

It was only yesterday

A note received by G3BLP from F8OL south-west of Paris commented on Johnny Haydon's dead-steady S8 signals, said the opening of 6 October was the best ever, and that he had QSOs with 23 different 2m stations that evening. Rig: 60W to an 829B, and 4-el up top. Soon he "would be on 435Mc/s with a Philips QQEO6/40".

The date on this letter: 11 October 1949, just a year after we got 2m. And just to show that things do not seem to change much, the Frenchman adds that he has a 6J6 push-pull converter with a noise factor of 4dB which was "*difficile de depasser*". Still is, today!

The significance of the date of 6 October will not be lost on those who, 23 years later, enjoyed the fantastic opening of last autumn, for it was during the night of 6–7 October 1972 that LA5UG stayed on the air for a continuous five hours working Scotland and northern England non-stop, one of the star turns of that particular lift, ". . . who gave many GM operators, myself included, their first taste of 2m dx", as Donald Smith, GM8FSR, of Strathaven, puts it. Interestingly, the 'UG power level and aerial were almost identical to those of F8OL all those years before.

QRO cold devices on 432

Semiconductors capable of giving substantial amounts of rf at 70cm may now be had (though hardly yet at amateur prices). The RCA TA8172 will deliver 25–30W at 432MHz for a line voltage of only 12·5. To do this it needs a fairly hefty kick from an RCA TA8425 module that will pump out 8–10W for 100mW in.

An extensive treatment of the subject was given in *New Electronics* of 20 June 1972, and thank you, G3RFG, for drawing our attention to it. If you do not have a back copy of *NE* in your club collection your local library may be able to let you have prints for the price of a Xerox copy of pages 33 and 34 of that number.

Xtal exchange

Well, not even "exchange": Vic Mee will *give* the following to anyone who will collect or send him postage: 6,000, 6,025, 6,050, 6,073·3 and 6,075kHz, all FT243. Letters to G3PJK at 205A Grimshaw Lane, Middleton Junction, nr Manchester.

G8EEJ, K. Basterfield, 51 Ruskin Cresc, Crownhill, Plymouth, has eight crystals at 8045·83 which come out at about 144·82MHz, HC6U (". . .useful for a club net"). Wishes to exchange for any other 8MHz crystals HC6U anywhere in 2m.

"Another way of talking . . ." again

Stuck with a morse learning problem? Then take heart from some advice from old timer G5IC, a professional telegraphist since he learned the code in his 'teens back in 1919. He says:

"Look, chum, when you were age 5 (or 6 or 7) you unconsciously learned with ease that the shape 'A' sounded 'ay' and so was 'a'. Ditto 'B'. Hard on a poor toddler, but you learned 'em, all 26 of 'em!"

Laurence Ivin adds that surely there should be no difficulty in mentally absorbing a system like the morse code which has just two parts, a dot and a dash, and always in a ratio of 1:3.

Another useful piece of advice which if taken would reduce the number of glass arms heard at the bottom end of 2m is: manipulate the morse key in a relaxed manner, learn to hold it properly right from the start, and swing *wrist only* as freely as you like.

All in the mind

Using a morse abbreviation to say so (and we all do) the new G8G-man concluded: "I must now go QRT to do my half an hour's code practice". He was determined to become a new G4B-man before the B-series runs out any moment now.

He must have wondered, doing his lonely daily stint, as others have wondered before, how the professionals go about attaining their perfectly formed 25wpm which is so delightful to copy that you can just sit back and read it like phone. Part of the technique has been disclosed by G3ZXN of Newcastle, Ernie Earnshaw having spent the last two years doing a radio officer course at wireless college. There is no secret to learning morse, is his conclusion: just rigid self discipline and regular practice.

" I do believe code groups to be very important", adds 'ZXN: "They prevent the beginner from getting into the bad habit of trying to guess what is coming next. Since most beginners can send better than they can receive I suggest that would-be G4s should send texts from books *backwards*, tape them, then try to receive them."

Dates for the new diary

Look for Liverpool stations on 4 February. The city's radio society will have a 2m phone contest running that Sunday, certificates not only to Liverpudlian operators but to leading non-Liverpool senders and receivers who work the Mersey sounds. And 10 points to work the club station G3AHD/A. Copy of rules if you send an sae to Bert Donn, G3XSN, 7 Thurne Way, Childwall, Liverpool 25.

Come July there will be celebrations on the Island of Rathlin to commemorate the 75th anniversary of the Marconi-Kemp trials, the Golden Jubilee of the City of Belfast Radio Club (GI6YM) and of course the RSGB "Diamond". Ian Kyle, GI8AYZ, hopes to organize a microwave link from the site of the aerial used by Marconi and Kemp. He tells us there will certainly be vhf/uhf activity from the island.

Another island: from 21 July to 4 August the North Bucks society will put GD4AFN/P on both 2m and 70cm. Says G8AAT, secretary Roger Pye: "The enthusiasm for this trip is really great among club members after the success of the previous expedition to the Mull of Galloway, when 250 stations were worked in four evenings by a crew with no previous dxpedition experience."

Contest news

Reminder: two more sessions of the 70MHz Cumulative this month. This contest did *not* finish in 1972. And if you think your score too lowly to put in, scan last month's VHF NFD results and take heart from the score of heroes at the bottom of the table who with no chance of a good placing nevertheless entered. (70MHz rules, p 623 September 1972 issue).

Second reminder: the 432MHz Cumulatives are now on (rules in this issue). Did you notice that 91 stations entered the 432MHz section of VHF NFD? If just half this number contribute to the Cumulatives that will make a well-worthwhile record.

New Year resolution for all metre-wave contestants: mull over once again the Contest Code of Practice printed here last May.

To GM5VG (left) went "The Jock Kyle Trophy" at the Scottish VHF Convention and Regional Meeting in Glasgow. The presentation was made after the celebrational dinner (130 were there) by RSGB VHF Manager Geoff Stone, G3FZL. *Picture by GM3CSM*

When the counties change

After a long gestation the Local Government Boundary Commission has come forth with its proposals to change the face of Britain by coalescing hundreds of disparate local authorities into a fewer aggregate ones, to wipe some counties off the map and create a few new ones.

"Roll up that map of Britain: we shall not need it again in our lifetime" may be true when the legislature approves what is being recommended—but until then, chaps, just carry on collecting QSLs for your Four Metres and Down claims as if the Boundary Commission had never existed.

When the time comes to revise the counties list on the FMD Certificate claim form we will let you know. But right now the existing form remains valid, and a copy may be had from the VHF Awards Manager if you send him an sae.

Tech corner

From G3PJK (Vic Mee, Middleton Junction, Manchester) Tests with the 2m vfo described by G8CGA (*RC* October 1971) have shown it to be far better than one expected. After the first 30min, during which it drifts about 10kHz at 144MHz, the drift per hour is as little as 100–200Hz.

As recommended by G8CGA I epoxyed the components to the die-cast box (except the tuning capacitor, of course). I considered filling the box completely with epoxy but rejected the idea on the basis of cost (epoxy is 94p for 2½oz) and also because if the unit developed a fault condition one would need to scrap it entirely.

I would also confirm the G8CGA recommendation not to cut corners with the power supply: build it exactly as his article. When I tried a power unit normally used to test transistor equipment at the station here, the note was T7 and stability poor.

Constructors may hesitate at paying £3.50 for the 6·5pF Tempatrimmer, but it does give good value for money and is worth the price to the constructor seeking really good stability. The main tuning capacitor VC1 came from an

VHF BEACON STATIONS

Callsign	Location	Nominal frequency	Emission	Aerial direction
GB3ANG	Angus	145·95MHz	A1	SSE
GB3CTC	Redruth, Cornwall	144·13MHz	A1	ENE
GB3DM	Burnhope, Co Durham	145·975MHz	F1	N/S
GB3GI	Bangor	145·99MHz	A1	NE/SE
GB3GW	Swansea	144·25MHz	A1	ENE
GB3GM	Thurso	145·995MHz	A1	S
GB3GEC	W. London	433·45MHz	F1	N/W
GB3LDN	S. London	1,297·500MHz	A1	E/NW
GB3SC	Sutton Coldfield	433·50MHz	F1	N/S
GB3SU	Sheffield (temporary location)	70·695MHz	A1/F1*	Omni
GB3SX	Crowborough	70·699MHz	A1	N
GB3VHF	Wrotham, Kent	144·500MHz	F1	NW

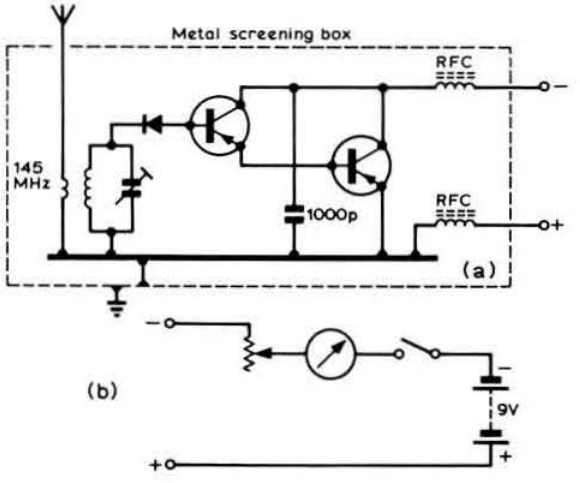
* Callsign on F1 continuously, on A1 once a minute. When on A1, F1 is suppressed.

RF26 unit, some vanes removed, leaving four fixed and three variable.

Output at 12MHz from the vfo feeds an EF80 tripler in the writer's transmitter followed by two 5763 doublers, a line-up which gives more than adequate drive to the final 6/40A.

From G8DLY (C. N. Bauers of Beccles)
Noting the item about remote field strength indication I am prompted to send details of a circuit intended for vhf use. Like G8HX I had found that the amount of rf being radiated bore little connection with the "ambient rf" in the radio room, even with a transmitter running only 15W dc input at 144MHz.

The indicator rf pick up unit is permanently positioned about 40ft from the aerial in a waterproof tin and proves to be sufficiently sensitive to give a good approximation of radiated power. It is connected via a length of cable, which need not be screened, back to the house and the battery box, on which is mounted the 500μA meter, variable resistor (adjusted to give a two-thirds scale deflection on the meter when transmitter is on), and an on-off switch. With transmitter off the leakage current reads 10μA.



Circuit diagram of the remote field strength indicator described by G8DLY. The aerial consists of 10in stiff wire extending from the waterproofed box, the input coil has four turns ½in diameter and the coupling coil one turn. The two rf chokes can be scramble wound with about 100 turns on a 1MΩ resistor. Any vhf crystal diode and any medium gain pnp transistors will operate satisfactorily

From G8AFA (Chris Atkins of Yeovil)
I question the validity of the commonly held belief that vhf signal strength at a distant point varies in direct proportion to the transmitted power. My practical experience shows this to be true only over an optical path.

Study of the path loss charts in the ARRL *VHF Handbook* suggests that for a given path under any given conditions there is a certain critical power level below which the received signal dwindles rapidly. I have found that over some paths increasing transmitter power to double (+3dB) produces as much as 10dB improvement at the distant receiver, yet over other paths makes no change. This can of course make all the difference between effecting a QSO or losing one.

Perhaps the students of metre-wave propagation can come up with some thoughts on this subject.

From G8ADP (Clive Elliott, Teignmouth)
Owners of Telford TC7 tunable IFs who experience receiver blocking in the vicinity of strong signals may find this to be caused by interaction of the varicap voltages of the rf and mixer stages upon the oscillator varicap. All three are tuned by a 10kΩ pot. Replace this with a twin-gang 10kΩ pot, one section tuning oscillator only, the other the rf and mixer varicaps. The extra gang requires duplication of the associated resistors going to the +5·6V line. Finally, perform minor realignment as handbook.

Telford have given me approval to describe this mod in *FMD*.

Here and there

A booklet of results of the IARU Region 1 vhf/uhf contests 1971 has arrived from NRRL, the Norwegian society responsible for handling them that year. In the September event, which was our VHF NFD of 1971, British stations appear in the first three places of the 432MHz Portable Section, while in the 1,296MHz Portable Section they collar the first five. As for the October 1971 event, UK stations dominate the fixed and portable sections on 2·3GHz and 10GHz, with G3LTF/P topping the 1,296MHz Portable. In all, 1,107 entries were received for the September and October 1971 events.

Talk-in station GB3ARE at the Leicester show directed 157 mobiles using the 2m band, 45 on 1·8MHz and 15 on 3·5MHz during the three-day event. Of the 2m cars talked in, 64 were fm, or 40 per cent, which is the normal proportion of fm activity in the Midlands. Paid admission to the show was 5,000.

The passing of G2XV at the end of November removes a pioneer figure from the vhf scene, and indeed from the Cambridge locale noted for its forward thinking in metre-wave matters. Gerald Jeapes, not a professional R & D man, learned by doing, and did it well, eg achieved and held the 70cm distance record for a long time. Had he been spared for another couple of years he would have held his ticket for half a century.

What they say

"Has not the time come for a 100kHz allocation in the bandplan for 2m sideband stations? The number using this mode seems to increase daily—and it might discourage some of the fm/a.m. stations who operate very close to 145·41"—GD2HDZ.

"I've got sufficient QSOs on 23cm to claim the FMD award, but six people do not want to supply QSLs!"—G3ZYC. (Other 23cm operators say the same. Reminder to the laggards: If you have given up QSLs at least send some kind of written verification to those you work to help them make their FMD claims).

25 YEARS BACK

Six Metre Licences: It was reported that the GPO has as the result of representations made by the Society agreed to issue 6-metre licences to about 30 amateurs . . . (report of November 1947 Council meeting).

* * *

G5MQ (Liverpool) got smartly off the mark by working W1CGY on 6 just 20 minutes after receiving his permit!—from "The Month on Five—and Six" by G2UJ in his first contribution as new conductor of the vhf page.

RSGB Bulletin, January 1948

Four Metres and Down Certificates

70MHz Transmitting Section

1 G3EHY; 2 G3PJK; 3 G2AIH; 4 G3OHH; 5 G3KEU/P; 6 G3NUE; 7 GI3IUD; 8 G6NB; 9 G8PD/A; 10 G5FK; 11 G3NDF; 12 GI3IMV; 13 GI3HXV/P; 14 G3SKR; 15 G3OUF; 16 G3BNL; 17 G3PMJ; 18 G3PHG; 19 GC3OBM; 20 G3TLA/P; 21 GI3HXV; 22 G5UM; 23 G3OJE; 24 G3SEK; 25 G3RWM/P; 26 G3FDW/P; 27 G3PPG; 28 G3FIJ; 29 G3GGL; 30 G3RDQ; 31 G3NJF/P; 32 G3RWM/P; 33 G3NUE/P; 34 G3AZI; 35 G3PDW; 36 GI3HCG; 37 G3LAS; 38 G3HRH; 39 GM2UU; 40 GI3PGG; 41 G3VPK; 42 G3RLE; 43 G3UFS; 44 ZB2VHF; 45 G3OUL; 46 G3UUT; 47 G5NU; 48 G3OZJ; 49 GI3HCG/P; 50 GI3PGG/P; 51 G3UBX; 52 G3VSA; 53 G3NKL; 54 G3THQ/P; 55 G3JHM/A; 56 GI3VJS/P; 57 G3EKP; 58 G3JHM; 59 G3VOF; 60 ZB2BO; 61 G3JHM/P; 62 G3NNO; 63 G3WQP; 64 G3OXD/A; 65 GI3WEL; 66 G3OHC; 67 G2WS/P; 68 G3JEQ; 69 G3RZK; 70 G8LY; 71 G3TDH; 72 G3GZJ; 73 G3XLH/P; 74 G3HBG; 75 G3VNQ; 76 G3VPF/P; 77 G2WS; 78 G3VJR; 79 GW3OXD/P; 80 G5UM/P; 81 GM3UAG; 82 GW3UCB/P; 83 G5UM (new QTH); 84 G3REP/M; 85 G3NKS/P; 86 EI2VBE/P; 87 G3VFD; 88 G3DOR; 89 G3REP; 90 G3WOS; 91 GW4ABR/P; 92 G3KSU; 93 G5DF; 94 G3ZYC; 95 G3JXN.

70MHz Senior Transmitting Section

1 G3SKR; 2 G3RWM/P; 3 G3FDW; 4 G3TCT; 5 G5NU; 6 G6HD; 7 G3OHH; 8 G3VSA; 9 G3VFD/P; 10 G(GM)3KSU/P.

70MHz Receiving Section

1 BRS15744; 2 BRS15822; 3 BRS32036; 4 BRS24450.

144MHz Transmitting Section

1 G3HBW; 2 G3BLP; 3 G3MTI; 4 G5YV; 5 G3BNL; 6 G3MCS; 7 G3LAR; 8 G3CO; 9 G3BA; 10 GW3MFY; 11 G3DFL; 12 G3NAQ; 13 G3NNG; 14 G3OJY; 15 G3KPT; 16 G3JYP; 17 G3KMT; 18 G3OHD; 19 G3BBR/A; 20 G3HRH; 21 GM3EGW; 22 GI3OFT; 23 G3OBD/P; 24 G2HIF; 25 G3JDN; 26 G8VZ; 27 G2AXI; 28 G3JYT; 29 G5UM; 30 G3EJO; 31 G3PBV; 32 G3FDG; 33 G3OSA; 34 G3JLA; 35 GC2FZC; 36 G3BOC; 37 G3MTI/M; 38 G3OJY (new QTH); 39 G3JWQ; 40 G3NOH; 41 G3PSL; 42 G3LBA; 43 G3FUR; 44 G2BJY; 45 G3MRA; 46 G3AGN; 47 G3MDH/P; 48 G3GMY; 49 G3GGK; 50 G3MDH; 51 G3NLR; 52 GM3LDU; 53 G3CKQ; 54 G5HZ; 55 G3NNK; 56 G6GN; 57 G5ZT; 58 G2PL; 59 G3FZL; 60 G3SAR; 61 G3NUE; 62 PA0EZ; 63 G3AHB; 64 G3PTM; 65 G3LAS; 66 G3RMJ; 67 G2CDX; 68 G3ORL; 69 G2DHV/P; 70 G3FIJ; 71 G3CXM; 72 G3HRH/P; 73 G3BDS; 74 G3FNM; 75 G3IMV; 76 G2BQ; 77 G3KHA; 78 G3OHC; 79 G3SHZ; 80 G3PKT; 81 G3UFA; 82 G3RST; 83 G5NU; 84 G2BHN; 85 G3OZP; 86 GW3KYT; 87 G3ICO; 88 G3ETH; 89 G2WS; 90 G3NJF/P; 91 GW3CBY; 92 G3TLA/P; 93 G3JFO; 94 G3TDR; 95 G5UM/P; 96 GM2UU; 97 G3UUT; 98 G3BNC; 99 G3SZX; 100 G3UKV; 101 GC3OBM; 102 G3FVC; 103 G3BJD; 104 G3PWJ; 105 G2ATM; 106 G3ISX; 107 G3USF; 108 G3OUL; 109 G3UIK; 110 G3GZJ; 111 G3EJA; 112 G3JHM/A; 113 G8AAZ; 114 G3EHR; 115 G8ATK; 116 G3WW; 117 G8APZ; 118 G3TR; 119 G3WZT; 120 G2WS/P; 121 G3EHM; 122 G3WSN; 123 G3RZK; 124 G3ILO; 125 G3RQI; 126 G3OXD/P; 127 G3WQG; 128 G8APO/P; 129 G8BQX; 130 G8BJK; 131 G6LK; 132 G8AYN; 133 GI5ALP; 134 G8BHI; 135 G8ATK (new QTH); 136 G3UQK; 137 G8BSH; 138 G8BWW; 139 G8AUN; 140 G8AEJ; 141 G3WDG; 142 G8BCP; 143 G8ABA; 144 G3WUW; 145 G3YUA; 146 G8VN; 147 G8BCA; 148 G3OHC/P; 149 G8BEO; 150 G3WUW/P; 151 G8BQX/P; 152 G8BPY; 153 G8CMB/P; 154 G5UM (new QTH); 155 G8AEL; 156 G8CKG; 157 G3HCW; 158 G8CJV; 159 G8CKV; 160 G8CEZ; 161 G3SFV/P; 162 G8CEA/P; 163 G8BEW; 164 G3OHC/M; 165 G8CXM/A; 166 G8CMU; 167 G3YRH; 168 G3YDY; 169 G8BKR; 170 G8CVK; 171 G3PKV; 172 G6FI; 173 G8CUO; 174 GW3OXD/P; 175 GW3OXD/A; 176 G8DBB; 177 G8CCE; 178 G3ENY; 179 G8BQH; 180 G8BUJ; 181 G8ADP/A; 182 G8CVS; 183 G8BXX; 184 G8BGE; 185 G8CUT; 186 G8DLZ; 187 G8DBA-G3ZNW; 188 G8DJF; 189 G8DLP; 190 G8BCI/P; 191 GW3UCB/P; 192 G8APO; 193 G8DKV; 194 G8CBZ; 195 G8BXJ; 196 G3DOR; 197 G8CBU; 198 G8BKQ; 199 G8DMY; 200 G8DJM; 201 G8BCL; 202 G8CXV; 203 G3YED; 204 G8DJK; 205 G8CRN; 206 G8BRT; 207 G8BRT/P; 208 G3EFX/P; 209 GC3YIZ; 210 GM8BZX; 211 G8BYV; 212 G3WHK; 213 GM8BDX; 214 G8ANQ; 215 G8CXQ; 216 G3VNQ; 217 G8EAV; 218 G8CKX; 219 GM8BKE; 220 G8CJO; 221 G8DML; 222 G8DAW; 223 G8DKF; 224 G8EGS; 225 G8CKV/P; 226 G3ISX/M; 227 G8EBI; 228 G8ENL; 229 G3SRX; 230 GW8AZU/P; 231 G8CEX; 232 GM8BRM/P; 233 GW4ABR/P; 234 G8EBV; 235 G8BDJ; 236 G8BXC/P; 237 G8BCO; 238 G8ERW; 239 G3XEB; 240 GI8AYZ/P; 241 G8CPG; 242 G3NHE; 243 G3DAO; 244 G4ADE; 245 G8ABP; 246 G8DWC; 247 EI2VBD/P; 248 G8EJH; 249 G8AWA; 250 G3FRV; 251 G8EBJ; 252 G8DDC/P; 253 G8EBF; 254 G3XFW; 255 G3WZT; 256 G8CFI/P; 257 G8ENI; 258 G8AWV/P; 259 G8COG; 260 G3BW; 261 G8DWT; 262 G3ZNZ; 263 G3UCS; 264 G4AVX/G8CXC; 265 G3PQF; 266 G8BPO; 267 G8EQH; 268 G3XTQ; 269 G8FDE; 270 G8CKY; 271 G8DTQ; 272 G3PFR; 273 GW3ZSS/P; 274 G8DYC/P; 275 G3GBH; 276 G8BPN; 277 G8ERM; 278 G8CQW; 279 G8FFC; 280 G8FUI; 281 GM3EOJ; 282 G3XTT; 283 G3PJK; 284 GM3JFG; 285 GM3ZVB; 286 G8FNI; 287 G8FIH; 288 G8DHA; 289 G8CDW; 290 G8FBL; 291 G3FYX; 292 G8FIY; 293 G8FDV; 294 G8AMU; 295 G3HBG; 296 GM3UAG; 297 G3YZU; 298 G8ESY; 299 G8CLK; 300 G3MYY.

144MHz Senior Transmitting Section

1 G3CCH; 2 G3FAN; 3 G5MA; 4 G3BLP; 5 G3CO; 6 G3BA; 7 G6NB; 8 G3EDD; 9 G3HRH; 10 G8GP; 11 G3LAS; 12 GI3IMV; 13 G3PTM; 14 G5NU; 15 G6GN; 16 G3KHA; 17 G3AOS; 18 G3MRA; 19 G3BHW; 20 GW3MFY; 21 G3DAH; 22 G3JEQ; 23 G6RH; 24 G3MCS; 25 G3GIM; 26 G2PL; 27 G2NH; 28 G3USB; 29 G6TA; 30 G3GZJ; 31 G3COJ; 32 G3JYP; 33 G8BBB; 34 G3OZP; 35 G3HCW; 36 G3DY; 37 G3KEQ; 38 G3WSN; 39 G3FIJ; 40 G3DKF; 41 G3JXN; 42 GC2FZC.

144MHz Receiving Section

1 BRS22550; 2 BRS22322; 3 BRS15822; 4 BRS15744; 5 NL687; 6 BRS20108; 7 A3470; 8 A4048; 9 BRS21667; 10 A4871; 11 BRS23140; 12 BRS7323; 13 A3942/P; 14 A3942; 15 BRS24550; 16 BRS30352; 17 A5032; 18 A6812; 19 BRS31172; 20 BRS31466; 21 A7929; 22 A6657.

144MHz Senior Receiving Section

1 BRS15744; 2 A5032.

432MHz Transmitting Section

1 G3NNG; 2 G3KPT; 3 G3LHA; 4 G3BNL; 5 G3MCS; 6 G8AAZ; 7 G8ABP; 8 G3AHB; 9 G5UM; 10 G8ACQ; 11 GW8ACG; 12 GW8ACG/P; 13 G8AHQ; 14 G8AEJ; 15 G8AGG; 16 G8AGU/P; 17 G3PTM; 18 G8AAY/A; 19 G8AGQ/A; 20 G3HRH; 21 G8AJU; 22 G8ARM; 23 G8ADP/P; 24 G8AUE; 25 G6GN; 26 G8AQA; 27 G8AWO; 28 G8AXP; 29 G8AHE/P; 30 G8AOD; 31 G8AWW; 32 G8AKT; 33 G8ANS; 34 G8ARD; 35 G8AIE; 36 G3PKT; 37 G8ATK; 38 G8ACP; 39 G8AQZ; 40 G8ARC; 41 G8AVL; 42 G8ART; 43 G5NU; 44 G3FIJ; 45 G3XEB; 46 GW8AHI; 47 G8AVX; 48 G8AKQ/P; 49 G8ABB; 50 G8ADC; 51 G8ADC/P; 52 G8ATL; 53 G3UBX; 54 G8AZO; 55 G2WS; 56 G8ALM 57 G8AYN; 58 G8BGQ; 59 G8AWS; 60 G8AWS/P; 61 G8BYV; 62 G3UQK; 63 G8BAK; 64 G8BCA; 65 G8BIL; 66 G8APZ; 67 G8CKX; 68 G8AMU; 69 G3EHM; 70 G8DLP; 71 G3RZG/P; 72 G5UM (new QTH); 73 G3OBD/P; 74 GC2FZC; 75 G8BQH; 76 G3PBV (old QTH); 77 G8CKX/P; 78 G2WS/P; 79 G8AMU/P; 80 G3RZK; 81 G8BKR; 82 G8ERW; 83 G8AAC/A; 84 G8CIT; 85 G8ADP/A; 86 G3FRV; 87 GW8EQH; 88 G8FCK; 89 G8FUI; 90 G8DAW/G4BMM.

432MHz Senior Transmitting Section

1 G3MCS; 2 G8AKE; 3 G3KEQ; 4 G2XV; 5 G8AWS/P; 6 G8AUE; 7 G8ACQ; 8 G8ATS 9 G8BBB; 10 G3COJ; 11 G8ARM; 12 G8BCA; 13 G3XEB; 14 G5NU; 15 G3ZYC; 16 G3DAH.

432MHz Receiving Section

1 BRS15744; 2 A5032; 3 A6812.

1,296MHz Transmitting Section

1 G3MCS.

Supreme Award

1 G3MCS; 2 G5NU.

Microwave Section: 3cm

1 GW3RPE/P; 2 G3ZGO/P; 3 G8APP/P; 4 G3ZKR/P; 5 G3WDG/P.

SWL NEWS item

by Bob Treacher, BRS32525

Updated score for the 1972 Countries Table

	10	15	20	40	80	160	Total
A7460	150	216	213	113	101	17	810
BRS25429	144	163	204	102	125	9	747
BRS33823	136	194	188	92	114	13	737
BRS17567	141	213	218	58	90	7	727
BRS33558	94	136	208	40	54	2	534
A7139	93	111	120	76	65	15	480
BRS33364	54	145	164	47	52	3	465
BRS32524	58	134	147	46	75	4	464
BRS32457	54	106	121	44	44	0	369
A8037	66	84	78	19	30	1	278
A8054	4	29	143	26	31	7	240
A8094	51	38	66	15	41	7	218
A7511	10	30	46	13	33	2	134

SWL NEWS

by BOB TREACHER, BRS32525*

FIRSTLY let me wish all readers a happy and prosperous New Year and I trust you will find much pleasure in amateur radio over the next 12 months. The New Year should get off to a lively start on all bands, as with the lengthy Christmas and New Year break people tend to find more time for amateur radio. The 80m band in particular should be worth listening on as conditions during January are usually rather special. During afternoon hours long distance dx stations can be heard from such places as ZL, KG6, VS6, DU and HS. When conditions are really good, W6 and W7 can also be heard at around 1430 to 1500gmt. A regular over the last few seasons has been Paul, VS6DO, who has an aerial perched on top of a large office block. His signal has been really tremendous, often peaking 20dB over S9 and has been heard regularly working the west coast of the USA before he turns his attentions to the hoards of Europeans anxiously waiting. Let us now consider whereabouts on the dial these exotic happenings can be found. Last year, the first 10kHz of the USA phone band were the main frequencies on which to listen. However, with the "extra" class USA licensees now being able to transmit between 3,775 and 3,800 (and on 40m from 7,150 to 7,200) things could be slightly different this year. To overcome the QRM problems which are experienced, the dx stations may still favour transmitting in the USA phone band and listening below 3,800 for calls. This afternoon 80m dx bonanza favours stations in Scandinavia because of the total darkness path between them and the dx, but Gs, DLs etc can capitalize on these good conditions and this was certainly so last year. It is hoped that more dx stations will be active at this time during January and it is known that several KL7s and a KH6 are to be active. Let me wish everyone luck in hearing these stations and I would be pleased to have reports of dx heard on 80m for publication at a later date.

Points from the post

A number of people have written in for the first time and we welcome them. They include Peter Giles, A8149, Ritchie Leslie, A8085, Norman Macdonald, BRS33637, and L. Poole, BRS33558. Peter writes enclosing a list of G calls heard on the band recently. To give the names and QTH of these would take up very much room but readers are recommended to purchase a copy of the 1973 RSGB call book. This publication is now on sale and costs 70p including postage. It will include the vast majority of calls listed. However, some, I feel, have been misread and I must stress that care should be taken to log the correct callsign at all times. Ritchie has an FR50B to a 7MHz dipole running NE/SW and this set-up has enabled much dx to be logged. The best to date appear to be VP1BH and 5R8BD. Norman comments on the bad manners to be found on our bands, especially on 80m. It is the writer's opinion, however, that the bands are not so polluted as they were a year or so ago and that some of the pirates on 80m have been caught and their equipment confiscated. SWL Poole started listening in April 1972 when he obtained an HRO receiver. Since then a KW202 has been purchased and he has heard many interesting stations, as his entry into the table proves. A 14AVQ vertical aerial is proposed at this QTH in the near future.

Colin Baker, A4483, now holds the call G8GMR but there are unfortunate circumstances which led to his taking out this call. During August he ended up in hospital, having come off second best in an argument with a car. He is progressing steadily but will not be 100 per cent for a while yet. Thanks to members of the Dunstable Downs Radio Club he was able to air his call /A from the hospital bed and had skeds with G3YPP daily.

The men at the top

The man at the top of the table is still Chris Henderson, A7460, and he comments that the bands were very changeable during November but he managed to hook three all-time new countries in the shape of HK0BKX, WA1RDH/VQ9 (Chagos) and VQ9R/D (Desroches). This takes his all-time score to 251 countries heard. Chris also reports good 160m conditions and offers EP2BQ, OK & OL, PA0PN, OH1RG, OH2BO/1 and W1BB as evidence. Chris helped man the Cray Valley Radio Society's CQWW Phone Contest station at the end of October and enjoyed the event immensely.

David Whitaker, BRS25429, also comments on the CQ Contest and mentions logging 103 countries on 10m during the contest. A session logging for Sydney, G3ZBA, in the same event ensured a well-spent weekend. David comments that the lf bands were in reasonable condition—UK0SAA/P in Zone 23 on 80m, XT2AC and XV5AC on 40m and KV4FZ on 160m ssb being proof.

Another to hear Herb, KV4FZ, was John Fitzgerald, BRS33823, who also heard HB0XMK and OH2BO/1 for three new ones on 160m. All this with a 20m doublet as an aerial! It seems as though the CQ Contest was the high spot of John's month with Carl, VQ9R/D, heard for an all-time new country and his QSL was received direct a fortnight later. John comments that 40m was in poor shape during November but 80m provided CE8AA, LU6FEP, YA0CDRC and XT2AC. The 2m bug has bitten John but the aim is to claim the FMD Receiving Award in the near future, although he needed a good number of QSL cards when he wrote.

Unusual prefixes

The CQ Contest usually accounts for many unusual prefixes and this year was no exception: CT7-Portugal, HT0-Nicaragua, CV, CW-Uruguay, YX, 4M4-Venezuela, XD, XI, 6D, 6F, 6G, 6I, 6J-Mexico, 9C9-Iran.

Finally, a 1973 countries table—same rules as 1972—will start from 1 January 1973. Contributions and scores for the 1972 and 73 tables to reach the writer by 3 February 1973.

*392 Rochester Way, Eltham London SE9 6LH.

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

IT is a sad fact that the world contains an ever-increasing number of persons who "know their rights"—and insist on pursuing them, regardless of the consequences to others. Readers may have noticed the occasional presence of Australian amateurs who are transmitting ssb below 21,150kHz —in other words in the portion of the 21MHz band which is reserved for exclusive cw use in most parts of the world either as a result of legislation or "gentlemen's agreement". Australian readers may point out that there is no licence restriction or band plan in force in their region, but they might bear in mind that when they are in contact with stations located in areas where band planning applies, they are encouraging a bad practice by not staying above 21,150kHz.

DX news

Changes in the political status of a number of smaller DXCC "countries" could possibly result in their re-classification in the near future. A dispute is reported to have developed over the sovereignty of Serrana Bank, Roncador Cay, and Quito Sueno in the Caribbean area. Since the USA relinquished its control, both Nicaragua and Colombia have claimed the areas. Arguments over who owns Minerva Reef continue, with the claims of Caribbean-Pacific Enterprises Ltd being rejected by Fiji and Tonga—the latter country having already planted a flag on the territory (which is submerged for most of the time). Stamp collecting readers will be interested to know that one of the buildings the private company is said to be building will be a post office. The latest list of criteria for DXCC recognition (published in October *QST*) refers to the exclusion of "unadministered areas"—any area which is unadministered will not be eligible for consideration as a separate entity.

Ralph Lord, GD3CAE, retired Canadian Army Major and electronics expert, first licensed in 1932 as VE4CAE, enjoys an ideal location 400ft asl overlooking the Calf of Man

QSL cards have been received from HH2JT who would now appear to be the only amateur in Haiti since HH9DL closed down and left early in December.

George, K0WTM, (ex-ET3GB), is on the air from Peru with the callsign OA6CV. He has an SB102 and 14AVQ and quad aerials, and is to be found on cw and ssb on all bands 28 to 7MHz. Skeds may be arranged by writing to the address in *QTH Corner*.

Readers will be pleased to hear that Tom Christian, VR6TC, has now recovered sufficiently from his foot injury to return to Pitcairn Is from New Zealand where he has been receiving treatment.

VQ9HCS is currently active from Aldabra Is and will be there until March. He has a KW2000B and ground plane aerial, and has been reported on 21,295kHz at 1630, and 28,600kHz at 1200. Three stations are now on the air from Chagos—VQ9DW, K5QFH/VQ9, and WA1RDH/VQ9 who appears to be a newcomer and who has been heard on 21MHz around 1200. It seems that Alex Mootoo, 3B8DA, did not succeed in visiting Rodriguez Is as planned and that a genuine 3B9DA has not been on the bands.

The Arabian Knights Net now meets on Tuesdays and Saturdays at 1400, and on Fridays at 1300, each time on 14,290kHz. The MC of the British Commonwealth Net is now G3SUW, G3LQP having retired after four years excellent performance in the position. Your scribe receives many comments on the first-class service provided by G3LQP in dealing with QSL requests for the stations for whom he acts as QSL manager.

VP8MR and VP8MX, in S Georgia, are often to be found on Tuesdays, Thursdays and Saturdays at 2020 on 14,127kHz, and are sometimes joined by VP8ME who is located on the S Orkney Is.

QSL cards from TI9C have been received from TI2GI, whose address appears in *QTH Corner*.

CT1 stations are to be permitted to use the CT4 prefix during the CQ WPX contest in March. CR5AJ is now to be found almost daily between 1130 and 1200, and 1700 and 2100 on 21,060kHz. He is often on all day on Sundays.

MP4MBB has been worked using his new callsign—A4FA—which is in the series recently issued to Oman.

According to the *West Coast DX Bulletin*, Japanese amateurs holding first-class licences may now have a two letter suffix to their calls. Second-class licensees will be given a JM prefix followed by three letter suffixes.

CR3RY informed G3YHB that CR3AB and himself are the only two stations in Portuguese Guinea who operate on cw. Jean, CR3RY, returns to his CT1RY call in Lisbon early in 1973, and CR3AB is expected to leave in the spring.

JY6UHA, UMM, UMS and UNM are on the air from Amman University. QSLs go to PO Box 13016, Amman, Jordan.

Chas, ex-TJIAW, is now living in the UK and has the callsign G5BAU. It is believed that he will stay for three years.

*10 Knightlow Road, Birmingham B178QB.

Awards

The Diplome de Nancy
This is available to those who have contacted (or heard) at least four stations located in the department of Meurthe et Moselle (54) after 31 December 1971. A certified copy of the log entries (signed by one other amateur) and eight IRCs should be sent to: Section du REF Diplome Manager, BP 088, 54002 Nancy Cedex, France.

The Brazilian DX Club Award
Six classes—for contacting/hearing 5, 10, 20, 50, 100 or 200 members of the Brazilian DX Club since 1 September 1964. Send log copy plus QSLs and 10 IRCs to: CBDX, PO Box 842, Recife, Brazil. Log extracts should show claimed class, station call, his CBDX number, date and time, band, mode, and report received.

The Ex-G Certificate
Applicants require confirmation of contact with six members of the Ex-G Radio Club—not more than four having been with stations in any one country, or more than one in any USA call area. (American and Canadian applicants require QSLs from 16 members, three of whom must be located outside the USA and Canada). QSLs and five IRCs (plus return postage for QSLs) should be sent to the nearest QSL secretary—in the UK this is G8FG, 235 Station Road, West Moors, Wimborne, Dorset. Listeners may also apply and require confirmations from eight members in the USA (not more than two from any one call area) and six from elsewhere.

The OZ Cross Country Award (OZ-CCA)
The old OZ-CCA Award, first issued in 1952, has been updated and a new award is being issued for contacts on and after 1 April 1970. It is given for contacts with OZ1—OZ9, and OX3 (not OX5), each of which count one point. Two stations in each OZ prefix area and up to nine OX3s may be counted for credit on each band. Contacts must have been all cw or all phone. Amateurs in Europe (outside Scandinavia) require 50 points, and in the rest of the world 40 points. A list of QSLs, certified by a national awards manager, plus five IRCs, should be sent to: EDRs Traffic Department, Box 335-DK 9100-Aalborg, Denmark.

The Norfolk Broads Award
The Norfolk & Suffolk Award
Worked British Fishing Ports
These are part of the Lowestoft & District ARC 1972 awards programme, and full details may be obtained from G3XSK, 28 Springfield Gardens, Lowestoft, Suffolk.

CPR Awards (special)
IARC is anxious to collect data of contacts made between 26 July and 14 August, and will award certificates marked "Special Event, 26 July to 14 August 1972". The total of contacts made between 0000 26 July and 2359 1 August, and between 0000 9 August and 2359 14 August may be multiplied by 10, and those made between 0000 2 August and 2359 8 August by 100 to qualify for the award. Applications must reach IARC, PO Box 6, 1211 Geneva 20, Switzerland, before 31 December 1972. The classes of CPR Award are as follows: 1st Class—for 10,000 contacts/reception reports, 2nd Class—for 5,000, 3rd Class—for 1,000, and 4th Class—for 100. Application forms are available from IARC.

GB3OG, 1st Newport (IOW) Old Guard Scouts, made 33 contacts with 22 different countries taking part in 1972 JOTA. The station was controlled by Eric Westmore, G3RXC (at operating position), and Don Lake, G3TGZ

Indian Independence Award
Awarded to those who have contacted at least 10 stations using the VU25 prefix. Log details and five IRCs should be sent to PO Box 6538, Bombay 26, India.

Worked All Zones (WAZ)
This popular certificate issued by *CQ* magazine will be available in single band/single mode form with effect from 1 January 1973. All five bands 3·5 to 28MHz will be catered for and the rules mention only all cw or all phone (ssb/a.m.) classes. All normal WAZ rules will apply except that contacts must have been made after 31 December 1972. Special plaques will be awarded to the winners of the first phone and cw awards on each of the five bands (10 in all) and applications for these must be sent direct to K4IIF, PO Box 205, Winter Haven, Fla, 33880, USA. The winners will be decided by the postmarks on the applications so it will be important that these are legible. Normal applications may be sent to G3FKM for certification—forms are available from the same source (sae, please).

Dxpeditions

A Norwegian scientific group is reported to be due to visit Bouvet Is during January, and it is rumoured that two callsigns have been issued to members of the expedition—3Y4CG and 3Y4DQ.

Jim Sorenson, G5AXC, operated from Tunisia as 3V8BB during the last weekend in November. He is hoping to return several times during the spring and summer and to be active on all bands 3·5 to 28MHz on cw and ssb. QSLs should be sent to the address in *QTH Corner*.

Contests

The ARRL International DX Competition
0000 3 February–2400 4 February, and same times 3–4 March (phone).
0000 17 February–2400 18 February, and same times 17–18 March (CW).
All bands 1·8 to 28MHz. DX stations contact as many stations in the 48 contiguous USA and the Canadian call areas as possible. Each contact counts three points and the multiplier is the total number of USA states plus VO and VE1–VE8 worked on each band totalled together. Log sheets (please state how many—each covers 100 contacts) and

QTH Corner

A2CAO PO Box 108, Orapa, Botswana.
A2CCY Bob Furzer, PO Box 298, Francistown, Botswana.
A2CJP via VE4SW, S. M. Wohl, 33 Cherryhill Rd, Winnipeg 17, Manitoba, Canada
DX40PAR via DU1EJ, 43 Pasole Road, Malinta, Valenzuela, Bulacan, Philippine Is.
F5IJ/MM via F5XA, BP 50, 78120-Rambouillet, France.
F0A ɔO/FC via VE8RA, PO Box 356, Yellowknife, NWT, Canada.
GW3GW (Blackwood ARS) via GW4BLE, 87 Thornbury Park, Rogerstone, Newport, NP1 9DR.
HB3XMK DJ1BP, H. Kimmel. Teckstr 13, 73 Esslingen-Hegensberg, Germany.
HH2JT J. Tomar, POB, 586, Port au Prince, Haiti.
OA6CV G. Brumley, Box 825, Arequipa, Peru.
PY7ZAH/PY0 Box 91, Recife, Brazil.
VP8HZ via G3NMH, The Spinney, Hilltop, Beaulieu, Hants.
VP1MU via W5WMU, P. E. Sonnier, 305 Silverbelle Pkway, Lafayette, La. 70501, USA.
VQ9HCS H. Stickley, Box 84831, Mombasa, Kenya.
VQ9HCS via WA1HAA, W. deLage, 238 Slater Street, Attleboro, Mass, 02703, USA.
YJ8EE Jacues Sapir, c/o Radio Station, Santo, New Hebrides.
ZF1GW, ZF1SF, ZF1VD Box 6834, Southbobo Sta, West Palm Beach, Fla, 33405, USA.
VRO D. Appleton, 3 Boyne Rise, Kings Worthy, Nr Winchester, Hants.
VS6AH A. H. Bridgman, Flat 18, 8 Mansfield Road, Hong Kong.
3V8BB J. Sorenson, G5AXC, 106 Eyre Ct, St John's Wood, London NW8.
4M4UA via W6CUF, J. A. Maxwell, Box 473, Redwood Estates, Cal, 95044, USA.
4W1BC new—via G3SUW, Beaulieu, Woodsland, Cliddesden, Basingstoke, Hants.
9H QSL Bureau PO Box 575, Valletta, Malta.
9H5C J. Harris, PO Box 302, Valletta, Malta.

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

When G3KPO met W6AM at his ranch in California, also present was HM1CG, and Song gave both Douglas and Don a beautifully hand-carved Korean perpetual calendar

summary sheets are available from G3FKM in exchange for an sae (large).

The CQ WW DX 160 Contest
2200 26 January to 1600 28 January (CW only).
Exchanges consist of QSO number and RST. USA/Canadian stations will also give their state or province. Contacts with stations in one's own country count two points, in other countries five points. Contacts with W/VE/VO count 10 points. The multiplier is the number of DXCC countries, USA states and Canadian provinces worked. Note that contacts with USA/Canada count as state/province multipliers only and not as countries as well. Top world scorer will receive a plaque, and top scores in each country a certificate. Log and summary sheets may be obtained by sending a large sae (with IRCs) to CQ 160 Contest, 14 Vanderventer Av, Port Washinton, LI, NY, 11050, USA. Logs should be mailed to this address before 28 February.

1973 French Contest
1400 27 January to 2200 28 January (CW).
1400 24 February to 2200 25 February (Phone).
Exchange RST and serial QSO number. Contacts with France and the DUF countries (HB, 4U1, LX, ON, 9Q, 9U and 9X) count three points. Multiplier is one point per band for each French department, Swiss canton, Belgian province, 4U1, LX, 9Q, 9U or 9X worked. Logs go to Lucien Aubry, F8TM, Rue Marceau 53, 91120 Palaiseau, France. Contacts made during this contest may be used in the absence of QSL cards when applying for the DUF, DPF, DDFM, or DTA awards for a period of two years after the contest. The 1972 event attracted over 400 entries—three of them from the UK—**G3TXF** (3,876 points) and **GW3INW** (1,428 points) on cw, and **G4ACQ** (5,550 points) on phone.

Winter QRP Contest 1973
1500 6 January to 1500 7 January.
Less then 10W input—cw only. 1·8 to 28MHz. An eight-hour rest period must be taken in not more than two parts. Exchange RST plus QSO number and input power with "x" if crystal controlled. Contacts with own country count one point, with own continent two, and with others three points. Contacts with contest stations attract an additional three points to these (ie, 4, 5 and 6 points). Points are doubled if using crystal control or less than 3W input. Multiplier is DXCC countries on each band—own continent each counts one, otherwise as two. Send separate logs for each band and summary sheet before 29 January to: Hartmut Weber, DJ7ST, D-3201 Derneburg, Am Walde 83, Germany.

W2CTN
Readers will learn with regret of the death of Jack Cummings, W2CTN. Jack will always be remembered for the magnificent service which he provided as QSL manager for a very large number of dx stations—a list in May 1967 *MOTA* contained 192 callsigns of stations distributed throughout 100 countries.

Odds and ends
9H1E has given up managing the Malta QSL bureau after 50 years of service to amateur radio, and Carmel Fenech, 9H1AQ, has now taken over.

David Appleton, G3NRA, formerly VR1O, may now be reached at the address shown in *QTH Corner*.

A. H. Bridgman, VS6AH, alias G3BAA, SU1SB, VK2AHO and 9M2BR, has a new location and hopes to be heard more frequently—his aerial being situated on the top of a 12-storey block of flats.

Top band news
What is believed to be a complete list of 160m WACs issued to date has been supplied by W1BB. The first—issued on 20 June 1953 was acquired by Stew himself, and the others are given as follows: G6GM, G3PU, W8GDQ, G3OQT, DL1FF, W1PPN, G3PQA, W2KQT, W6KIP, G3RBP, W2IU, G3FPQ, G3LIQ, K6DZC, W0VXO, DL9KRA,

W0NWX, GI6TK, W9PNE, W1HGT, KV4FZ, OK2PDN, GM3YCB, HB9NL, HB9CM, OK1ATP, W2EQS, W6RW, WA4PXP and GM3WDF. ARRL did not keep complete records prior to 1966 but listings before that are from W1BB records which are thought to be accurate. W1BB, ARRL and the writer would be pleased to hear of any omissions from this list.

VK3CZ reports hearing G3SZA on 17 November at around 1900 but no contact was made. On 25 November OK1ATP was RST569 at the same time, and on the following day OK1FCW was RST349. No contacts took place but DHJ has been well received on quite a few mornings and Arthur is hopeful that he will soon break through.

Band reports

As expected, the excellent conditions on 28MHz did not last into November, and winter-like behaviour is now very noticeable on the other bands.

Many thanks to the following for supplying logs from which this section has been compiled: G2BJY, G2HKU, G3AAE, G3GVV, G3HCT, G3NKQ, G3UYM, G3YHB, GW4BLE, G5JL, BRS17567, ORS30694, BRS31301, BRS33823, A7511 and A7785. Stations listed in italics were using cw, the rest ssb.

3·5MHz. 0000 KV4FZ, PZ1CU, VP2LL, XT2AC, YA0CDRC, 6W8DY, 9K2AL, 9Y4VT. **0100** CE8AA, *KP4DLW*, VP2LI. **0700** F0ADQ/FC, HH9DL, TF5TP, *VR1AA*, XE1IIJ, *ZB2GN*. **0800** ZF1GC. **1400** DU1XJ. **1700** *UH8CS*, *UI8AE*, ZL4KE. **2000** EA6BH, *UM8FM*, YA1DT. **2200** DU1EJ, TY0ABD, 5B0CE. **2300** M1I, *MP4TDL*, PJ2CW, 9H1BX.

7MHz. 0000 *HK0BK*X, *YV5DR*. **0500** *HV3SJ*, *PYs*. **0600** *9L1JT*. **0700** *EA9EU*. **0800** VKs. **1700** JA5ACF. **1800** DU1EJ. **2000** CR6GA, *F0AHY/FC*. **2200** ZB2CM, *5B4CZ*. **2300** *KP4UW*, *ZC4BI*.

14MHz. 0700 FK8BK, KS6DY, KX6KL. **0800** C29ED, FK8BP, KC6SK, KG6SW, VK9FV, *3D2CM*, *9H3GB*. **0900** *JT1KAF*, *KC4USX*, *KL7HLT*. **1400** 9K9WB (Kuwait). **1500** FB8ZZ, FO8CS, OY8VM, SU1MA, VK0JV, VQ9DW, 4U1ITU, 5X5NK (QSL via DJ3JV). **1600** FL8AG, JY9LOM (QSL to K6LOM), VK9XX, 3B8CI, *3D6AX*, *4S7EA*, *4W1BC*. **1700** *FR7AI/E*, TJ1AX, VQ9HCS, ZS2MI, *5R8BD*. **1800** A2CJP (Box 52, Gaberones—or via VE4SW), FR7ZW, HH9DL, KH6BB, UA1GZ/M, XP1AB, **1900** CR3AD, UA1KAE/Vostok Base, ZD7SD, ZLs. **2100** *CR5AJ*, FG0AMC/FS7, OA6BH, VP2SAF. **2200** *CP1IY/B*, CR3KD, *EA9EO*, *HZ3TYQ*, *VK8ZZ*. **2300** XT2AF. **2400** JAs.

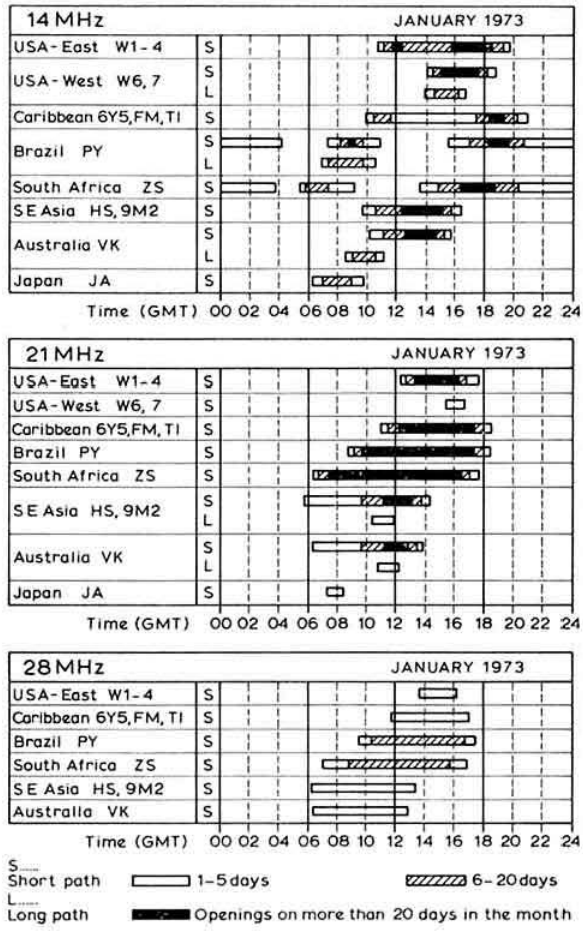
21MHz. 0800 *G3TZL/MM* (off 5R8—often to be heard at 1400 on 21,020kHz looking for UK contacts), JAs, XT2AC, *ZD3Z*, *9L1GC*. **0900** *JT1CAA*, *KA6AY*, *KC6SK*, *VS6s*, 5T5DY. **1000** TY0ABD, *VQ9R*, YA1DX, ZLs. **1100** JY6UNM, *TU2DQ* (QSL via WB4SPG), 3B8AD, 5N2ESH. **1300** *FP8FU*, HH9DL, HI8LC, HR3AC, ST2SA, TZ2AC, YB1KW. **1400** CT3AR, FB8XX, VQ9HCS, ZF1SB, 3B8AW. **1500** CR3RY, CR4BS, *FR7AI/E*, *HM5EE*, KC4USP, VQ9DW, 6Y5DL, 9G1HF. **1700** FH0DL, W6s, W7s. **1800** *KL7HIK*, *4S7ZW*. **2000** *PY0DVG*. **2100** *CR5AJ*.

28MHz. 0800 ET3USF, FL8AG. **1000** TZ2AC, UL7PAR, VK6s. **1100** *CW3AA*, VS6CD, OH2BH/6W8. **1200** MP4MBC (QSL via G3XEC), *VP2LAW*, VQ9HCS. **1300** KG4FO, KV4HI, VP2MAH, ZE1DP, 5R8BF, 9J2WF. **1400** HK0BKX, KZ5AA, W1-W0, *ZC4BI*. **1500** FL8OM, FR7ZN, VP8HZ, *3B8MS*. **1600** EA9EJ.

Propagation Predictions

Conditions in January will differ little from those of the previous month. The hf bands should remain open a little longer towards the end of the month, otherwise the forecast given for December will hold good for all bands mentioned. It is again pointed out that the times in the tables 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 1972 was 37·6 with solar activity reasonably evenly spread throughout the month. The predicted smoothed monthly sunspot numbers for March, April and May 1973 are 43, 41 and 39 respectively.



Many thanks to all correspondents, and especially to the authors of the following for information obtained from their publications: **QUAX** (*G3DME*), the **DX'ers Magazine** (*W4BPD*), **NARS Newsletter** (*5N2ABG*), **Long Skip** (*Nick Sawchuk*), the **West Coast DX Bulletin** (*WA6AUD*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX'press** (*PA0INA/PA0TO*), **DX News Sheet** (*Geoff Watts*), and the **29 DX Club Newsletter** (*VK6JR*).

Please send all items for the **February** issue **to reach G3FKM** no later than **10 January**, for **March** issue by **7 February**, and for **April** issue by **7 March**.

The 1972 AGM

Despite the appalling weather and the counter curvacious attractions of the Miss World Contest, more than 100 persons were present when the meeting was opened by the President, Mr R. J. Hughes, G3GVV. After welcoming those present, G3GVV called for the adoption of the minutes of the 1971 meeting followed by the approval of the annual report of Council. It was explained that the annual report, as required by the Companies' Act, is included as part of the accounts but that a full report giving details of Society activities would be published in the February issue of *Radio Communication*. It was obvious from a number of comments from the floor of the meeting that this procedure was not welcomed since it gave no opportunity for comment on the general Society activities, as distinct from the accounts. This point will surely be noted for future annual meetings. The Treasurer, Mr J. O. Brown, G3DVV, provided some additional explanation of the accounts and proposed their adoption. While the small profit shown for the year ended on 30 June 1972 is welcomed, it was emphasized that difficult times lie ahead and the profit for 1972–3 is expected to be smaller, bearing in mind that no subscription increase is envisaged.

The President then announced the results of the election for Council for 1973, naming Messrs Allaway, Newnham and Ward as successful ordinary members, while Mr W. J. Green, G3FBA, retains his seat as zonal member for Zone C. Mr J. Bazley, G3HCT, has tendered his resignation from Council for business reasons and it will be necessary to co-opt a member to represent Zone B during 1973. The Treasurer then formally moved the re-appointment of the auditors, Messrs Edward Moore and Sons. There being no items of other business the President then closed the formal section of the meeting.

On behalf of the Society, G3GVV accepted from Mr W. C. Green, G3QG, a portrait in oils of The Prince Philip, Duke of Edinburgh. G3QG, who was accompanied by Mrs Green, was thanked by the President for his unique gift. The presentation of Society trophies then followed. It is fitting to specially mention that the Courtenay-Price Trophy, awarded to the late G2UJ, was received by G5OX. At the conclusion the President thanked the Trophies Manager, Mr Peter Carey, G3UXH, for his work during the year and complimented him on the sparkling appearance of the various trophies.

After a short break the informal meeting was opened. An item of interest to all, in view of the impact on subscriptions, was VAT. The possibilities were explained by G3DVV who reported discussions with the Customs & Excise as to ways of lessening the effect on membership dues. It had been established that VAT was not payable on the Society's journal. The operation of VAT will commence on 1 April 1973 and the RSGB attitude must be finalized well before that time.

G3NKR raised the question of European participation in RSGB contests which, he felt, would be a worthwhile stimulus to activity. G3ZGO questioned the Society's decision regarding the 144MHz band plan, particularly in relation to the IARU band plan adopted at Scheveningen. The RSGB views were given by G3FZL.

G6RC asked that action should be taken concerning the interference on 21MHz which was apparently audible throughout the world. G3PSM, the Intruder Watch organizer, reported that action had been taken through official channels. The interference was said to be of Russian origin.

G3VUQ asked for more information on Society activities through such features as "Council Proceedings". G3PAO backed this suggestion. G3VZV asked for more amateur television articles in *Radio Communication* and queried the necessity for fm channels on 2m, as recently suggested. G2BVN, replying, mentioned that no articles on television had been received for a considerable period and that space in the journal had to be divided pro rata according to the support given to the various interests.

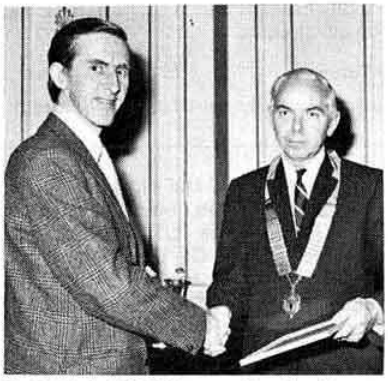
Concerning fm channels, G3FZL assured members that the Society had no intention of adopting a mandatory plan specifying channels. The 144MHz band plan was designed to accommodate users of all modes. G3LTF complained of the poor signals now often heard on 144MHz.

G3GJW asked how it was planned to celebrate the Diamond Jubilee of the Society and the President said that the various events were being organized on a regional basis.

G8BNE, G3SKD and G3PYU all commented on the choice of time and place for the AGM. It was asked why should not the meeting be held in a centre away from London, possibly on a rotation basis. The point was noted for further consideration and the

Racal ARC, winners of the Bristol Trophy, with Tim Hughes, G3GVV, RSGB President, after the presentation

(All photographs by Paul Fletcher).



P. K. Blair, G3LTF, accepting the Surrey Trophy on behalf of the Mid-Essex and Mid-Severn VHF/UHF Contest Group

Mr T. I. Lundegarde, G3GJW, accepting the RAEN Award

The Gravesend Trophy, accepted on behalf of the Oxford & DARC by D. R. Ward, G4AOQ

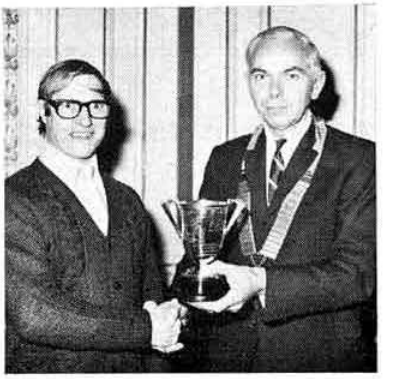
speakers were reminded that the quorum for an AGM was 50 members, and in the past there were at some meetings barely sufficient persons present in order for the meeting to take place. After some comments from the floor on this matter there were no further questions and the President closed the informal session at 8.30pm.

This brief account of the AGM has been written in order to give those who could not attend some idea of the matters discussed in advance of the minutes of the meeting proper and in no way constitutes a formal record of the occasion.

G2BVN

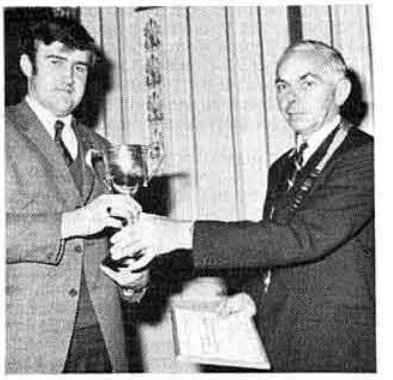
Dr D. A. Tong, G8ENN, with the Wortley-Talbot Trophy, awarded for outstanding experimental work in the field of amateur radio

M D. Beattie, G3OZF, receiving the Whitworth Trophy



Mr Curtis, G3SVK, receiving the Victor Desmond trophy

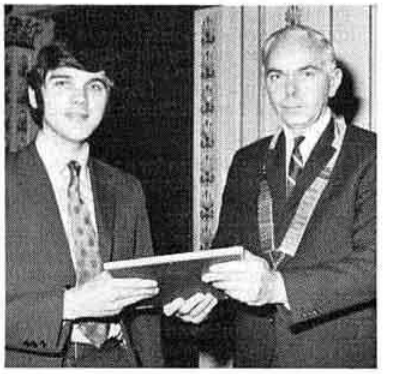
The Surrey Radio Contact Group, winners of the NFD Shield, seen here with RSGB president Tim Hughes, G3GVV



Terry Cooper, BRS28005, winner of the VHF/UHF Listener Championship 1971/72, accepts the Hanson Trophy

I. D. Brown, G3TVU, and S. L. Norman, G8BDO, with the Ostermeyer Trophy, awarded for a constructional article published in *Radio Communication*

The Founders Trophy was awarded to C. J. Thomas, G3PSM



"Les Clochards"—the tramps—were awarded the Mitchell-Milling Trophy as overall winners of the July 144MHz Open Contest. J. A. Coffey, G3PSH, accepts the trophy on their behalf

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 10 October 1972

Present: *Mr R. J. Hughes (President, in the Chair), Messrs J. O. Brown, W. J. Green, E. G. Ingram, G. R. Jessop, W. F. McGonigle, L. E. Newnham, C. H. Parsons, J. R. Petty, W. A. Scarr, R. F. Stevens, G. M. C. Stone, F. C. Ward and E. W. Yeomanson* (members of Council, *D. A. Findlay* (general manager) and *A. W. Hutchinson* (editor).

Apologies for absence had been received from Messrs Armstrong, Bazley, Smith and Dr Allaway.

Diamond Jubilee HF Contest
It was reported that provisional rules had been formulated by the HF Contests Committee.

Finance report
The Hon Treasurer commented on the draft accounts for the year to 30 June 1972. There had been no significant changes since the provisional figures were notified to the Council.

The effect of VAT on the Society's finances was discussed and it was explained that VAT would be payable on subscriptions. It was agreed that this matter should be referred to the Finance and Staff Committee for consideration and recommendations to Council.

Correspondence
A letter dated 19 September 1972 from Mr E. M. Wagner, G3BID, commenting on the difficulty of voting for prospective Council members when little was known about them was considered.

Emission modes in the 1·8 and 3·5MHz bands
It was pointed out that the use of ssb by the maritime mobile service with whom the above bands are shared, would be mandatory after 1 January 1975. It was agreed that it was desirable for amateurs to conform with the ITU requirements as to modes of emission on these bands. Therefore the Society would encourage its members to use ssb rather than a.m. on 1·8 and 3·5MHz.

Members and affiliation
Council noted the number of applications for membership, transfers and reinstatements for July and August 1972.
It was resolved:
(i) to accept a reduced subscription from one member;
(ii) to waive the subscriptions of 10 members on the grounds of blindness or other disability;
(iii) to grant affiliation to the Shirehampton Amateur Radio Club, Bristol; the South of Scotland VHF/UHF Contest Group; the Durham Contest Club, and the Solway Radio Club.

Region 12 ORM
Council gave permission for an ORM to be held in Region 12 (North Scotland) in August/September 1973.

Bristol celebrations '73
Council agreed that the President, Immediate Past President and general manager should accept the invitation of the organizers of the Bristol Convention 1973 to be present at the convention and following dinner/dance.

Committee minutes and recommendations
Council received the minutes of the following committee meetings: Raynet (3.6.72), MPT Liaison (27.6.72), HF Contests (20.7.72), Finance and Staff (21.7.72), Interference (21.7.72), Diamond Jubilee (25.7.72), Mobile and Exhibitions (1.8.72), VHF Contest (3.8.72), M and R (8.8.72), Technical and Publications (8.8.72), VHF (16.8.72), Education (19.8.72), Finance and Staff (21.8.72), Scientific Studies (21.8.72), Mobile and Exhibition (22.8.72), VHF Contest (7.7.72).

Recommendations as set out in the Technical and Publications Committee meeting minutes of 8 August 1972, and in the VHF Committee meeting minutes of 16 August 1972 were approved.

North West Amateur Radio Convention
Mr Stone reported on this convention in Lancaster over the weekend of 23-24 September. It had been very good and the organisers were to be congratulated on the success of this event.

Scottish VHF Convention and Region 14 ORM
The President reported that he and Mr Stone had attended this convention and ORM held in Glasgow on 1 October. Both events had been very successful and a credit to the organizers.

Council election results

The results of the election to fill the four vacancies on Council for 1973 are as follows:

Ordinary members		
E. J. Allaway,	G3FKM,	1,365 votes
P. Balestrini,	G3BPT,	633 ,,
A. C. Butcher,	G3FSN,	193 ,,
J. H. Ellis,	G2FNK,	382 ,,
M. Hearsey,	G8ATK,	727 ,,
R. E. G. Kendall,	G8BNE,	435 ,,
R. A. Ledgerton,	G2ABC,	382 ,,
L. E. Newnham,	G6NZ,	1,174 ,,
D. M. Pratt,	G3KEP,	635 ,,
C. J. Thomas,	G3PSM,	399 ,,
R. C. Wainwright,	G3YMH,	549 ,,
F. C. Ward,	G2CVV,	1,451 ,,
Zonal member—Zone C		
D. J. Andrews,	G3MXJ,	321 ,,
W. J. Green,	G3FBA,	357 ,,

Spoilt papers	4
Disallowed	34
Voting papers accepted	2,893

Messrs E. J. Allaway, W. J. Green, L. E. Newnham and F. C. Ward were, therefore, elected to serve on Council for the three years 1973–75.

OBITUARIES

Mr G. F. Cole, VK2DI
Mr G. F. Cole died on 13 July 1972. He was a very keen dx worker in his earlier years and had twice won BERU. He was also active in ARRL contests, a DXCC fan, and a member of WIA.

Mr G. A. Jeapes, G2XV
Gerry Jeapes, one of the old-timers of amateur radio, died on 25 November. He was licensed in the early 'twenties and his interests ranged over all aspects of the hobby from experimental and home-constructed gear to contests, in all of which he excelled; his work on 70cm being well known. A former area representative of the RSGB, he was also an active committee member of the Cambridge & District ARC.

The Society was represented at his funeral by G3GGK, regional representative; and G6LL, an honorary vice-president.

Mr E. G. Liebert, GW3ZXT
George Liebert died on 30 September. A keen radio amateur since his retirement, he was an active supporter of RAIBC.

Mr J. M. F. Sweet, G3CIV
Frank Sweet died on 21 November. He took a keen interest in radio communications, dating from his time with the Royal Corps of Signals, and was active on the hf bands.

General Rules for VHF/UHF/SHF Contests 1973

The following are the general rules for all RSGB vhf/uhf/shf contests during 1973, excepting the Special Jubilee Contest, VHF Field Day and the October UHF Contest, the rules for which will be published separately. The rules for any vhf/uhf/shf contest will be made up from the general rules, which will be referred to by number.

This year, in addition to events being either "Open", with no sub-sections, or of two sections "F" and "P", for fixed and for portable and temporary stations, there are some "portable only" and "fixed only" events of eight hours duration. The "fixed" events may run concurrently with part of some two-band 24-hour events.

Entrants should always use RSGB VHF/UHF Contest Log and Cover Sheets (Form 427); these are available from RSGB HQ or from adjudicators. Please enclose a large, strong sae. The attention of entrants who persistently use old hf cover sheets, no cover sheets at all, and/or odd types of log sheets, is drawn to Rules 13 and 14(ii).

1 Date and time. See individual contest details.

2 All entries must be sent to the adjudicator at the address given with the rules of the contest. Entries that are sent elsewhere will be disqualified.

3 All operators must be fully paid-up members of the RSGB.

4 Awards

(a) In each section of the contest there will be an award to the highest scoring station. An award will 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.

N.B. All awards are certificates. In addition, trophies will be awarded to the highest scoring stations in the following contests.

Trophy	Contest
VHF Manager's Trophy	June 70MHz Contest
Mitchell Milling Trophy	July 144MHz Contest
The Council Cup	May 432MHz Contest

5 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 per kilometre.

6 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.

7 Cross-band contacts

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

(b) On each band to be used for scoring in the contest, half points may be claimed for a cross-band contact by transmitting to, or receiving from, a station where two-way communication cannot be established. (Points may not be claimed on the same band for a further cross-band contact with the same station with the transmitting and receiving roles reversed, see Rule 10a)

8 Sections

(a) There are two sections:
Section F—fixed stations.
Section P—portable and temporary stations.
/A stations in which the equipment is a permanent installation enter Section F. /A stations in which the equipment has been installed for the contest enter Section P.

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

(c) Fixed stations only.

(d) Portable stations only.

9 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.

(c) Entrants must make 2-way A3J (ssb) contacts only.

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.

(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.

11 Stations using telephony in the recognized cw sub-bands 70·025–70·1MHz, 144·0–144·15MHz, 432·0–432·10MHz and 1,296·0–1,296·15 MHz are liable to disqualification.

12 Contest exchange

The contest exchange shall consist of:
(i) RS or RST report followed by serial number
(ii) Both QRA Locator and QTH.
No points will be lost where an entrant is unable to obtain a serial number or complete location information from a station not taking part in the contest.

13 Entries

Logs must be made out on RSGB Contest Log Sheets and tabulated as follows:
(i) Date and time (gmt).
(ii) Callsign of station worked.
(iii) My report on his signals and serial number sent.
(iv) His report on my signals and serial number received.
(v) QRA Locator received.
(vi) QTH received.
(vii) Points claimed.

14 (i) Entries must be postmarked not later than 15 days following the termination of the contest.
(ii) The RSGB VHF/UHF Contest Cover Sheet (Form 427) enclosed with the log must be correctly made out and the declaration signed.

15 An entrant must operate within the terms of his or her licence.

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

17 Stations that persistently overmodulate, or radiate key clicks or poor quality signals, render themselves liable to disqualification.

18 Contacts with unlicensed stations will not count for points.

19 All entries become the property of the RSGB and will not be returned. Entrants must keep their own log records in accordance with licence requirements.

20 Contacts made by EME reflection, man-made satellites (active or passive) or any relaying device will not count for points.

21 Proof of contact may be required.

22 Gross errors in claimed score render the entrant liable to disqualification.

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

24 The ruling of the Council of the RSGB shall be final in all case of dispute.

Definitions

All equipment, including aerials, for stations entering Section P must be installed on the site within the 24 hours preceding the contest or during the contest itself. This does not apply to storage of equipment. "Site" is defined as a circle of 1km radius centred on the operating position during the contest.

Club, /A and multi-operator stations may enter either Section F or Section P, according to their status under Rule 8(a).

QRA Locator is the standard five-symbol location system.

QTH must be given as a point identifiable on the Ordnance Survey 10-mile map, or as a bearing and distance in kilometres (not more than 25km) from such a point, to the nearest kilometre.

Serial numbers start at 001 for each band and advance by one for each contact. In cumulative activity contests the serial commences at 001 for each activity period.

General Rules for RSGB HF Contests

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.

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 contest information. This consists of an RS report on telephony, or an RST report on telegraphy, and a three-figure serial number starting with 001 for the first contact and increasing by one for each successive contact throughout the contest, irrespective of the band or mode in use. The supplementary rules for specific contests may call for additional information to be exchanged.

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

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 Radio Society of Great Britain. 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) Unless otherwise stated, entries must be addressed to the HF Contests Committee, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE, England.

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 framed certificate. 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 tone reports of T8 or less.

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

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

(e) If log entries contain unmarked duplicate contacts for which points have been claimed.

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

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

RSGB CONTEST LOG SHEET

Band .....

Contest ..... Sheet No. ..... Callsign .....

Date and time (gmt)	Callsign of station worked	My report on his signals and serial No. SENT	His report on my signals and serial No. RECEIVED	(5)	(6)	(7)	Points claimed
					Total from	previous sheet	.....

County Code Letters for RSGB Contests

County Code Letters	County
AD	Alderney
AG	Anglesey
AL	Argyllshire
AM	Antrim
AN	Aberdeenshire
AR	Armagh
AS	Angus
AY	Ayrshire
BD	Bedfordshire
BE	Berkshire
BF	Banffshire
BR	Brecknockshire
BS	Buckinghamshire
BU	Bute
BW	Berwick
CA	Cardiganshire
CD	Cumberland
CE	Cambridgeshire
CH	Cheshire
CL	Cornwall
CN	Clackmannanshire
CR	Carmarthenshire
CT	Caithness
CV	Caernarvonshire
DB	Denbighshire
DF	Dumfriesshire
DH	Durham
DN	Devonshire
DT	Dorset
DU	Dunbartonshire
DW	Down
DY	Derbyshire
EL	East Lothian
EX	Essex
FE	Fifeshire
FH	Fermanagh
FT	Flintshire
GN	Glamorgan
GR	Gloucestershire
GY	Guernsey
HD	Herefordshire
HE	Hampshire
HF	Hertfordshire
HN	Huntingdonshire
IM	Isle of Man
IS	Inverness
JY	Jersey
KB	Kirkcudbrightshire
KE	Kincardine
KS	Kinross
KT	Kent
LD	London (Postal District)
LE	Lancashire
LK	Lanarkshire
LN	Lincolnshire
LR	Leicestershire
LY	Londonderry
MG	Montgomeryshire
MH	Monmouthshire
MN	Midlothian
MR	Merioneth
MX	Middlesex
MY	Moray
ND	Northumberland
NK	Norfolk
NM	Nottinghamshire
NN	Nairn
NR	Northamptonshire
OX	Oxfordshire
OY	Orkney
PB	Peebles
PH	Perth
PK	Pembrokeshire
RD	Rutland
RH	Roxburghshire
RN	Radnorshire
RW	Renfrewshire
RY	Ross & Cromarty
SD	Staffordshire
SE	Shropshire
SF	Suffolk
SG	Stirlingshire
SK	Selkirk
SL	Shetland
SR	Sark
ST	Somerset
SU	Sutherland
SX	Sussex
SY	Surrey
TE	Tyrone
WD	Westmorland
WE	Wiltshire
WG	Wigtownshire
WK	Warwickshire
WN	West Lothian
WR	Worcestershire
YS	Yorkshire

General Rules for RSGB HF Receiving Contests

The general rules for all RSGB hf receiving contests are given below. For each contest held, a supplementary set of rules will be set out which should be read in conjunction with these general rules.

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) 11(e).

CONTEST NEWS

80m Field Day results

Eleven entries were received this year, although at least 16 portable stations appear to have been active for the contest. There was plenty of activity on the band and this enabled the leading stations to maintain a good scoring rate even during the last hour of the event.

The winning station was operated from Oakham in Rutland by G3SJX and G3UFY. They used an FT277 transceiver with an outboard transistor pa driving a dipole at 60ft, and they comment that the two of them could have done with some help when erecting the 60ft masts. G3VOC/P operated by G3ANK and G3VLT from Sidcup, Kent, employed a homebrew transmitter running 8W to a TT11, an HRO, and a dipole at 40ft to bring them second place. Close behind was G2KK/P, assisted by G3GKI, with a Codar AT5, an FET'd "command" receiver and a dipole. G2KK was very unfortunate as three of his four 20ft aerial poles left on site the day before the contest were stolen overnight. Their aerial was supported by the sole remaining pole.

G3JKY/P used the only home-constructed fully solid-state station, which he powered from 4·5V dry batteries. Most entrants' aerials were dipoles—one notable exception being G3SGH/P who loaded-up a 30ft length of wire.

The Houston Fergus Trophy will be presented to G4ALE, and Certificates of Merit will be sent to G3VOC and G2KK.

Posn	Callsign	QSOs	Points
1	G4ALE/P	87	595
2	G3VOC/P	69	465
3	G2KK/P	66	460
4	GW3HGL/P	63	445
	G3XRX/P	59	445
6	G3JKY/P	54	430
	G3VW/P	60	420
8	G3IGU/P	59	410
9	G3WGV/P	48	378
10	G3AGX/P	36	300
	G3SGH/P	37	300

Check logs from G3XIV and BRS30033 are acknowledged with thanks.

First 1·8MHz Contest 1973 rules

1. **The General Rules for RSGB HF Contests,** published in this issue of *Radio Communication,* will apply.
2. **When.** 2100gmt Saturday 10 February 1973 to 0200gmt Sunday 11 February 1973.
3. **Contacts.** CW (A1) only in the 1·8-2MHz band. County code letters, as published in this issue of *Radio Communication,* must be sent after the report/serial number group; eg for a contact from Surrey, 579001 SY.
4. **Scoring.** Six points for each of the first six contacts with stations in any one county; three points for the seventh and subsequent contacts with stations in that county; six points for each contact with a station outside the British Isles.
5. **Logs.** Column 5 should be headed "County Code Letters Received". Entries should be addressed to: The HF Contests Committee, c/o S. V. Knowles, G3UFY, 32 Nursery Road, Thornton Heath, Surrey, CR4 8RF.
6. **Awards.** The Somerset Trophy will be awarded to the winning station. 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 1972.

   A certificate of merit will be awarded to the leading entrant whose 18th birthday falls on or after 14 February 1973. Entrants wishing to compete for this award should state their date of birth on the contest cover sheet and mark clearly at the TOP of the sheet "UNDER 18". 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.

432MHz Cumulative Activity Contest rules

Dates: 4, 12, 20, 28 January; 5, 13, 21 February.
Times: 2000–2200gmt.
All entries and checklogs must be sent to: VHF Contests Committee, c/o G2HIF, 20 Harcourt Road, Wantage, Berks OX12 7DQ.
The following **General Rules,** published in this issue of *Radio Communication,* will apply, 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9a, 10b, 11–24.

January 144MHz SSB Contest rules

Date: 7 January.
Times: 1000–1800gmt.
All entries and checklogs must be sent to: VHF Contests Committee, c/o 17 Holmbush Road, London SW15.
The following **General Rules,** published in this issue of *Radio Communication,* will apply, 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9c, 10a, 11–24.

February 144MHz CW Contest rules

Date: 4 February.
Times: 1000 to 1800gmt.
All entries and check logs must be sent to: VHF Contests Committee, c/o 11 Liphook Crescent, Forest Hill, London SE23 3BN.
The following **General Rules,** published in this issue of *Radio Communication,* will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8d, 9b, 10a, 11 to 24.

4th BARTG VHF RTTY Contest 1972

The general comments on band conditions seem to indicate that these were not too good on the first stage but that they were a little better during the second leg. Conditions to the Continent from the UK were not favourable, but despite this G3NYK near Ipswich managed to work across to PA0-land. The activity in England seems to have been fairly evenly divided between the Home Counties and the central and west Midlands with some activity in East Anglia. The distances between contacts for UK stations were a little lower than last year but the German rtty operators were fortunate to be able to make contacts at greater range. Notable was the contact between DJ9MJ in Munich and OE1VKW/3 SW of Vienna at 333km.

The number of logs was slightly up on last year and it was encouraging to see a few more stations operating on 70MHz and 432MHz. The number of logs from G stations was down on last year but the number of other active G stations was slightly higher. Activity from Germany was higher this year and it was pleasing to hear from Austria for the first time on vhf.

Interest in the contest seems to have been maintained, and the event will be held again this year but with some changes in the scoring system. It is proposed that the rules will be based on the RSGB Rules for VHF Contests. The country multiplier will be dropped altogether and the multiplier for 432MHz operation will be reduced (Ted Double, G8CDW, would appreciate your comments on this at an early date).

Many thanks to all stations who supported the event either directly by an entry or by giving contact points to competing stations and we look forward to your continued support and interest next year.

Callsign	Points	Contacts		Countries	Farthest contact (km)
70MHz band					
G3NHZ	27	2		1	28
G3OLM	26	1		1	28
G3WHQ	26	1		1	4
144/432MHz Band					
		144MHz	432MHz		
G3XSO	324	16	4	1	177
G3NHZ	309	15	2	1	170
G8DJF	291	8	1	1	150
G3WMQ	289	10	4	1	48
G3NYK	140	7	—	2	205
DJ4KW/P	134	7	—	2	254
OE1VKW/3	130	5	—	2	333
DJ8EA	128	14	—	1	277
DL8CX	78	9	—	1	277
DJ9MJ	68	3	—	2	333
G3OLM	53	9	—	1	200
G4AYK/P	53	7	—	1	200
DK3QA	42	3	—	1	245
G3PVJ	41	6	—	1	187
G8CUO	39	4	—	1	177
DK1AQ	37	2	—	1	167

The contest manager gratefully acknowledges the receipt of check logs from G8LT and DJ8BT.

The following stations were active during the contest and gave points to stations who submitted contest logs: 144MHz band: DC1FG DC0XL DJ3GK DJ8BT DJ9XB/P DK2DRX DL2XP DL2ZC DL3NO/P DL3DT DL7HR DL0AF/P DL0OG DL0WH DL0WNA G3AJS G3NNU G3PAQ G3TWX/A G3UMV G3VZZ G3WJG G3ZKE G8LT G8AEL G8ALL G8CDL/A G8CIU G8CJL G8CKT G8COT G8EDB G8EHY OE1MWW OE1WWA PA0HLA PA0PMB.

BARTG Spring RTTY Contest rules

1. **When.** From 0200gmt Saturday 24 March to 0200gmt Monday 26 March 1973.

   The total contest period is 48 hours but not more than 36 hours of operation are permitted. Times spent in listening count as operating time. The 12-hour non-operating period can be taken at any time during the contest, but off periods may not be less than two hours at a time. Times on and off the air must be summarized on the log and score sheets. The contest is also open to SWLs.
2. **Bands.** 3·5, 7, 14, 21 and 28MHz amateur bands.
3. **Stations.** Stations may not be contacted more than once on any one band, but additional contacts may be made with the same station if a different band is used.
4. **Country status.** ARRL Countries List, except that KL7, KH6 and VO to be considered as separate countries.
5. **Messages.** Messages exchanged will consist of: (A) Time gmt. (B) Message number and RST.
6. **Points.** (A) All two-way rtty contacts with stations within one's own country will earn **two** points. (B) All two-way rtty contacts with stations outside one's own country will earn **10** points. (C) All stations will receive a bonus of **200** points per country worked including their own. **Note:** Any one country may be counted again if worked on another band, but continents are counted once only.
7. **Scoring.** (A) Two-way exchange points times total countries worked. (B) Total country points times number of continents worked. (C) Add (A) and (B) together to obtain final score.
8. **Logs and score sheets.** Use one log for each band and indicate any rest periods. Logs to contain: date, time gmt, message and RST numbers sent and received, and exchange points claimed. *All logs must be received by 31 May 1973 to qualify,* and should be sent to Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex, EN1 4DX.

Certificates will be awarded to the leading rtty stations and SWLs. The final positions in the results table will be valid for entry in the "World Champion of RTTY" championship.

The judges' decision will be final and no correspondence can be entered into in respect of incorrect or late entries.

Additional notes. (A) If a contestant manages to contact 25 or more different countries on two-way rtty during this contest a claim may be made for the Quarter Century Award issued by the BARTG and for which a charge of $2 USA or 8 IRCs is made. Make your claim at the same time as you send in a contest log. Holders of existing QCA Awards will automatically have any additional new countries added to their records. (B) If any contestant manages to contact stations on two-way rtty with all six continents and the BARTG contest manager receives contest logs from the operators in those six continents, a claim may be made for the WAC Award issued by the *RTTY Journal*. The necessary information will be sent on to the *RTTY Journal* who will issue the WAC Award free of charge.

Contests calendar

1973	
January-February	— Amateur TV Cumulative Activity (Rules in December issue)
January-February	— 432MHz Cumulative (Rules in this issue)
7 January	— 144MHz SSB Open (Rules in this issue)
13-14 January	— AFS (Rules in December issue)
26-28 January	— CQ WW DX 160
27-28 January	— REF CW
4 February	— 144MHz Fixed CW (Rules in this issue)
3-4 February	— ARRL DX Phone
10-11 February	— First 1·8MHz (Rules in this issue)
17-18 February	— ARRL DX CW
18 February	— 70MHz Open
24-25 February	— REF Phone
3-4 March	— 144/432MHz Open
3-4 March	— ARRL DX Phone
4 March	— 144MHz Fixed
10-11 March	— BERU (Rules in November issue)
17-18 March	— ARRL DX CW
24-25 March	— CQ WW WPX SSB
24-26 March	— BARTG Spring RTTY (Rules in this issue)
7-8 April	— 432MHz Open
8 April	— 80m Low Power
21-22 April	— Bermuda Phone
22 April	— 70MHz Portable
5-6 May	— 144/432MHz Open
5-6 May	— Bermuda CW
6 May	— 432MHz Fixed
12-13 May	— Jubilee Phone
19-20 May	— Jubilee CW
27 May	— 144MHz Portable
2-3 June	— NFD
9-10 June	— 70MHz Open
16-17 June	— Microwave FD
23-24 June	— Summer 1·8MHz
7-8 July	— Jubilee VHF/UHF
14-15 July	— SSB FD
22 July	— 432MHz Portable
12 August	— 70MHz Fixed and Portable
19 August	— 144MHz SSB Open
1-2 September	— VHF NFD
1-2 September	— IARU 144MHz
9 September	— 80m FD
6-7 October	— UHF NFD
6-7 October	— IARU 432/1,296MHz
13-14 October	— 21/28MHz
20-21 October	— 7MHz CW
3-4 November	— 7MHz Phone
3-4 November	— 144/432MHz CW
10-11 November	— 2nd 1·8MHz
11 November	— 70MHz Cumulative
9 December	— 144MHz Fixed

RAYNET

by S. W. LAW, G3PAZ*

As we enter the twentieth year of our existence, our good wishes and thanks go out to those who have been with us from the first and to those newly arrived in our ranks who will carry on our aims and work.

Even after this length of time we still receive enquiries as to our aims. They are to provide relief to our fellow men when disaster strikes. As to the method of forming a Raynet group, we repeat for the benefit of those newly interested that five signatures from a proposed group nominating one of their members as controller should be sent to the Raynet Committee for their consideration. The only proviso is that the nominated controller should be an RSGB member in order that he may have an official liaison with the committee which is a part of the RSGB and responsible in turn to the Council. There is no obligation on the other members of the group, however, other than that of obtaining a registration card which must be kept up to date; the address of the honorary registrations secretary is in the panel below. There is no entrance fee, and groups are expected to make their own financial arrangements for the running of the group under the direction of the chosen controller in whatever system of administration may be best for them.

Raynet Committee

At the meeting on 25 November all members and officials agreed to serve for a further term subject to the approval of the RSGB Council. One member opted to act in the capacity of a corresponding member in view of certain commitments and this was accepted, thanks being expressed for the very great help received in past years. Thanks were also given to the officers and certain members for the work carried out despite great personal inconvenience in some instances.

Concern was expressed that, despite the strictly non-political and non-sectarian nature of our aims, one of our Northern Ireland groups had lost its meeting place in one of the many explosions. However, the report went on to state that the group was on the air again within 24 hours so we must congratulate this group on its tenacity.

It was noted that the Port of London Authority were in possession of full particulars of the recent multi-group flood exercise in 1972 and this will doubtless establish an even firmer liaison with the existing services dealing with the Thames flood hazard.

The committee ratified the NE Lancs group under its present title of the Pendle Group and controller Mike Crawshaw, G4BLH (ex G8CME). The frequencies in use are 145·15 and 145·8MHz with back-up on top band. Area covered is on the ordnance survey map 95 (Blackburn and Burnley). Also confirmed was Teesside controller, G8CDP. Chester and Mid-Cheshire Group held their inaugural meeting on 21 September 1972 under their controller Ian Jolly, G8EOO. Frequencies in use are 145·08 and 433·15MHz.

Since the September committee meeting there have been 84 re-registrations and 55 new members enrolled. To date, 338 manuals have been sold.

Change of address

West Country members are asked to note that Cornwall controller G3VJB is not now QTHR. The address is now The Firs, Tresskerby, Scorrier, Redruth, Cornwall.

Honorary registrations secretary: **Mrs Jane Balestrini, "Merrivale", Willow Walk, Culverstone, Gravesend, Kent.**

* 130 Alexandra Road, Croydon, Surrey CRO 6EW

Looking ahead

7 April—RSGB VHF/UHF Convention Winning Post Hotel, Whitton, Middlesex.

CLUB NEWS

Items for inclusion in this section should be sent to regional representatives before the first of each month for inclusion in the following month's issue. They should not be sent direct to the editor.

The date of publication of the following month's issue, first Tuesday in the month, should be borne in mind so that events are not, in fact, history when the details are published. While regional representatives are pleased to receive clubs' events calendars for several months ahead, they still require monthly events lists so that entries can be confirmed or amended.

Important

Attention is drawn to a special announcement concerning *Club News.* **See** *Current Comment,* **page 12.**

REGION 1 **RR B. O'Brien, G2AMV**

Ainsdale (ARC)—Members should contact N. Horrocks, G2CUZ for details of meetings.

Blackburn (ELARC)—1st Thursday each month, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Secretary: W. E. Baxendale, G8FDG, "Juverna", Westland Avenue, Darwen, Lancs.

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

Bolton (B & DARS)—1st and 3rd Wednesdays, Bolton Recreation Club, Kensington Place. Morse tuition at every meeting. Further details from G3XUM.

Bury (B & RRS)—Tuesday, 9 January (Constructional competition), Wednesday, 24 January (Talk by G3SVW (ex VP8LK) with slides on his activities in the Antarctic), 8pm, George Hotel, Market Street, Bury.

Carlisle (C & DARS)—Mondays, 7.30pm, Currock House, Lediard Avenue, Currock. Secretary: G8GSE, 6 Carlton Gardens, Stanwix, Carlisle GA3 9NP.

Cheshire (Mid-Cheshire ARC)—Wednesdays, 7pm, Technical Acitivities Centre, Winsford Verdin Comprehensive School, Grange Lane, Winsford. Nets on 160m, 7pm, Mondays; on 2m, 7pm, Tuesdays. Details from G3JWK.

Chester (C & DARS)—Tuesdays, 8pm, except on 1st Tuesday in month, which is net night, YMCA Chester. Details from G8AYW.

Douglas IOM (D & DARS)—Secretary, GD3YUM, will be pleased to hear from any member who intends to visit the island.

Eccles (E & DARC)—Tuesdays, 8pm, Bridgwater School, Worsley, Manchester. Club 2m net 1100 on Sundays, 145·65. All visitors and prospective members welcome. Secretary: G4AEQ QTHR.

Lancaster University (UOLARS)—Prospective members should write to Phil Jones, Department of Environmental Sciences. The Society's vhf station, G8DOU, is operational on 144MHz rtty and would welcome enquiries about skeds.

Leyland Hundred ARG—Second Monday each month, 7.30pm, Rose & Crown, UlnesWalton, Leyland. Net night Saturdays 1900bst on 145·8MHz. Details from F. Harrison, 78 Lancaster Lane, Leyland, Lancs.

Liverpool (L & DARS)—2 January (G3AHD on the air). 9 January (Group project—2m transceiver), 16 January (Film show), 23 January (Junk sale), 30 January (Business meeting), 4 February (Liverpool club 2m contest), Conservative Association Rooms, Church Road, Liverpool.

Liverpool (NLRC)—Tuesdays, 8.30pm (Informal meeting at the "Nags Head"), Thornton, Crosby, Liverpool 23. Visitors welcome. Secretary G3XMG.

Liverpool University (ARS)—Prospective members should contact G4AXA through the Students' Union or via his home QTH which is 234 Derby Road, Chesterfield, Derbyshire S40 ZEP.

Manchester (M & DARS)—Wednesdays, 7.30pm, all meetings include morse classes. 203 Droylesden Road, Newton Heath, Manchester 10. Sec: G3IOA.

Manchester (SMRC)—Sale Moor Community Centre, Norris Road, Sale, Cheshire, every Friday, 8pm. The vhf group meets on Mondays at the club shack, "Greeba", Shady Lane, Manchester 23, 8pm, 5 January (Natternite), 12 January ("The good old days" by Don Barber, G2AKR), 19 January (Mystery lecture by Matt Barnsley, G3HZM), 26 January (Visit of B. O'Brien, G2AMV, Region 1 RSGB representative, also a talk by a guest lecturer); advance warning! 2 February (Surplus equipment sale, no junk please). Visitors welcome on both Mondays and Fridays. Hon sec: G3WFT.

Manchester University (ARS)—G3VUM is active on all hf bands and now also on 2m; details may be obtained from G4AZA, G3ZNS or G3XDY. The programme of lectures, visits, RAE and morse tuition continues as previously. Enquiries may be addressed to any of the above at the University Union, Oxford Road, Manchester.

Preston (PARS)—4 and 18 January, 1 February, 7.30pm, Windsor Castle (private room), St Paul's Square, Preston. Secretary: G. Earnshaw, G3ZXC. Morse practice 7.30pm, main feature 8pm.

Stockport (SRS)—Second Wednesday each month is a discussion night, fourth Wednesday is a lecture night, 8pm. Blossoms Hotel, Buxton Road, Stockport. Secretary G8BCG.

Thornton Cleveleys (ARS)—First and third Wednesdays, 8pm, St John Ambulance Brigade HQ, off Fleetwood Road North (behind Police Station), Thornton, Lancs. Project group meets on Fridays, 7.15–9pm at the Project Laboratory, Rossall School, Fleetwood. Work in hand includes 160 and 2m transmitters and receivers. Further details, G3ZYE.

Warrington (W & DARS)—Tuesdays at Thames Board Mills Social Club, Alford Hall, Manchester Road, Warrington. Secretary: G3ZRN. Alternate meetings are devoted to beginners.

Westmorland (WRA)—First Monday each month at New Allen Technical College. Acting sec: N. Stanley, G3UEC, 9 Castle View, Sedgwick, Westmorland.

Wirral (WARS)—First and third Wednesdays each month, 7.45pm, Sports and Recreation Centre (Old Drill Hall), Grange Road West, Claughton, Birkenhead. Sec: G3WSD.

Wirral (Wirral DX Association)—Last Thursday each month at members' homes. Visitors are welcome, please inform sec beforehand. Sec: G3XSM, 43 Stuart Avenue, Moreton.

REGION 3 **RR R. W. Fisher, G3PWJ**

Birmingham (MARS)—No information. The Birmingham & Midland Institute, Margaret Street, Birmingham 2. *G3ZMT.*

(Slade)—No information. The Church House, High Street. Erdington, Birmingham 23. *G8EYL.*

(South)—No information, Hampstead House, Fairfax Road, West Heath, Birmingham 31.

Coventry (CARS)—5 January (Film Show), 12 January (Club night on the air), 19 January (Surplus Sale), 26 January (Club night on the air), 8pm, Baden Powell House, St Nicholas Street, Radford Road, Coventry. *G3TFA.*

Cannock (CCARS)—4 January, 1 February, 8pm, Bridtown Social Club. *G8EHY.*

Dudley (DARC)—9 January, 23 January, 8pm, Central Library, St James's Street, Dudley. *G3PWJ.*

Hereford (HARS)—First and third Fridays of each month, morse tuition every Friday evening 7.30-8pm, 7.30pm. Civil Defence HQ, Gaol Street, Hereford.

Lichfield (LARS)—First and third Tuesday of each month, Swan Hotel. *G8EID.*

Leamington Spa (MWARS)—Every Monday, 8pm, 28 Hamilton Terrace. *G8CXL.*

Nuneaton (NARS)—First Tuesday of each month, 7.30pm, Nuneaton Technical College, Hinckley Road. *G4AEH.*

Rugby (R & DAR & EC)—Last Tuesday of each month, 8pm. Lawrence Sheriff Public House. *G3YQC.*

Solihull (SARS)—16 January (Junk sale), 7.30pm, The Manor House, High Street, Solihull. *G4ABV.*

Stratford (SuA & DRC)—12 January, 26 January, 8pm, South Warwickshire College of Further Education. *G8GAG.*

Stourbridge (STARS)—2 January (informal), 8pm, Shrubbery Cottage, 18 January (Annual constructors competition), 8pm, Longlands School.

Sutton Coldfield (SCRS)—Second and fourth Mondays of each month, Sutton Town Football Club Social Centre, Coles Lane, Any new members will be most welcome. *G8ALO.*

Wolverhampton (WARS)—8 January (Natternite), 15 January (Junk sale), 29 January (Natternite), 5 February ("Basic radio and tv servicing," by G3FWD and G8BTA), starting Friday 5 January, a beginners hour and morse class. *G3UBX.*

Worcester (W & DARC)—20 January ("Electricity" by G4AWA) 8pm, Crown Hotel, Broad Street. *G8ASO* (Worcester 29208).

REGION 4 — RR T. Darn, G3FGY

Derby (DADARS)—3 January (Surplus sale), 6/7 January (Cumulative Contest), 10 January ("Modern circuit methods" by E. Avery, G3WBB), 13 January (History of Radio WEA Exhibition, St Helen's House, King Street, Derby), 17 January (Constructors' Contest for Founder Members Trophy), 24 January ("My year as President RSGB" by F. C. Ward, G2CVV, Ladies Evening). 31 January ("Colour photography" by M. Shardlow, G3SZJ). All meetings are held in the Club Room, 119 Green Lane, Derby, commencing 7.30pm. Visitors very welcome. *G2CVV.*

Melton Mowbray (MMARS)—19 January ("Marine radio" by D. Potter, G4AMK). All meetings are held at the St John Ambulance Hall, Asfordby Hill, Melton Mowbray, 7.30pm. *G3NVK.*

Nottingham (ARCON)—4 January ("Forum"), 11 January (Tape and slide lecture "Expedition to Andorra"), 18 January (Activity night), 25 January ("Two for the price of one", G3YUT on his transistor tester and G3VUI on his integrated circuit crystal calibrator). If enough interest is shown it is hoped to run a project on the ic calibrator. All meetings 7.30pm, the Sherwood Community Centre, Mansfield Road, Nottingham. *G4AFJ.*

REGION 5 — RR P. J. Simpson, G3GGK

Bedford (B & DARC)—4 January ("Oscar 6 satellite" by G8GWC and G3SOA), 11 January ('RTTY" by G8AEL), 18 January (Homebrew equipment—members talk and demonstrate), 25 January (Exhibition preparations). 7.30pm, "The Dolphin", The Broadway, Bedford. Hon sec: John Bennett, G3FWA, 47 Ibbett Close, Kempston, Bedford.

Cambridge (C & DARC)—5 January (Contests 1973), 12 January (Informal), 19 January (Film night), 26 January (Informal). Meetings 7.30pm, hq Corporation Yard, Victoria Road, Cambridge. Hon sec: John Hern, G3NAC, 5 Acheson Road, Brampton, Hunts.

Dunstable Downs (DDRC)—5 January ("Electric power supplies" by John Gould), 12 January (Between week), 19 January (Club annual dinner), 26 January (Visit to BBC Daventry), 2 February ("70cm PAs" by G6JP). Meetings 8pm at Chews House, 77 High Street South, Dunstable, Beds. Hon sec: C. G. Powell, G8BPK,, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury, Bucks.

Ely (EARS)—11 January (AGM). 7.30pm at Ely Adult Education Centre, Bedford House, St Mary's Street, Ely. Hon sec: P. Brown, G8GLB, 59 Fieldside, Ely.

Shefford (S & DRS)—4 January (Club equipment review and programme planning), 11 January ("RTTY basics" by G8AEL), 18 January ("RTTY demonstration" by G8AEL), 25 January (AGM). 7.30pm, Shefford Church Hall, Ampthill Road. Hon sec: C. Davies, G8DUY, 17 Brigham Gardens, Biggleswade, Beds.

Stevenage (S&DARS)—4 January (Review of 1972 and plans for 1973), 18 January ("HF communications rx" by G3URX), 1 February (Discussion). Meetings 7.30pm in Senior Staff Canteen, Hawker Siddeley Dynamics Ltd, Gunnels Wood Road, Stevenage, Herts. Hon sec: F. Collett, G3OVT, 8 Silam Road, Stevenage, Herts.

REGION 6 — RR L. W. Lewis, G8ML

Banbury (ARS)—Meeting at Woodgreen Hall, Banbury, 7.30-10pm. Details from G3LTN. Tel Banbury 710623.

Cheltenham (RSGB Group)—4 January ("Integrated circuits for the radio amateur" by J. Bryant, of the Plessey Group), 8pm, Royal Crescent Hotel, Clarence Street, Cheltenham. G2FWA.

Gloucester (ARS)—First Thursday of each month at the Oddfellows Club, Barton Street, Gloucester, 7.30pm. Also each remaining Thursday of each month at the Drill Hall, Education and Leisure Centre, Chequers Road, Gloucester, 7pm. *G3MA.*

North Bucks (ARS)—8 January (Speaker on teleprinters). Meetings are held on the second Monday in each month, 8pm, at Wolverton Youth Club. *G8AAT.*

Oxford (O & DARS)—10 January, 7.30pm in the Mansfield Road Club ("Use of scopes" by G3NCM), 24 January ("Power supplies" by G3LYP). *G4AOQ.*

South Bucks (VHF) Club—First Tuesday in each month at Bassetbury Manor, High Wycombe. 6 February ("Helpful hints and mods to vhf receivers" by G8AMF). All visitors welcome. *G8DDM.*

REGION 7 — RR R. S. Hewes, G3TDR

Acton, Brentford & Chiswick (ABCRC)—16 January (AGM), 7.30pm, Chiswick Trades & Social Club, 66 High Road, Chiswick, W4. Hon sec: W. G. Dyer, G3GEH, QTHR.

Addiscombe (AARC)—Every Tuesday from 9pm, "Prince George", High Street, Thornton Heath. Hon sec: S. V. Knowles, G3UFY QTHR.

Ashford, Middlesex (Echelford ARS)—8 January ("RTTY" by Chris Marsden, G3XSO), 25 January (Constructional evening), 7.30pm for 8pm, St Martins Court, Kingston Crescent, Ashford. All visitors welcome. Hon sec: Vic Higgs, G3WVJ QTHR.

Barking (BR & ES)—25 January (AGM), 7.45pm, Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex. All visitors welcome. Hon sec: H. Davidson, G3FZP QTHR.

Bexley Heath (North Kent RS)—11, 25 January (No details received). 7.30 for 8pm, Congregational Church Hall, Chapel Road, Bexley Heath. Hon sec: Maurice Lee, G4BAL QTHR.

Burnham Beeches (BBARC)—4, 18 January (No details received), 8pm, Hedgerley Scout Hut, Hedgerley, Nr Slough, Bucks. All visitors welcome. Hon sec: Nina Appleby, G8ENZ QTHR.

Cheshunt (CDRC)—5 January, 8pm, Methodist Church Hall, opposite Theobalds Station, Cheshunt. Hon sec: Richard Ludwell, G3ZZQ QTHR.

Chingford (Silverthorn RC)—Every Friday 7.30pm, Friday Hill House, Simmonds Lane, Chingford, E4. Hon sec: K. S. Arnold, G3XNP QTHR.

Cray Valley (CVRS)—4 January (Talk and demonstration by members of Dartford DF Group), 18 January (Natternite), 8pm, Congregational Church Hall, Court Road, Eltham, SE9. Hon sec: P. F. Vella, G3WVP QTHR.

Croydon (Surrey Radio Contact Club)—16 January (Talk and demonstration on 3cm by Dain Evans, G3RPE, and Robert Skegg, G3ZGO), 8pm, Swan & Sugarloaf, Brighton Road, South Croydon. Hon sec: Sid Morley, G3FWR QTHR.

Crystal Palace (CP & DRC)—20 January ("What is magnetism?" by Charlie Newton, G2FKZ), 8pm, Emmanual Church Hall, Barry Road, SE22. Hon sec: Geoff Stone, G3FZL, tel 699-6940.

Dartford Heath (DF Club)—5, 19 January (Club nights) 8pm, The Scout House, Broomhill Road, Dartford. Hon sec: Maureen Worbey, G3XVC QTHR.

Dorking (DR & DRS)—Second and fourth Tuesdays (9, 23 January), 8pm, "Surrey Yeoman" Dorking. Hon sec: P. B. Gilby, 6 Hawkwood Rise, Gt Bookham, Surrey.

Ealing (E & DRS)—Every Tuesday, 7.30pm, Northfields Community Centre, Northcroft Road, Ealing.W13. Details from Hon sec: J. E. Alban, G3JEA QTHR.

East London RSGB Group—21 January (Technical films by G3JVZ), 3pm, Wanstead House, The Green, Wanstead, E11. Further details from Ron Broadbent, G3AAJ QTHR.

Edgware (E & DRS)—11 January (AGM), 25 January (Informal), 8pm, Watling Community Association, 145 Orange Hill Road, Edgware. Hon sec: Alan Masson, G3PSP QTHR, tel 01-950 6827.

Gravesend (GRS)—Mondays at 7.30pm, "Windmill Tavern", Shrubbery Road, Gravesend, Kent. Area representative: P. F. Jobson, G3HLF QTHR.

Guildford (G & DRS)—Second and fourth Fridays, (12, 26 January), 8pm, Model Engineering HQ, Stoke Park, Guildford, Surrey. Further details from hon. sec: Peter Hopwood, G8CQM QTHR.

Hampton Court (Thames Valley ARTS)—3 January (AGM), 8pm, "The Three Pigeons", Portsmouth Road, Long Ditton, Surrey. PRO: Rob Muir, G3LHN, QTHR.

Harlow (DRS)—Every Tuesday, 8pm, Mark Hall Barn, First Avenue, Harlow. Club station now operative on 80-10m ssb/cw. Club net Sunday mornings, 1030, on 28MHz, members use frequency most nights at 2100gmt. Hon sec: V. Heard, 106 Vicarage Wood, Harlow, Essex.

Harrow (RSH)—5, 12 January (to be arranged), 19 January (AGM), 8pm, Harrow Sea Cadets HQ, Woodlands Road, Harrow. Refreshments available during evening. Hon sec: Leslie Light, G3KDL QTHR.

Havering (H & DARC)—10 January (Air your views), 24 January (to be arranged), 8pm, British Legion House, Western Road, Romford. Hon sec: S. J. Hobday, G3SKV QTHR.

Holloway (Grafton ARS)—Mondays (RAE), Fridays (Morse and club night), 7.30pm, Archway School Annexe, Whittington School, Highgate Hill, N19. Hon sec: Tom Coleman, G8EEI QTHR.

Ilford (ARS)—Every Thursday 8pm, Mortlake Road (off Ilford Lane), Ilford. Hon sec: F. G. Jarvis, G3HIW QTHR.

Kingston (K & DARS)—10 January (Discussion of contest requirements for 1973), 8pm, "Penguin Lounge" 37 Brighton Road, Surbiton, Surrey. At the recent agm the new committee was elected

as follows: chairman, D. Beakhurst, G3OSQ; treasurer, M. E. Grout; secretary, R. S. Babbs, G3GVU; assistant secretary, M. Tatum; publicity, M. Diprose, G4AKA; other members, A. Martin, G3ZYS, N. Dudman, G8GGW. *G3GVU QTHR.*

Loughton (L & DRS)—5 January (Informal), 19 January ("SSB techniques", by G3BYW), 8pm, Loughton Hall, near Debden Station. Hon sec: David Bowers, 12 Theydon Park Road, Theydon Bois, Essex.

New Cross (Clifton ARS)—Every Friday 8pm, 225 New Cross Road, London SE14. Details from hon sec: R. A. Hinton, 58 Camilla Road, Bermondsey, SE16.

Northolt (BEAARS)—First Thursday in the month, BEA Trident Club, Western Avenue, Northolt, Middlesex. (This club is open to non-BEA employees by invitation. Contact David Evans, G3OUF, tel Amersham 21573 for details).

Paddington (P & DRS)—Every Wednesday, 8pm, Beauchamp Lodge, Warwick Crescent, W2. Further details from hon sec: Mike Pawley, G8AWV QTHR.

Purley (P & DRS)—5 January (Natternite), 19 January ("Production of printed circuit boards by photo etching", by Dave, G8ASV). 8pm Lansdowne Hall, Lansdowne Road, Purley. Hon sec: Alan Frost, G3FTQ QTHR.

Reigate (RATS)—3 January ("TVI problems and cures" by Andrew Holloway, G3VUQ), 8pm, Nutley Hall, Nutley Lane, Reigate; 17 January (Natternite), 8.30pm "Marquess of Granby" Hooley Lane, Redhill, Surrey. Hon sec: F. H. Mundy, G3XSZ.

Scouts (Baden Powell House ARG)—18 January (Simple receiver construction), 8pm, Baden Powell House, Queensgate, South Kensington, SW7. Hon sec: Alf Watts, G3FXC QTHR.

Southgate (SRC)—11 January, 8pm, Civil Defence Hut, Bowes Road, N11 (near Arnos Grove underground station). All visitors welcome. PRO Steve White, G3ZVW QTHR.

St Albans (Verulam) ARC—17 January ("VHF propagation" by D. Hayter), Market Hall, Verulam. All visitors very welcome. Hon sec: Hugh Young, G3YHY QTHR.

Sutton & Cheam (SCRS)—16 January (Film about Elmley Moor tv mast, by G3HQX), 8pm "The Harrow Inn", Cheam Surrey. Hon sec: Jack Korndorffer, G2DMR QTHR.

UK FM Group (London)—Second Tuesday in month (9 January), 7.30 for 8pm, Scout Hut, Hayes Road, Southall, Middlesex. Details from PRO: Mike Tooley, G8CKT QTHR.

Welwyn (Mid-Herts ARS)—11 January, 8pm, Welwyn Civic Centre, Welwyn, Herts. Hon sec: Peter Wilcocks, G8AIE QTHR.

Wembley (GECARS)—Every Thursday, 7pm, Sports Club, Preston Road, North Wembley. (This club is open to non-GEC employees by invitation, tel Dain Evans G3RPE at 01-904 1262 during business hours for details.)

West Middlesex ARC—Meets at Greenford Community Centre, Oldfield Lane, Greenford, Middlesex. Details of meetings from John Hedges, G3MMQ QTHR.

Wimbledon (W & DRS)—12 January (Film show), 26 January (Club project), 8pm, St John Ambulance HQ, 124 Kingston Road, Wimbledon, SW19. Hon sec: F. W. Hill, G3WDO QTHR.

REGION 8 — RR D. N. T. Williams, G3MDO

Canterbury (EKRS)—18 January ("Adjustment of ssb linears" by G4AJC), 3 February (Annual dinner dance, tickets available from hon sec). Further details of future meetings from G3MDO QTHR.

Canterbury University (UKCRC)—Details of club meetings from K. Beesley, G3XUE, Eliot College, University of Kent at Canterbury.

Crawley (CARC)—Monthly meetings held at Trinity Congregational Church Hall, Ifield, Crawley.

Medway (MARTS)—Meetings held every Friday at Aurora Club, Gillingham. Further details of meetings from H. E. Willis, 111 Laburnam Road, Strood, Kent.

Maidstone (MYMCAARS)—All meetings at "Y" Sports Centre. First and third Fridays devoted primarily to the beginners.

Horsham (HARC)—Monthly meetings held at Guide Hall, Denne Road, Horsham.

Eastbourne (SARS)—Meetings held first Monday in the month at Victoria Hotel, Latimer Road, Eastbourne. PRO G3JFM.

Brighton (BTCARC)—Details of future meetings from hon sec: G2CMH, 35 Willington Way, Brighton.

Tunbridge Wells (WKARS)—Details of future meetings from H. F. Reynolds, 17 Reynolds Lane, Tunbridge Wells.

Worthing (W & DARC)—Meetings held every Tuesday, 8pm, Rose Wilmot Youth Centre, Littlehampton Road, Worthing. Further details from G8ETL, 12 Bramble Crescent, Worthing.

Mid-Sussex (MSARS)—Details of future meetings and activities from hon sec: G3RXJ.

REGION 9 — RR H. W. Leonard, G4UZ

Bristol (City & County RSGB Group)—29 January (Annual general meeting followed by sale of equipment), 7pm, Becket Hall, St Thomas Street, Bristol 1. *G3ULJ.*

Bristol (BARC)—Every Tuesday, 7.45pm, 24 Bright Street, Barton Hill, Bristol 5. *G3XEI.*

Bristol (Shirehampton)—Now affiliated to RSGB. Every Friday, 7.30pm, Twyford House, Shirehampton.

Bristol (University ARS)—Most Saturdays, 2.30pm, Dept of Physics, Royal Fort, Tyndalls Park Road, Bristol 8. *G8CVS.*

Cornish (CRAC)—First Thursday in month, 4 January ("Fault location on underground cables" by G3XFL), 7.30pm, SWEB Social Centre, Pool, Camborne. Visitors most welcome. *G3WKP.*

Newquay Group (CRAC)—Fortnightly on Wednesdays, 7.30pm, Treviglas School, Newquay. G3THT, Newquay 4512. Further details of Cornish and Newquay Group gladly supplied by G3NKE QTHR.

Exeter (EARS)—Every Tuesday, 7.30pm, Community Centre, St Davids Hill, Exeter. Hon sec: A. W. Bawden, 232 Exwick Road, Exeter, EX4 2BA.

North Devon (NDRC)—Second and fourth Wednesdays of month, 7.30pm, "Grinnis", High Wall, Sticklepath, Barnstaple. *G4CG.*

Plymouth (PRC)—First and third Tuesdays of month, 7.30pm, Virginia House, Bretonside, Plymouth. Hon sec: S. E. Martin, 32 East Park Avenue, Plymouth PL4 6PF.

Saltash (S & DARS)—First and third Fridays of month, 7.30pm, Burraton Toc H Hall, Saltash. Further details from G3ZHM.

South Dorset (SDRS)—First Friday of month, 5 January (Transistor transmitters), 2 February (Slides and films of club activities), 7.30pm, Alma Road Section of Weymouth Technical College. *G3VPF.*

Taunton (T & DARS)—Fridays, 7.30pm, Jelalabad Barracks, The Mount, Taunton.

Torbay (TARS)—Every Tuesday and last Saturday of month, 27 January (Homebuilt equipment contest and TARS awards night), 7.30pm, rear of 94 Belgrave Road, Torquay. RAE course running well. Visitors always welcome. *G3NQD.*

Weston-super-Mare (WsMRS)—Second Friday of each month, 7.30pm, Lewis Room M3, Worle Comprehensive School, New Bristol Road, Worle. *G3PQE.*

Yeovil (YARS)—Every Thursday, 25 January ("Amateur electronic repairs" by G3XFW), 7.30pm, The Youth Centre, 31 The Park, Yeovil. *G3NOF.*

REGION 10 — RR D. M. Thomas, GW3RWX

Blackwood (ARC)—Fridays, 7.30pm, Oakdale Community Centre, Oakdale, Mon. *GW3TUG.*

Barry College of Further Education (ARS)—Thursdays, 7pm, College of Further Education, Colcot Road, Barry, Glam. *GW3VKL.*

Cardiff (RSGB Group)—Monday 8 January, 7.30pm, BBC Club, Llandaff nr Cardiff. *GW3GHC.*

Haverfordwest (ARS)—Tuesdays, 7.30pm, hq, Rosemary Lane, Haverfordwest, Pembs. *GW3YBB.*

Hoover (ARC)—Mondays, 7.30pm, Hoover Social Club, Hoover Works, Pentrebach, nr Merthyr, Glam. Secretary: Mr F. E. Tribe, c/o Hoover Works, Pentrebach, Glam.

Pembroke & District (RSGB Group)—Last Friday of each month at the Defensible Barracks, Pembroke Dock, Pembs. *GW3LXI.*

Pontypool (RSGB Group)—Tuesdays 7pm, the Educational Settlement, Rockhill Road, Pontypool, Mon. *GW3JBH.*

Port Talbot (ARS)—Second Tuesday of each month, 7.30pm, the Rail & Transport Club, Station Road, Port Talbot, Glam. *GW5VX.*

Sully & District Short-wave Club—Tuesdays, 7pm, the Annexe, Sully Bowls & Social Club, 59 Port Road, Sully, Glam. *GW4AMV.*

Rhondda (ARS)—Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. Details of Meetings from GW3PHH.

Swansea Radio Society—Meets on first and third Tuesdays of each month at 7.30pm. Meetings also held on second and fourth Tuesday of the month when RAE and morse classes are held. All meetings at the Palace Bar, High Street, Swansea. Further details from Mr D. E. Connor, 54 Talley Road, Penlan, Swansea SA5 7EU.

South-east Wales Raynet Group—Details from GW3ZFG. Tel Cardiff 62411.

University College of Wales, Cardiff (ARS)—Details from Mr Simon Northeast, c/o Students Union, Dumfries Place, Cardiff.

University of Wales, Aberystwyth Radio & Electronics Society—Enquiries to the society secretary, c/o Students Union, University College of Wales, Aberystwyth. Society callsign: GW4BBG.

REGION 11 **RR P. Hudson, GW3IEQ**

Bangor (UCNWARS)—25 January ("Can the stars foretell the future" by Dr R. H. C. Newton UCNW). Meeting takes place at 1700. 8 February ("Tape noise reduction" by Mr Ian Hardcastle, Dolby Laboratories Inc) 1930, School of Engineering Science, Dean Street, Bangor.
Conway Valley (CVARC)—11 January ("Transistor voltage regulators" by GW3HGL), & ("Receivers" by GW3MZY), 8 February ("The Westminster" by GW3ELM & "Navigation" by GW3GRY). All meetings 1930 prompt, Llanddulas, Abergele.
Rhyl (R & DARC)—9 January ("Power supplies" by GW3JGA), 13 February ("Oscilloscope measurements" by M. Thistlethwaite, Tektronix), Mona Hotel, Market Street, Rhyl.

REGION 12 **RR A. J. Oliphant, GM3SFH**

Aberdeen (AARS)—Fridays, 7.30pm, 8 Blenheim Lane, Aberdeen. *GM3HGA*. Tel Aberdeen 33838.
Dundee (Kingsway Technical College ARC)—Wednesdays, 7pm, (morse practice 6.30pm), Kingsway Technical College, Old Glamis Road, Dundee. Visitors always welcome.
Inverness (IRS)—Fortnightly on Fridays at 7.30pm, next meeting 12 January. Cameron Highlander's Memorial Youth Club, Planefield Road, Inverness. Mr L. Bell, 114 Glenurquhart Road, Inverness.
Lerwick (LRS)—Every Tuesday, 7pm, clubrooms, Abbsbrae House, Lerwick. *GM4BBL*. Tel Lerwick 1238.
Lhanbryde (MFARS)—Wednesdays, 7.45pm, St Andrews School, nr Lhanbryde, Elgin, Morayshire. *GM3UKG*. Tel Clochan 225.
Queen's Own Cameron Highlander's Memorial Youth Club Radio Section—Tuesdays, 7.30pm, Planefield Road, Inverness. Section caters for all young people from 13 years interested in leaning, and obtaining practice in, elements of radio techniques. Mr Bill Begg, 68 Tomnahurich Street, Inverness.
Thurso (CARS)—Second Tuesday in each month, 7.30pm, Scapa House, Thurso. *GM4BKO*. Tel Thurso 3704. Visitors always welcome.

REGION 13 **RR V. W. Stewart, GM3OWU**

Berwick (BARS)—Last Sunday in each month, 3pm, Tweed View Hotel. Further details from C. H. Crook, G3YOG, 19 Hatters Lane, Berwick upon Tweed or from the AR, G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.
Dunfermline (DRS)—Second Wednesday in each month 7.30pm, Abbot House, Dunfermline. Further details from G. Martin, GM3NVQ, 42 Rose Street, Dunfermline.
Edinburgh (LRS)—Second and fourth Thursdays, 7.30pm, 66 Hanover Street, Edinburgh, Further details from K. C. Henderson, 97 Ganton Road, EH5 3NH. (Phone 552 2147).
Glenrothes (GDARC)—First Sunday in each month, 7.30pm, Old Nursery Buildings, Leslie, Fife. Details from A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife.
St Andrews (UStAARS)—17 January (Films), 24 January (TV camera tubes), 7 February (Tape/slide lecture), 5pm, Dept of Physics, North Haugh, St Andrews. Further details from R. Marchant, GM3ZCQ, as above.

REGION 14 **RR M. A. Comrie, GM3YRK**

Ayrshire (AARG)—14, 28 January, 7.30pm, YMCA, Howard Street, Kilmarnock.
Ardeer (ARCARS)—Thursdays at 7.30pm, Ardeer Recreation Club, Stevenston, Ayrshire.
Falkirk & District (RSGB)—Temperance Cafe, Lint Riggs Falkirk. Date and time from J. Ramsay, 78 Wheatlands Avenue, Bonnybride, Stirlingshire.
Greenock & District (ARC)—Tuesdays and Fridays at 7.30pm, Watt Library, Union Street, Greenock, Visitors welcome. All enquiries to hon sec: N. C. Henderson, GM3LYI. Club callsign GM3ZRC.
Glasgow University Radio Club (GURC)—George Service House, University Gardens, Glasgow. Details from hon sec, c/o Dept of Electrical Eng.
West of Scotland Amateur Radio Society (WOSARS)—Each Wednesday, 8pm, construction & social night. Friday meeting takes place at 8pm with Jim Stirling, GM3UWX in the chair. Further details obtainable from hon sec: Mike Parks, 6 Stamperland Hill, Clarkston, Glasgow G76 8AE. All meetings take place in the spacious club rooms at 81 Virginia Street, Glasgow, 2UP. Club callsign GM3AGG.

REGION 16 **RR D. F. Beattie, G3OZF**

Chelmsford (CARS)—First Tuesday of each month, 7.30pm, at Marconi College, Arbour Lane, Springfield, Chelmsford. 2 January (Lecture by Ron Ham, BRS15744), 6 February (Film Show). Details from G3YNV.
Colchester (NEETCARS)—Every Wednesday, 7.30pm, North-East Essex Technical College, Sheepen Road, Colchester. Details from E. T. Jacobs, 26 Pondfield Road, Colchester.
Gt Yarmouth (GYRC)—Last Tuesday of the month, 7.30pm, at the Central Library, Gt Yarmouth. Details from A. D. Besford, 49 Blake Road, Gt Yarmouth.
Ipswich (IRC)—Where possible, two meetings each month at Handford House, corner of Ranelagh Road, and the main London road (A12), at 7.30pm. Next meeting—10 January (Junk Sale), 31 January (Open meeting). Details from G3YWM.
Norfolk (NARC)—Every Wednesday, 7.45pm, at Crome Community Centre, Telegraph Lane East, Norwich. Details from G8BLD, the Rectory, Framingham Pigot, Norwich, Norfolk NOR45W.
Southend (S & DRS)—Every other Thursday, 7.30pm, at the Flarepath Canteen, Southend Airport. Next meetings 11 and 25 January. Details from G3AXN.
University of East Anglia (UEAREC)—Meetings are held during term time, details from Mike Wade, School of Biological Sciences.

REGION 17 **RR L. N. G. Hawkyard, G3ZKR**

Basingstoke (ARC)—6 January (Beginners and natternite), 20 January ("Integrated circuits in amateur radio" by Jim Bryant of Plessey), 7.30pm, Chineham House, Popley, Basingstoke.
Farnborough (F & DRS)—9 January ("Halley Bay" by W. Bell Chambers), 23 January ("Carbon fibres" by G3WZY), 7.30pm, Cove Further Education Centre, St Johns Road, Cove, Farnborough, Hants. All visitors welcome. *G8BIH*.
Harwell (AERE ARC)—Meetings on the third Tuesday of each month, also informal meetings and junk sales every Friday lunch time. 7.30pm at the Social Club AERE, Harwell, Berks. *G3NNG*.
Maidenhead (M & DARC)—1 January ("Test instruments" by G3VMR), 16 January (Informal) at Victory Hall, Coxgreen, Maidenhead, 7.30pm. G3VMR.
Southampton (RSGB Group)—13 January at the Lanchester Building, Southampton University. Every Wednesday at the clubroom, Kent Road. *G3ZKR*. Tel 773378.
Swindon (SDARC)—10 January (RTTY demonstration by G3LLZ), 24 January (Lecture on police communication systems), 7.30pm, Penhill Junior School. *G3YKC*.

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of 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 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

The closing date for each issue is the 4th of the preceding month but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale.

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

See the current order form on the last page for further details.

FOR SALE

Panda Explorer tx, 150W a.m., cw, 10–80m, good cond, £40 ono. **Wanted** pa unit for 4X150A. H. F. Lewis, 271 Popes Lane, London W5 4NH. Tel 01-567 6389.

Spinx ssb tx £30; Heathkit 10–12U scope £20; AR88D rx, external psu, spare valves and hndbk £30, buyer coll. Gordon Allis, 117 Chessington Road, Westewell, Surrey. Tel 01-394 1497.

18AVT/WB Hygain, almost new, with instructions, £18, buyer coll. Cole, 19 Oxen Ave, Shoreham by Sea, Sussex BN4 5AF. Tel Shoreham by Sea 5240.

Eddystone EA12 rx £105; Eddystone semi-auto morse key £1; Avo valve vmtr £5; 4m 4-el J beam aerial £1.25; sig gnrtr af/rf £1. G3YAS QTHR.

5 260V 2·5A panel-mntng variacs, £3.50 ea; Partridge choke 1H, 1A £2; used Solatron Varipack 0–500V, 100mA, metered 0–4–6·3V 3A, manual, £5; pr Tinsley resistor decade boxes, 0·1–1kΩ, 1–10kΩ, £3, carr extra. GM3JHL QTHR. Tel Fauldhouse 433.

KW2000A, ac psu, dynamic mic, vgc, fully re-aligned, spare valves, £135. GM3WDF QTHR. Tel 0245 380341.

2m mosfet cnvrtr 28–30MHz, i.f. anodized case, new £9.95. G3OLB QTHR. Tel Oldbury 4559.

Codar AT5 tx, xtal mic, mains psu, good cond, homebrew, 12V dc invrtr to suit, £25 ono the lot, pref buyer insp and coll. G3YIO QTHR. Tel Burntwood 6019.

Trio 9R59DS rx, good cond, fitted voltage stblzr, with hndbk and orig box, £38. P. F. Saxby, 30A Crossways, South Croydon, Surrey CR2 8JL. Tel 01-657 6251.

KW2000B tx/rx, ac psu, this eqpmnt is unmarked, as new and in perf wkng order, few hrs use, only £185 ono. G3MSL, 11 Coombe Drive, Fleet, Hants. Tel Fleet 21446.

Samson ETM3 Keyer £18. Poole, Dolphin Cottage, Chestnut Way, Repton, Derbyshire. Tel Repton 2294.

HA600 rx £30 ono; 160m cnvrtr, 2m cnvrtr, any offers considered, buyer coll. Andrew Hopkinson, "Ferndale", Muskham Rd, Newark, Notts.

Heathkit HP13A, new, £30; SB620 Scanalyser £60; GR78 rx £60. G3ONX QTHR. Tel Gloster (0452) 23329.

VHF rx 308, gen cov, 19–150MHz, gd wrkng order, £25. A. Giannecchini, 9 Coxwold Rd, Stockton, Teesside.

Minimitter 150W, 80m–10m, a.m./cw, 4 spare 807s, 2 spare 866As, £15, will del within 25 miles, cct diag, instrctns with tx. G3ZHE QTHR. Tel Penketh 5735.

O/board motor, Clinton J9 £40; Heathkit Mohican rx, ideal /M, £12; mags—*Practical Electronics* Vol 1–7, £5 ono. G3URZ QTHR. Tel Comberton 2048.

QQVO3–10 valve 50p; QQVO3–20A base tank cct, micro adjustable link, 2m, 50p; 2 valves CV2797 KB/DF £1; 1 RCA 815 valve 50p; box 36 untested small valves £1. H. H. Seymour, 6 Chichester Buildings, Swan Mead, London SE14RY.

2m tx/rx, steel table-top case, 10½in by 18in by 16½in, 25W out a.m., 145MHz calling, choice second xtal, built-in spkr etc, switched metering, £30, exch tv camera. G3OWB QTHR. Tel 59127.

Bound vols *RSGB Bulletin*, 11yrs, 1939–1950, offers; various trnsfmrs, smoothing chokes, mod trans, cheap, buyer view and coll. G3ADK QTHR. Tel 27595.

Versatower, 40ft, crank up and over, floor-mounted ground post, two auto-brake winches, all cables, good cond, buyer dismantle and coll, offers. H. G. Johnson, Dowrich House, Crediton, Devon. Tel 2734.

Drake R4B rx, extra xtals to 29MHz + 160m, genuine, little used, £180, no offers; type G2DAF psu for tx, £7.50, fraction of cost. G3RHM QTHR. Tel 01-422 5810.

Yaesu FRDX400 rx, 3 months old, mint condn, with orig packing case, best offer over £130 secures. G3XXM QTHR. Tel Welwyn Garden City 29749.

Pair 813s with bases £5; psu, 2kV 5mA, 350V 250mA, 6·3V 17A, £3; 70cm 8/8 slot beam £1; 30V 100A, dc, genny, sound, £4; many assrtd dynamotors, buyer coll. G8AFA QTHR.

Hartley dbl-beam scope, good cond, with cct and mains lead, £15 ono. G3XFU QTHR. Tel 36331.

Pye base stn cnvrtd 2m, 4 xtals, tunable rx, dial needs attn, £7.50. W1191 wvmtr with xtal £2.50; portable battery tx/rx, 7·4–9MHz, whip aerial, no cct, £1.50, buyer coll. G. H. Woolner, 35 New Road, Wood Green, London, N22. Tel 01-888 3428.

Truvox PD99 stereo t/rcdr, appearance new, service manual £20; Labgear LG300 fb, cct and h/duty psu/modulator, bargain, £25 ono. BC221, Zenith, brand new cond, re-calibrated by G. H. Bradley, £27. G8BMQ QTHR. Tel 01-653 8489 evngs.

R1132A, inc psu, £7, needs slight repair; Marconi Giant atu £3; 3A rf ammeters £1·25; meters, 1.5mA fsd, 50p incl p & p. Dr D. P. Nicholls, Ancoats Hospital, Manchester M46EB. Tel 061-205 2204.

Cheap, 3in scope tube, VCR138, new wvmtr W1646, ac powered, airflow base for 4X150A. **Wanted** old pattern 450kHz, i.f. trnsfmr having large tuning slugs. Parker, 133 Station Road, Cropston, Leicester LE7 7HN.

New 15m 2-el quad, well tried proven design, complete with boom, spreaders, gamma match, easy assem and tuning instrctns, forward gain 8dB, front-to-back 25dB or better, £12 carr extra. G3ZIG QTHR.

QTH for sale, 18th century house, ch, 3 bed, 1 acre, dble garage, 50ft tower, in one of the loveliest spots in Wales, offers over 25K. GW3EJM QTHR.

7B teleprinter £10; Hy-gain 18AVT/WB £29; KW204 tx, 10–160m £110; JXK 2m cnvrtr, 12–14MHz i.f., £9, can del within rsnble dist SW Essex. G3ZXF QTHR. Tel 01-508 0980.

LG50 tx £15; electronic keyer, Dentsoi, £12; Pye Vanguard with all fittings and xtals for 2m /M, £30; BC348 with sep psu, £15. G3YBL, 14 Box Lane, Boxmoor, Hemel Hempstead, Herts. Tel 0442-56286.

Tx/rx 22, mains psu, exc QRP rig, 2–8MHz wrkng, £7; 19 MarkIII Canadian, special psu, 12V vibrator for receiving, all cables junction box, key, mic, hdphns, exc, £10 carr extra. J. R. M. Hewitt, 114 Canterbury Rd, Kennington, Ashford, Kent. Tel Ashford 21158.

Wheatstone bridge resistance box, pre-war, wooden case, good working cond, manual, £2; calbrtd air variable cpctr, 600pF, wooden case, wartime, 50p, post extra, may suit collectors. G3TTC QTHR.

Osc test No 1, CT212, 2DOO783, 85kHz–32MHz, 7 ranges, 110/250V ac or 12V dc, vgc, terminating unit, filter assy and lead for 12V, mains lead, £30, carr extra; three Command TXs, 7–9·1, 3·4, 2·1–3MHz, cw/phone, modified to clamp modulation and pi-output, £8 ea, carr extra, with valves, wrkng. Robert Williamson, 13 Avonmore, Antrim Road, Ballymena, Co Antrim, Northern Ireland. Tel Ballymena 41468.

Power supply, 1,700V, 300mA, made from Woden comps, in steel case, £3; 813 valves £1; bases 50p, rf ammeters 50p; AT5 and 250S power control unit £20; 10V 10A trnsfmr £1. G3RFG QTHR.

KW Vanguard tx, 10–80m, good cond, £20. G3IZA QTHR. Tel 01-460 5768.

AR88LF with case, S-mtr, both not orig, hndbk, PR30 preselctr, £25. Write or call wknds, A. W. Benn, 4 Copthorne Road, Keresley, Coventry, CV6 2EE, Warks.

Going cheap, very large s/d house, three storey, cellar, recently decorated, 8 by 12ft shack, 50 by 60ft garden, shed, garage, quiet residential area, nr shops and railway stn, need quick sale, £30,000. S. D. Terry, "Kynance", Stratford Rd, Watford, Herts. Tel Watford 24752.

Modulator QRO, two KT88s, fixed bias, Class AB1, speech clipping approx 14dB max, UM3 mod trnsfmr, suit xtal mic, self-contained with psu, 17in by 6½in by 12in. G8DJM QTHR. Tel Lye 4388, (Worcs).

100/1,000kHz calibrating xtal £1 + 10p p & p. **Wanted** HRO coil covering 28–30MHz, G. Harwood, 243 Leigh Rd, Chandlers Ford, Eastleigh, Hants, SO5 3AX.

Grundig TK35 tape rcrdr £15; Pye base stn tx on 2m with 6–40 pa, £15; RCA wvmtr, TE149, ac psu, 2,500–5,000kHz, £3.50; BC455 for spares 50p. G3XOF QTHR.

KW Valiant 6 bander, PTT, low power tune and 160 interlock, prof-built power pack, solid state, £30; G3XYX QTHR. Tel 07-34-31 5548.

Complete, 2 vol *Wireless Telephony and Broadcasting* by Dowsett, published 1924 by Gresham, good cond, offers. G3LIA QTHR. Tel Framingham Earl 3478 after 6pm.

KW Viceroy Mk3 £70; AR88D with S-mtr, £25, both ono, buyer coll. G4BKY (QTHR as G3ILO).

Marconi TF455D/1 wave analyser, 0-16kHz, hndbk, £30 ono; TCS-12 tx, transistor modulation preamp, £10 ono. G3UFW QTHR. Tel Devizes 2515.

40290s, equiv BLY33, £1.15 ea, 5 for £5, post 5p. Enquiries for Toko fltrs welcome, sae please. W. S. Poel, "Littlecroft", Mill Hill, Brentwood, Essex.

G2DAF transistor ssb rx, 160–10m + 2m, built by G3LUB, £35; 4m cnvrtr, transistor i.f. 2·8–3·5MHz, £6; DET24, new, £1; B44 on 4m with tx xtal £5; TM616A field-strength mtr £1.50. Ray, 2 Springfield, Highland Avenue, Brentwood, Essex.

2 FX2249 ferrite rings, 1 FX1115; Newmarket PC1 audio amp. G3RSJ QTHR.

Sound to light cnvrtr, normal and inverted o/ps, 1kW ea, self powering, variable sensitivity, no connctn to amp req, ideal for disco etc, £6.00. M. G. B. Baker, 25 Newtown, Beaminster, Dorset.

S36A, 28–140MHz, a.m./fm/cw, good, £24; GR78 gen cov rx £56; Microwave Modules 2m cnvrtr, i.f. 4–6MHz, £12; KW match, 50/75Ω, £3.50; GEC 4m tx, a.m. with xtal 70·25, £8. G3BHT QTHR. Tel 021-308 4764.

Hallicrafters HA1 electronic keyer, new, surplus to requirements, £40 for quick sale. Tel Ron Stone, 01-606 2690, 9 to 5.

KW gear, 2000A, ac psu, Ezee-match, lp fltr, trap dipole, balun and 97ft coaxial cable, Shure 201 mic, swr indicator, £155, recent service by KW. Winsford, 13 Battlefield Road, St Albans. Tel 63633.

KW Ezee-match, mint cond £10. G4AQH QTHR. Tel 01-653 7623.

KW Vanguard, 80-10m, good wrkng order, modified for relay control, £20 ono, cct diag available, pref buyer coll. G3OVG QTHR. Tel Hitching 52709.

55ft galvanized tiltover tower based on Hamtower/Unimast, will carry heaviest beams, photos available, £65; Hy-gain 39ft vertical, £20, hp available. E. N. Cheadle, 27 Shenley Hill, Radlett, Herts. Tel Radlett 4435.

Single 3 speed record player, ideal present for teeny bopper, pref exch for absorption wvmtr with 2m capabilities or why? R. C. Miller, 8 Avoca Rd, Tooting, SW17. Tel 01-226 1262, ext 226.

Codar CR70A rx £15; PR30 preselector £5; RQ 10X Q-mult £5; all gd cond, buyer coll. R. Ahern, 76 Stamford Brook Rd, W6. Tel 01-743 2923.

KW Vanguard tx, 160–10m, vgc, offers over £25, would arr to del up to 50 miles from QTH. J. Powell, 448 Slade Rd, Erdington, Birmingham. Tel 021-373 1841.

CR100/2 exc cond, revalved with circ diags, £17; Pye Ranger 2107, boot mounting and control box £9; Pye Ranger 2007, dash mounting, £9, buyers coll. D. Pollington, 27 Stoke Ave, Hainault, Ilford, Essex. Tel 01-500 6922.

Heathkit Mohican rx £12 ono. G. C. McDowall, 22 Spey Terr, Pilrig, Edinburgh 7.

Hudson AM108 low band /Ms £5 ea; Murphy low band base stn, all suitable 4m cnvrsn. G. Hooper, 12 Bramble Crescent, Worthing. Tel 62013.

Crystals HC6U, 1MHz, 60p; 5MHz 75p; HC18U, 8·950MHz, 50p, send 3p sae with remittance and order. Richard Bowell, 16 Margarite Way, Wickford, Essex.

AIWA TP712 two track, two speed mains or battery operated tape recorder, £18. Scott Magnolias, Marlow Rd, Lane End, High Wycombe, Bucks. Tel High Wycombe 881298.

Trio 9R59DE rx, matching spkr, exc cond, £35; Lafayette version of Heathkit DX60 tx with homebrew vfo, £25; mains Class D wvmtr £5. G3VRY QTHR. Tel 01-888 9482.

AR88 rx, mint cond, S-mtr, matching spkr, spare valves, £50, no offers, buyer coll. T. Pringle, 377 Meadow Lane, Oxford OX4 4BL. Tel Oxford 21810.

XF9A fltr with usb xtal, £11. **Wanted** XF9D fltr. G3ZSS QTHR.

Asahi Pentax fisheye lens F11-32, fixed focus, and bellows unit, both unused, £20 and £5 respectively, or swop. **Wanted** TR44 rotator and control unit in good order, also 2m beam. G2BPC QTHR.

KW2000A, new pa valves, very clean; KW Ezee-match; KW swr match; KW harm fltr, £150. **Wanted** KW77 or sim part exch or why; Lafayette HA600, new, £35. G4AJZ QTHR. Tel 051-709 3750.

Met balloons 65p; 275ft reels aluminium wire 55p, post and pckng incl, ideal for balloon-supported vert. G3XKV, 15 Avenue Road, Brentford, Middx TW8 9NS. Tel 01-560 8671 after 6pm.

BRT 402E rx, handbook, £60; 32ft self-supporting tower £20; Yaxley switch making kit £10. G3UDA QTHR. Tel Shrewsbury 51733.

Stolle automatic rotator, unwanted present, used once, £21.75 inc p & p; two J beam alignment bearings, used on Field Day only, £3.75 inc p & p. G3VYN QTHR. Tel Hempnall 423.

10 mains trnsfmrs, 600V ct 120mA, 4 x 6·3V, 1A, 5V 2·5A, £2 ea; five 200V 40mA, 100V 40mA, £1 ea; Gardener 0·25H 2·5A, £1.50; all varnish impregnated, paxoline panels with turret tags, as new, carr extra. GM3JHL QTHR. Tel Fauldhouse 433.

30ft three sectn tower £15; homebrew cw tx, all bands, 10–80m, 100W, psu, 6146 pa, £10 ono, pref buyer coll. G4ATW QTHR. Tel Wymondham 2474.

Trio 9R59DS rx, SP5DS spkr, as new, sig and pattern gnrtr, property of late swl, £37.50 the lot. G3OVT QTHR. Tel Stevenage 50136.

Radar display, 16in screen, and rx units, complete and in good order, will accept first rsnble offer, sae for further details/photo of gear. J. Elsworthy, 2A Steele House, High St, Dovercourt, Essex.

Mullard high speed valve tester, commercial model, vgc, buyer coll, £45 ono, or would exch for aerial rotator suitable for 2in mast. D. May, 10 High Street, Wyke Regis, Weymouth, Dorset. Tel Weymouth 71796.

Variac 100LM 8A, 2kVA, new, £8; dble-smoothed power units, 19in panels, 750V 250mA, 6·3V 500V, 200mA, 6·3V ea, £6, plus carr; unused electrolytics 32/600V, 200/500V, 2× 32/450V, 3 × 50/350V, 600/250V, 4000/70V, 20p ea + carr. G3GOT QTHR. Tel Billericay 4986.

RTTY Creed auto tx, type 7ID, £11 ono. G3YKB QTHR.

Crystal cal No 10, ac, £4; 60W modltr, UM3, £7; xtls HC6U 24,183kHz, 44,889kHz, £1.50 ea, 6 over 6 2m beam, £4.50; Hy-gain 12AVQ, £10, buyer coll or carr extra. G3GMY QTHR. Tel Potters Bar 57333.

Tavasu whip, all coils £8.50; Joystick (needs new dowel former), Joymatch 4RF, £4.50 inc p + p. **Wanted** 14AVQ or sim. R. M. Trott, 12 Arundel Close, Duppas Rd, Croydon, CRO 4BR, Surrey. Tel 01-686 6687.

12in Tannoy dual concentric spkr with crossover unit, 15Ω, almost new, offers; Goodmans 12in spkr, vgc, £4.50; Tripletone hi-fi amp, mono, £7.50. Stephen Downey, 19 Wellington Avenue, Chingford, E4.

Gonset G76 tx/rx covers 80—6m amateur bands, tx 100W, rx with noise limiter, xtal calibrator, resettable dial /m and mains PSUs, 12 by 5 by 10in, £35 ono. G3XLB, QTHR. Tel 051-36 71968.

FTdx560, vfo 400s, FT101, E-zee match, HRO, all bndsprd coils, stab power-pack, calibrator No 10 with power supply, G8KW, 14AVQ, 26 radials, mics, phones, spkrs, misc gear, SAEs only answered. GM4AGS, QTHR. Tel Newport on Tay 3113.

Signal gnrtrs, Marconi TF867, £25, TF144G, £12; KW Viceroy MkIII £65. M. Kinsella, 37 Terry Road, Coventry, CV1 2AW.

CR100, good cond, £7; 60W mod with trnsfmr £1.50; psu 400V 150mA plus heaters, £1.50, mains trnsfmrs 275-0-275V, 150mA, 6·3V 4A, 5V 2·8A, 75p buyer arranges colln. G3YQV, QTHR. Tel Brighton 735694.

HeathkitV7AU vvm £10; KW2000, ac psu, mint, £120 ono; KW aerial switch, mint, £2.50; Eagle field-strength mtr £2. G3VMY, QTHR Tel Langford 540.

Pye Ranger tx/rx for 4m, QQVO3-10 pa, gd cond, £5; Labgear tx 80-10m pa two 807s, with psu, any offers? G3XFB, QTHR.

R107 rx, fitted S-mtr, £10; 70cm tx, QQVO-320A tripod and pa, £5; Pye base station 320pa, am/fm, £10, 120W modulator £3; 70cm cnvtr £2. J. Roughton, 42 Severn Road, Bulkington, Nuneaton, Warks. Tel Bedworth 315729.

Superb vhf site for sale around £14,950, comp with pleasant centrally heated three bedroom house with integral garage in Bedfordshire village, convenient M1 and London trains, local TVs filtered, friendly go-ahead local club. G3VZV, QTHR. Tel 05255 2470.

Spy set B2 £10; 52 set tx with spare 813 and orig manual, £6; CR100/B28, xtal controlled tx £15 CR300 £15; Vibroplex bug key £5. **Wanted** Joystick aerial and tuner. G3YAQ, 1 Ballam Rd, Larches Estate, Preston, Lancs.

Westminster W15AM, 2m rx xtal, copy manual £28; Printset SBG9 kit; 9MHz ssb gnrtr inc B&W psn, £3. Tel 01-599 0197, evngs.

Knight-kit rf Z-bridge £2; Garex 70cm cnvrtr, 28MHz i.f., £5; LSM100 ssb /M pa unit, 100W p.e.p, as new, £15, buyer coll; exciter unit, matching pa, transistorized, 2-15MHz, fltr unit incomplete, as new, £8, buyer coll. G2BVN, QTHR.

FT-2F tx/rx, two months old, £75; Stolle automatic rotator, plus 20m cable, new £20; Mosley 10m aerial, ok for receiving Oscar, £10; Creed 75R teleprinter, £40; Marconi rtty demodulator, £40. Nigel Graham Boyd, 4 Kings Avenue, Eastbourne, Sussex, BN21 2PF. Tel Eastbourne 31844.

KW2000B plus ac psu, sked arranged, del 100 miles, £160 ono. **Wanted** standby rx, no junk please, gen cov, amateur band or good homebrew, part exch with cash adjustment for 2000B? G3PDL, QTHR.

HW100 and HP23 ac pu, both exc cond, £120, going QRT due to business demands. G3PBW, QTHR.

J Beam 70/18P, 70cm, 18-el, £4.50 ono. **Wanted** BAY66 or BAY96 varactor diode or sim device. G8DDW, QTHR. Tel 01-858 3921.

TA33 Jnr £15; 2m 8-el £2; 4m 4/4 with phasing harness, £7.50; halo £1.50; TW tx £8; cnvrtr, i.f. 28-30, £12; AR22 £15; RA1 £25; R4A MS4 with extra xtals £170. Colin Baker, 18 Collingtree, Luton, Beds, LU2 8HN. Tel Luton 35806.

FT-2F mint cond, xtals on nine channels, £75; two sets Pye pocket phones, complete with leather cases and two chargers, £60. Ferryman, 10 Grenville Gdns, Birchington, Kent. Tel Thanet 43253.

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Marconi signal gnrtr, type TF 144 F/H, £10; mains voltage stblzr, type BMVR-1725, £10. M. D. Watson, 74 Bowrons Ave, Wembley, Middlesex, HA0 4QP. Tel 01-903 4363.

Pye Vanguard, modified 2m with 145MHz xtals, complete with all leads and control box, £30 ono; Pye Ranger low band with leads, no control box, £10 ono. G4ABQ QTHR. Tel Harrold 587.

Eddystone 840C vgc, £44. Hobden, 6 Cockshot Road, Malvern, Worcs. Tel Malvern 3282.

HW17A 2m tx/rx, prof built, £50, carr paid or will exch for good HW32A with dc psu, cash adjustment if necessary. G4AHC QTHR. Tel 051-638 7400.

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Marconi Electra rx £15 ono; Marconi CR300 rx, brand new cond, £15 ono, both incldg hndbks and spare valves; Marconi tv monitor £10 ono, buyer coll. G8CVI QTHR.

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AR88D with S-mtr, manual, spkr, spares, £50; AM25B Vanguard and manual, £20; Teletype 14 reperforator £15; DL6EQ TU and AFSK £15; G2DAF two 813 lin and spares, no ht, £15. G3LDI QTHR. Tel Wymondham 3463.

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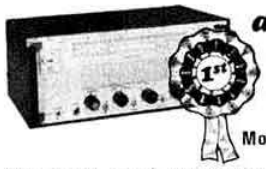

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