January 1986

RADio COMmunication

QRV 50?

DEPARTMENT OF TRADE AND INDUSTRY
Radio Regulatory Division
Waterloo Bridge House Waterloo Road London SE1 8UA

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Your reference

Our reference

Date December 1985

D A Evans Esq
General Manager/Secretary
Radio Society of Great Britain
Lambda House
Cranborne Road
POTTERS BAR
Herts EN6 3JW

Dear David,

50 MHz

You are well aware that on 28 June, Mr Geoffrey Pattie, Minister of State for Industry and Information Technology made a statement about the future use of Bands I and III. As part of that statement he said: "I am conscious that the interim Merriman Report recommended that the radio amateur service should be given an allocation in the Band and I am therefore proposing to fulfil that recommendation by allocating the band 50-50.50 MHz to radio amateurs.

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Journal of the Radio Society of Great Britain

INSIDE: RSGB TAKES OVER MORSE TESTING

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Headline News
Tel 0707 (77 from London) 59312 for a recording of the latest amateur radio news

CONTENTS

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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hf transceivers

TS940S HF transceiver with general coverage receiver
Top of the range, the TS 940S has every operating feature that the discerning HF operator needs. Amateur bands, 160 through to 10 metres plus a general coverage receiver tuning from 150KHz to 30MHz. Modes of operation are USB, LSB, CW, AM, FSK and FM, included as standard. Forty memory channels, each effectively a separate VFO and simple keyboard frequency entry make operation and ownership of a TRIO TS940S a pleasure.

TS940S . . . £1695.00 inc VAT, carriage £7.00

TS930S HF transceiver with general coverage receiver
Much has been said and written about the TS930S and it now has a place high in the affection of those amateurs fortunate enough to own one. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150KHz to 30MHz, the TRIO TS930S is ideal for today's crowded frequencies.

TS930S . . . £1295.00 inc VAT, carriage £7.00.

TS430S HF transceiver with general coverage receiver
A compact transceiver suitable for mobile or portable operation, yet having all the facilities necessary for effective radio communication. The TS430S has, in addition to the amateur bands from 160 to 10 metres, a general coverage receiver. Modes of operation are USB, LSB, CW, AM with FM optional. Owned by many radio amateurs worldwide, the TRIO TS430S is an ideal way to combine amateur radio with short wave listening.

TS430S . . . £720.00 inc VAT, carriage £7.00.

TS830S HF amateur bands transceiver
Needing no description, the TS830S, which uses a pair of 6146B valves in the PA is well known on the amateur bands for its superb signal quality. Having variable bandwidth tuning, IF notch, IF shift and provision for various filters, its receive performance is excellent too.

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TS530SP HF amateur bands transceiver
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TS530SP . . . £698.00 inc VAT, carriage £7.00

handheld transceivers

TR2600E and TR3600E 2 metre and 70 centimetre FM handhelds
The latest handhelds from TRIO are a natural progression from the much liked TR2500/TR3500. By adding DCS, the ability to skip particular memory channels, to hold for either timed or carrier when scanning, for the memory to hold whether the channel is simplex or repeater shift and an illuminated "S" meter, TRIO have produced a first class pair of handhelds.
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TR3600E . . . £292.00 inc VAT, carriage £7.00.

TH21E and TH41E 2 metre and 70 centimetre FM compact transceivers
The TH21E and TH41E are two simple handhelds, each extremely small yet having full repeater facilities including reverse repeater. Power output is one Watt or 150 mulliWatts in the low position and frequency selection is by means of thumbwheel switches. Very small but still convenient to operate, the two transceivers are just right for the amateur who wants to stay in touch.
TH21E . . . £170.00 inc VAT, carriage £7.00.
TH41E . . . £199.00 inc VAT, carriage £7.00.

vhf/uhf all-mode transceivers

TS780 VHF/UHF dual band transceiver
The TS780 is the ultimate base station for the enthusiastic operator who wants both 70 centimetres and the 2 metre band in one transceiver. Modes of operation are USB, LSB, CW and FM. Full repeater facilities, plus two VFOs, IF shift, two priority channels, memory and band scan combine to make the TRIO TS780 the perfect rig.

TS780 . . . £948.00 inc VAT, carriage £7.00.

TR9130 two metre all-mode transceiver
The TR9130 is now a classic rig—so popular that to have one on the second hand shelf is rare. 25 Watts on SSB, FM and CW, green frequency display, six memories, two VFOs and memory scan make the TRIO TR9130 ideal for either mobile or base station operation.

TR9130 . . . £499.00 inc VAT, carriage £7.00.
TR9300 (6 metres) . . . **£569.97** inc VAT, carriage £7.00.

TS711E and TS811E 2 metre and 70 centimetre base stations
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vhf/uhf fm transceivers

TW4000A FM VHF/UHF dual band transceiver

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TR7930 2 metre FM mobile/base station transceiver

A mobile FM transceiver that also doubles as a piece of shack equipment. Producing 25 Watts and having 21 memories, priority alert, full repeater facilities including reverse repeater, programmable band scan, memory scan and keyboard frequency entry, the TR7930 is ideal for mobile operation using the programmed memories, yet is suitable for shack use with the front panel keyboard.

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TM201A and TM401A 2 metre and 70 centimetre mobile FM transceivers

Accepting the fact that there is little space in a modern car for anything other than a radio/cassette unit, TRIO have with the TM201A and TM401A produced the definitive compact transceiver. By removing the speaker and making this separate, TRIO have given you excellent receive audio quality. The TM201A and its 70 centimetre version, the TM401A are ideal for the amateur who wants a high performance rig with ease of operation.

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general coverage receivers

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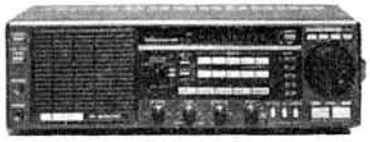
The R600 is a general coverage receiver covering 150KHz to 30MHz. Modes of operation are AM, USB, LSB and CW. Operating is on either mains or 12V DC. Easy to use and with a green digital frequency display for easy tuning and internal speaker, the TRIO R600 is equally at home in the lounge, caravan, boat or shack.

R600 . . . £299.52 inc VAT, carriage £7.00.

R2000 general coverage receiver

The R2000 general coverage receiver from TRIO covers the frequencies from 150KHz to 30MHz. Modes of operation are AM, USB, LSB, CW and FM. For convenience the R2000 has ten memories, each of which holding frequency and mode information. Memory scan and programmable scan between user designated limits are also included. Provision has been made for an optional internal VHF converter covering from 118 to 174MHz. Operating from either mains or 12V DC the TRIO R2000 is an ideal way to listen to the world.



R2000 . . . £479.47 inc VAT, carriage £7.00.
VC10 VHF converter 118 to 174MHz . . . **£128.36** inc VAT, carriage £2.50.

station accessories

TL922 HF amateur band linear amplifier

The TL922 is a class AB2 grounded grid linear amplifier using two high performance EIMAC 3-500Z tubes. It covers 160 to 10 metres for SSB, CW and RTTY modes of operation. Engineering perfection, those who have seen a TL922 will know what I mean. It is one of the few items of amateur radio equipment which is truly hand built by a specialist engineer.

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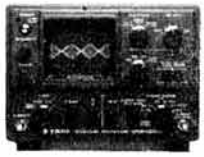

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"as I said to John"

The article last month discussed the effects of strong signals close to a receiver's tuned frequency and described various methods by which its performance could be degraded. The effects described —blocking, reciprocal mixing, and filter leakage —were not sensitive to particular frequencies, but pertained to a band of frequencies on either side of the wanted signal. A receiver can also be sensitive to signals on specific frequencies other than the one to which it is tuned. These are called SPURIOUS RESPONSES and their effect can be measured by specifying a response rejection ratio (in decibels) which indicates how much stronger the spurious signal must be to achieve the same effect as the wanted signal.

A common spurious response that is present in superheterodyne receivers is the IMAGE RESPONSE or I.F. IMAGE. The receiver tunes a particular signal by mixing it with a local oscillator to produce an intermediate frequency. The oscillator frequency may be above or below the signal frequency, but the frequency difference is always the IF. There is, however, another signal frequency (on the opposite side of the local oscillator from the wanted signal) that will mix to produce the IF. This frequency will be twice the IF away from the wanted signal, and may be above it or below it in frequency, depending on the receiver in question.

The image rejection of a receiver depends on its front-end selectivity—on how much attenuation the input filters can offer at the image frequency. This has led to modern receivers having higher and higher IF frequencies to achieve adequate performance from broad-band input circuits. Multi-band VHF/UHF scanning receivers generally suffer badly from image response, with 10.7 MHz IF's giving an image 21.4 MHz away from the wanted signal, which often lies in bands covered by the receiver. Many ingenious systems of electronically tuned RF stages are used to good advantage, but the problem has only really been solved by receivers like the AR2001 which has an IF at 750 MHz, placing the image 1.5 GHz away from the wanted signal!

Other spurious responses exist within receivers. Multiple conversion receivers can have image responses from each IF, and many frequency synthesisers in receivers produce low-level signals which mix with the required output. These signals appear as sidebands on the local oscillator, and lead to spurious responses which tune with the receiver, but often at different rates or in the opposite direction. Such responses are difficult or impossible to predict by studying the design of a receiver, and measurement of the responses is very time consuming. For this reason it is unusual to find much information on spurious response rejection in equipment specifications.

The responses considered so far have all been related to the frequency to which the receiver is tuned, and so although a spurious response may prevent reception of a particular station, it is unlikely that the effect will occur on more than one or two frequencies. Some spurious responses can be at fixed frequencies, typically at the IF or at a simple factor of the IF (one half or one third). HF band receivers are most prone to this since the IF frequencies lie near to the RF frequency band the receiver must cover, and can therefore only be attenuated by a limited amount in the input filters. A strong signal at the frequency of a fixed spurious response can have a disastrous effect on receiver performance over a wide band of received frequencies.

Image and spurious rejection ratios should really be 60 dB or better, and a figure of 80 dB for all responses is necessary for a top-range receiver. IF rejection should be as good as possible, certainly better than 80 dB for a good receiver.

Spurious responses should not be confused with SPURIOUS SIGNALS generated within receivers. All but the very simplest of receivers have several internal oscillators, and some of these will produce signals that are within the frequency range of the receiver. These spurious signals can find their way directly into the input ciruits of the receiver if screening is inadequate, or can be radiated from the receiver to be picked up by a nearby antenna. The signals induced directly inside the receiver are usually quantified by quoting an equivalent antenna input level which produces a similar output from the receiver. Spurious signals that exceed 1 μV equivalent input can be regarded as significant, and can cause problems if they are close to a station being received. Spurious signals can normally be ignored for HF and broadcast reception, but they can be a real problem on VHF and UHF scanning receivers, where internal signals are seen as wanted stations, and scanning is halted.

Next month. Swamped with spurious signals this month, but better late than never—INTERMODULATION.

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432-5B	5 Ele	16.95
432-19T/ATV	19 Ele	35.60
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144-14T	14 Ele	46.71
144-19T	19 Ele	55.88
144-6X	6 Ele Crossed	39.75
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4M		
70/3	3 Ele	30.12
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T.E.T. ANTENNAS

		SRP	Discount Price
AX210N	10 element crossed Yagi. 2 metres	74.94	59.00
HB15F2T	2 element 15 meter beam	60.66	48.50
HB15M2SP	2 element 15 meter mini beam	69.49	55.59
HB210S	10 element 2 meter beam	47.99	38.40
HB23SP	2 element tri-band beam 10, 15, 20m	172.50	138.00
HB23M	2 element tri-band beam (mini) 10, 15, 20m	169.50	135.90
HB32SP	3 element dual-band beam 10, 15m	168.64	134.99
MLA4	HF band 100p antenna	105.60	84.40
MV3BN	Vertical antenna 10, 15, 20m	45.95	36.79
MV3BHR	Vertical antenna 10, 15, 20m + trapped radials	78.00	67.00
Q7U10S	10 element 430 MHz Yagi	67.90	54.32
SQ007	Double quad 430 MHz	66.99	53.59
SQ10	10 meter quad mono band antenna	97.50	78.00
SQ15	15 meter quad mono band antenna	106.99	85.59
SQ22	Double quad 144 MHz	58.95	47.00
SQY06	Swiss quad/yagi 144 MHz 6 element	45.75	36.60
SQY08	Swiss quad/yagi 144 MHz 8 element	52.74	42.00
SSL218	Double 144 MHz slot Yagi 9 element	144.78	115.89
TE214	14 element long Yagi 144 MHz	74.39	59.50

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PC1	Gen. Cov. Con	137.40
VLF	Very low frequency conv.	29.90
FL2	Multi-mode audio filter	89.70
FL3	Audio filter for receivers	129.00
ASP/P	r.f. speech clipper for Trio	82.80
ASP/A	r.f. speech clipper for Yaesu	82.80
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D75	Manual RF speech clipper	56.35
D70	Morse Tutor	56.35
MK	Keyboard morse sender	137.40
RFA	RF switched pre-amp	33.90
AD270-MPU	Active dipole with mains p.s.u.	51.75
AD370-MPU	Active dipole with mains p.s.u.	69.00
MPU	Mains power unit	6.90
DC144/28	2m converter	39.67
PTS1	Tone squelch unit	45.00
ANF	Automatic notch filter	67.85
SRB2	Auto Woodpecker blanker	85.25

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T100	100 Watt 3.5-500 MHz dummy load	35.20
T200	200 Watt 3.5-500 MHz dummy load	42.55
BL40X	50 ohm-50 ohm 1-1 Balun 1kw pep	16.90
BL50A	50 ohm-50 ohm 1-1 Balun 4kw (pep) 2kw (cw)	19.84
SA450N	2 way antenna switch, 'N' connectors	18.40
SA450M	2 way antenna switch SO239 connectors	14.49
YM1X	3.5-150 MHz 120 Watt SWR/PWR meter	21.49
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AE/DOG	Ceramic dog bone insulator	0.60
TOYO		
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T435	144/432 200W	49.35
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HK703	Up down keyer	29.35
HK704	Up down keyer	19.95
HK705	Up down keyer	15.49
HK706	Up down keyer	16.96
HK708	Up down keyer	14.95
HK802	Up down solid brass	86.31
HK803	Up down brass	82.64
HK808	Up down keyer	39.95
MK704	Twin paddle keyer	13.50
MK705	Twin paddle keyer marble base	25.65
KENPRO		
KP100	Squeeze CMOS 230/13.8v	82.50
KP200	Memory 4096 Multi channel	169.50

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All the features of the FT 270 but on 70cms

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HIGHER AND HIGHER WITH

2 New models to raise ICOM Amateur frequencies to 1·2GHz.

IC-1271E Fantastic new multimode 1.2GHz Transceiver

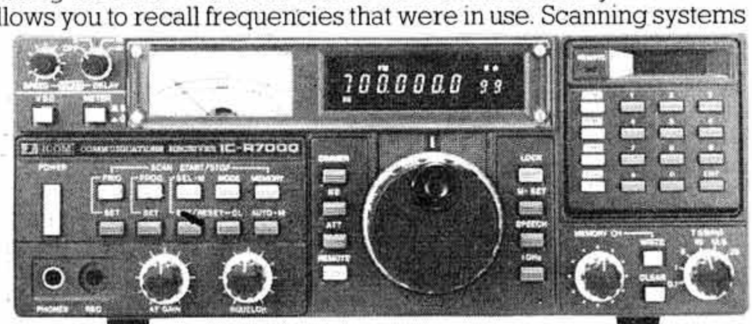
ICOM, a pioneer in 1.2GHz technology are proud to introduce the first full feature 1240 – 1300 MHz base station transceiver. Features include: multimode operation, 32 memories, scanning and 10 watts RF output. The IC-1271E allows you to explore the world of 1.2GHz thanks to a newly developed PLL circuit that covers the entire band, a total of 60MHz, SSB, CW and FM modes may be used anywhere in the band making the IC-1271E ideal for mobile, DX, repeater, satellite or moonbounce operation. The IC-1271E has outstanding receiver sensitivity, the RF amplifiers use a low noise figure and high-gain disc type GaAs FET's for microwave applications. The rugged power amplifier provides 10 Watts which can be adjusted from 1 to 10 Watts. A sophisticated scanning system includes memory scan, programme scan, mode-selective scan and auto-stop feature. Scanning of frequencies and memories is possible from either the transceiver or the HM12 scanning microphone. 32 programmable memories are provided to store the mode and frequency in 32 different channels. All functions including memory channel are shown clearly on a seven digit luminescent dual colour display. The IC-1271E has a dial-lock, noise blanker, RIT, AGC fast or slow and VOX functions. With a powerful 2 Watt audio output the IC-1271E is easily audible even in a noisy environment. The transceiver operates with either a 240V AC (optional) or 12 volt DC power supply.

A variety of options include IC-PS25 internal AC power supply, IC-EX310 voice synthesizer, the TV-1200 TV transceiver adaptor and the IC-EX309 computer interface. The IC-1271E is the most compact and lightest all-mode 1200 MHz transceiver currently available.

IC-R7000 VHF/UHF scanning receiver

Causing quite a stir at the moment is the ICOM IC-R7000. This new receiver is able to give high frequency coverage up to 1.3MHz without sacrificing SSB stability which is maintained throughout the IC-R7000's entire frequency range. For simplified operation and quick tuning, the IC-R7000 feature direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM/AM/SSB modes, frequency coverage 25-1000 MHz and 1025 – 2000MHz (25 – 1000MHz and 1260 – 1300MHz guaranteed specification). The IC-R7000 has 99 memories available to store your favourite frequencies including the operation mode. Memory channels may be called up by simply pressing the memory switch, then rotating the memory channel knob or by direct keyboard entry. A sophisticated scanning system provides instant access to most used frequencies. By depressing the Auto-M switch. The IC-R7000 automatically memorises frequencies in use, while the unit is in the scan mode. This allows you to recall frequencies that were in use. Scanning systems include memory selected frequency ranges or priority channels, scanning speed is adjustable. Narrow/wide filter selection. Five tuning speeds: 10Hz, 100Hz, 1.0KHz, 10KHz and 25KHz. All functions including memory channel readout are clearly shown on dual-colour fluorescent display with dimmer switch. The IC-R7000 has dial-lock, noise blanker, S-meter and attentuator. Options include RC-12 infra-red remote controller and a voice synthesizer.

For a more detailed specification of the competitively priced IC-R7000 contact your authorised ICOM dealer.



Thanet ICOM

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IC735 compact HF Transceiver

As predicted the ICOM IC-735 has rapidly gained the reputation it deserves. When compared with similar 'top names' transceivers the IC-735 towers above them (despite its smaller size). The IC-735 has a larger number of programmable channels, but notably most important is the superb sensitivity in all modes SSB, CW, AM and FM. This superior sensitivity is due to the excellent front end performance. All amateur frequencies from 1.8MHz to 30MHz are available including the three new bands 10, 18 and 24MHz.
RF output is approximately 100 Watts. Tuning ranges from 100KHz to 30MHz, made continuous by using a high-side IF and a CPU control system. RTTY operation is also possible.
Dynamic range is 105dB with a 70.451MHz first IF circuit. Pass-band tuning and a sharp IF notch filter provide clear reception even under duress. Preamp is 10dB and attenuator 20dB. Computer remote control is possible via the RS-232C jack. Options include: the AT-150 automatic antenna tuner, the PS55 AC power supply and the SM-6 and SM-8 desk mics. Why not find out more about the IC-735 by ringing us or your local ICOM dealer.

Thanet Electronics are proud to offer their continued complete service for all Amateur radio requirements – no matter what your problem may be regarding the smooth operation of your shack Thanet have the answers, and technical 'know-how'.
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BARCLAYCARD VISA

WANT TO LEARN MORE?

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This is strictly a helpline for obtaining information about or ordering ICOM equipment. We regret this service cannot be used by dealers or for repair enquiries and parts orders. Thank you.

ICOM authorised dealers in the U.K.

Alyntronics, Newcastle, 0632-761002.
Amateur Radio Exchange, London (Ealing), 01-992 5765.
Amcomm, London (S. Harrow), 01-422 9585.
A.R.E. Comms, Earlestown, Merseyside, 09252-29881.
Arrow Electronics Ltd., Chelmsford, Essex, 0245-381673/26.
Beamrite, Cardiff, 0222-486884.
Booth Holdings (Bath) Ltd., Bristol, 02217-2402.
Bredhurst Electronics Ltd., W. Sussex, 0444-400786.
D.P. Hobbs, Norwich, 0603-615786.
Dressler (UK) Ltd., London (Leyton), 01-558 0854.
D.W. Electronics, Widnes, Cheshire, 051-420 2559.
Hobbytronics, Knutsford, Cheshire, 0565-4040. Until 10pm daily.
Poole Logic, Poole, Dorset, 0202 683093.
Photo Acoustics Ltd., Buckinghamshire, 0908-610625.
Radcomm Electronics, Co. Cork, Ireland, 01035321-632725.
Radio Shack Ltd., London NW6, 01-624 7174.
R.A.S. Nottingham, 0602-280267.
Ray Withers Comms, Warley, West Midlands, 021-421 8201.
Scotcomms, Edinburgh, 031-657 2430.
Tyrone Amateur Electronics, Co. Tyrone, N. Ireland, 0662-42043.
Reg Ward & Co. Ltd., S.W. England, 0279-34918.
Waters & Stanton Electronics, Hockley, Essex, 0702-206835.

Listed here are just some of the authorised dealers who can demonstrate ICOM equipment all year round. This list covers most areas of the U.K. but if you have difficulty finding a dealer near you, contact Thanet Electronics and we will be able to help you.

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DEWSBURY ELECTRONICS

ICOM

IC751	HF Transceiver	1299.00
IC745	HF Transceiver	899.00
IC735	New HF Transceiver	849.00
PS15	P.S. Unit	145.00
PS30	Systems p.s.u. 25A	297.85
SM6	Base microphone for 751/745	40.25
IC290D	2m 25w M/Mode	479.00
IC290E	Low Multi-Mode Mobile	449.00
IC271E	2m 25w M/Mode Base Stn.	729.00
IC271H	100W version of above	899.00
IC25H	2m 45w FM	359.00
IC27E	25W FM mobile	379.00
IC45E	70c 10w FM	345.00
IC47E	25w 70cm FM mobile	469.00
ICBU1	B/U Supply for 25/45/290	29.90
ICR70	General Coverage Receiver	629.00
ICR71	General Coverage Receiver	729.00
IC02E	2m H/Held	269.00
IC2E	2m H/Held	199.00
ML1	2m 10w Linear	79.35
IC4E	70cm H/Held	259.00
IC04E	70cm handheld	279.00
BC35	Base Charger	62.10
HM9	Speaker mic	18.56
IC3	Carry Case	5.50
ICBP3	Std Battery Pack	27.50
BP5	High Power Battery Pack	52.80
CP1	Car Charging Lead	5.50
DC1	12v Adaptor	13.75

MUTEK

SLNA 50	50MHz Switched preamp	44.90
SLNA 144s	144MHz Low noise switched preamp	39.95
SLNA 145sb	Preamp intended for 290	29.90
GLNA 432e	70cm Mast head preamp	149.90
RPCB 144ub	Front end FT221/225	79.90
RPCB 251ub	Front end IC251/211	84.90
BBA 500u	20-5000MHz Preamp	34.90
GFBA 144e	2m Mast head preamp	149.90
SBLA 144e	2m Mast head preamp	89.90
RPCB 271ub	Front end for IC271	89.90
TVHF 230c	2M-FM Transverter	334.90
LBPF 144v	Bandpass Filter	22.40
LBPF 432u	Bandpass Filter	22.40
TVVF 50c	6M Converter	199.90
GLNA 433e	70cm Pre-amp	79.90
TVVF 144a	2M Transverter	239.90

MET ANTENNAS

70cms		
432-5B	5 Ele	16.95
432-19T/ATV	19 Ele	35.60
432-17X	17 Ele Crossed	49.17
432-17T	17 Ele Long	39.20
2M		
144-5	5 Ele	19.55
144-7T	7 Ele	24.15
144-8T	8 Ele Long	31.26
144-14T	14 Ele	46.71
144-19T	19 Ele	55.88
144-6X	6 Ele Crossed	39.75
144-GP	Ground Plane	14.41
4M		
70/3	3 Ele	30.12
70/5	5 Ele	45.74

SWR/POWER METERS

WELZ		
SP45	130-470MHz PWR/SWR	69.00
SP10X	1.8-150MHz PWR/SWR	34.00
SP200	1.8-160MHz PWR/SWR	89.00
SP250	1.8-60MHz PWR/SWR	65.00
SP300	1.8-500MHz PWR/SWR	129.00
SP350	1.8-500MHz PWR/SWR	79.00
SP400	130-500MHz PWR/SWR	89.00

DAIWA

CN410M	3.5-150 Mhz mobile cross needle	48.00
CN460M	140-150 Mhz mobile cross needle	52.00
CN520	1.8-60 Mhz mini cross needle	39.00
CN500	1.8-60 Mhz cross needle	19.50
CN620A	1.8-150 Mhz cross pointer. Up to 1KW	2.10
CN630	140-450 Mhz cross pointer. Up to 200W	66.21
CN650	1.2-2.5 Ghz cross pointer. Up to 20W	98.11
CNW419	1.8-30 Mhz 200W tuning unit	159.64
CNW919	2M Power meter and antenna tuning unit	129.50
CNW518	3-30 Mhz 8 band hi power tuner	233.09
CL680	1.8-30 Mhz 200W general coverage ATU	104.99

ICS

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TRIO

TS940	HF General Cov	1695.00
TS940S	9 Band TX General Cov RX	1695.00
TS930S	General Cov RX	1295.00
TS830S	160-10m Transceiver 9 Bands	832.75
AT230	All Band ATU/Power Meter	157.99
SP230	External Speaker Unit	47.73
TS530S	160m-10m Transceiver	698.00
TS430S	160m-10m Transceiver	720.00
PS430	Matching Power Supply	138.00
SP430	Matching Speaker	39.50
MB430	Mobile Mounting Bracket	13.17
FM430	FM Board for TS430	45.00
TS130S	8 Band 200W Pep Transceiver	633.06
SP120	Base Station External Speaker	30.74
AT130	100W Antenna Tuner	108.62
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MC35S	Fist Microphone 50K ohm IMP	17.01
LF30A	HF Low Pass Filter 1kW	24.68
TR7930	2M FM Mobile	329.00
TR9130	2M Multimode	499.00
TW4000A	2M/70cm mobile	522.00
TM201A	2M 25W mobile	296.00
TM401A	7cms FM 12W	316.00
TR2500	2M FM Synthesised Handheld	258.00
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ST2	Base Stand	60.36
SC4	Soft Case	15.92
SMC25	Speaker Mike	18.66
PB25	Spare Battery Pack	29.10
MS1	Mobile Stand	37.31
R600	Gen. Cov. Receiver	299.52
R2000	Synthesiser 200KHz-30MHz Receiver	479.47
HC10	Digital Station World Time Clock	78.99
HS5	Deluxe Headphones	26.88
SP40	Mobile External Speaker	16.46
TH21E/41E	2M/70cm Mini-Handhelds	170.00/199.00
TM211E/411E	2M/70cm FM Mobiles	365.00/399.00
TS711E/811E	2M/70cm base stations	695.00/795.00
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6 amp	69.00	25 amp	169.00
12 amp	115.00	40 amp	345.00
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LPM 144-3-100	2m, 3W in, 100W out, preamp		197.50
LPM 144-10-100	2m, 10W in, 100W out, preamp		175.00
LPM 144-25-160	2m, 25W in, 160W out, preamp		255.00
LPM 144-3-180	2m, 3W in, 180W out, preamp		295.00
LPM 144-10-180	2m, 10W in, 180W out, preamp		295.00
LP 144-3-50	2MN 50W out, preamp		125.00
LP 144-10-50	2M 10W in, preamp		125.00
LPM 432-1-50	70cm, 1W in, 50W out, preamp		235.00
LPM 432-3-50	70cm, 3W in, 50W out, preamp		235.00
LPM 432-10-50	70cm, 10W in, 50W out, preamp		195.00
LPM 432-10-100	70cm, 10W in, 100W out, preamp		335.00

CW/RTTY/TOR

Tono 9000E	Reader/Sender	P.O.A.
Tono 550	Reader	329.00
HI-MOUND MORSE KEYS		
HK702	Straight keyer marble base	30.95
HK703	Straight keyer	29.35
HK704	Straight keyer	19.95
HK705	Straight keyer	15.49
HK706	Straight keyer	16.96
HK708	Straight keyer	14.95
HK802	Straight solid brass	86.30
HK808	Straight keyer	39.95
MK704	Twin paddle keyer	13.50
MK705	Twin paddle keyer marble base	25.65
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Vibrokeyer Standard		63.98
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The Presentation		129.62
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AFR2010	TOR/RTTY/CW Decoder	496.80
AFR2000	TOR/RTTY/ASCII Decoder	427.00
AFR1000	Low cost version of above	260.00
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CW module for AFR2000		124.00
Telereader	CWR610E CW/RTTY/ASCII	195.00
STAR		
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Junkers	Straight key	45.00
GW Morse Keys		34.99

YAESU

FT690	6m Multimode	269.00
FT980	HF Transceiver	1450.00
SP980	Speaker	78.95
FT77	Mobile HF Transceiver	479.00
FP700	PSU	150.00
FC700	Tuner	105.00
FT77s	10w. version	449.00
FMU77	FM Board for FT77	28.35
FL2050	Linear Amplifier	115.00
FT290	2m M/Mode Port/Transceiver	315.00
FT290	With Mutek front end fitted	345.00
FL2010	Linear Amplifier	69.00
MMB11	Mobile Bracket	30.00
NC11	Charger	11.50
CSC1	Carrying Case	5.00
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YHA44D	70cm ½wave	9.95
YM49	Speaker Mike	20.20
MMB15	Mobile Bracket	14.55
FT203R	NEW 2m H/Held/C/W FNB3	195.00
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MMB10	Mobile Bracket	8.80
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NC8	Base/station Charger	64.80
PA3	Car Adaptor/Charger	18.00
FNB2	Spare Battery Pack	27.02
YM24A	Speaker Mike	23.75
FT726R	2m Base Station	775.00
430/726	70cm Module for above	255.00
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MD1B8	Desk 600 8pin mic	64.80
MF1A3B	Boom mobile mic	18.00
YH77	Lightweight phones	14.95
YH55	Padded phones	15.35
YH1	L/weight Mobile H/set-Boom mic	14.95
SB1	PTT Switch Box 208/708	15.70
SB2	PTT Switch Box 290/790	13.80
SB10	PTT Switch Box 270/2700	14.95
QTR24D	World Time Clock	33.35
FF501DX	Low Pass Filter	29.90
NEW MODELS		
FRG8800	HF Receiver	475.00
FRV8800	Convertor 118-175 for above	80.00
FT703R	70cm H/Held	235.00
FT709R	70cm H/Held	259.00
FT270R	2m 25W F.M.	315.00
FT270RH	2m 45W F.M.	365.00
FT2700R	2m/70cm/25W/25W	499.00
FRG9600	60-905MHz Scanning RX	449.00

ROTATORS

MR750E	Multitorque, round controller	193.00
MR750PE	Round and preset controller	217.64
MR300E	High speed VHF rotator	193.00
MR750U	Additional motor unit	64.64
MR300U	Additional motor unit	64.64
DR7600X	Heavy duty. Preset control	189.37
KS065	Deluxe bearing	27.30
KR500	Elevation rotator (not Daiwa)	144.90

Scanners

AR2002	25-550MHz and 800-1,300GHz	398.00
FRG9600	60-905MHz Continuous Coverage	449.00
ICOM R7000	25MHz-2.0GHz The Best Yet!	P.O.A.
Fairmate	8 Band Scanner (55-469MHz)	169.00

Miscellaneous

DRAE	Wavemeter	27.50
L30	30W Dummy load	8.05
L100	100W Dummy load	35.20
L200	200W Dummy load	42.55
CT300	300W Dummy load	69.00
DRAE	2m Pre-set A.T.U.	14.50
TOKYO HI-POWER		
HC200	10-80 HF Tuner	82.50
HC400	10-160 HF Tuner	176.00
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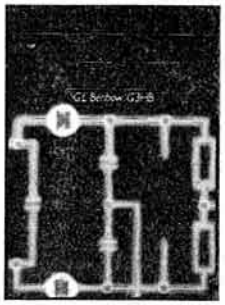
AMATEUR RADIO SOFTWARE by John Morris GM4ANB
This brand new book from the RSGB marks the rapidly growing interest in computing among radio amateurs. Covering contest scoring, through eme and construction, to Morse tuition and the new modes such as packet radio. Basically, to make your computer do anything, you need software. Although there is a lot of fun to be had in writing your own programs, this book contains nearly 100 programs for you to use. 328 pages, hardback, 1985.

RSGB AMATEUR RADIO CALL BOOK
This annual top seller is the most up to date printed source of call signs issued in the United Kingdom, and Eire. This edition is also the largest-ever, with no fewer than 53,000 callsigns included, along with names, addresses and as previously, it also contains lists of RSGB affiliated societies and groups, special callsigns, and repeaters. A most useful addition to every radio amateur's shack. 252 pages, paperback, 1985.

HOW TO PASS THE RAE by G. L. Benbow G3HB
Undoubtedly the best introduction and guide to would-be radio amateurs intending to take the Radio Amateurs' Examination. This low-priced book is crammed with advice and explanations of the RAE, and how best to get through it. All about multiple choice questions, this recently-published book includes a revision course in mathematical subjects, plus a worthwhile sample of examination papers for you to try out prior to the real thing! 96 pages, paperback, 1984.

VHF/UHF MANUAL by G. R. Jessop G6JP
This is the acclaimed standard work on theory, techniques and equipment for amateur radio transmission and reception between 30MHz and 24GHz. Now into yet another reprint, this fourth edition gives full contructional details of many items of equipment, some using semiconductor devices. Written primarily for the radio amateur, this comprehensive volume includes much valuable information for the professional engineer. No serious amateur should be without this excellent book. 528 pages, hardback, 1983.

RADIO AMATEURS' EXAMINATION MANUAL by G. L. Benbow G3HB
The essential standard work for all would-be licenced radio amateurs. This important book provides all the necessary tuition for those studying for the Radio Amateurs' Examination, and this 11th edition has been updated to take full account of the new 1985-1988 syllabus. Chapters take you though all the necessary stages, including tackling the RAE, mathematics for the RAE; RAE syllabus and objectives, plus up to date practice multiple-choice RAE questions. 136 pages, paperback, 1985.



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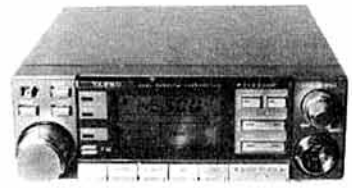
£499 inc vat



The FT2700R, virtually two transceivers in one case, is designed to be the ultimate in convenience, for FM mobile or case station operation, on the 144 *and* 430MHz bands. Using Yaesu's new one piece die-cast aluminium chassis concept, the FT2700R provides 25 Watts continuous output on either band, for full duplex (or simplex) operation whilst obtaining optimum circuit shielding and efficient heat dissipation.

Two 4-bit CPUs provide convenient control together with simple operation of the dual VFOs, 10 channel memory with back up and two calling frequencies.

Dual, receiver front ends, local synthesisers, IFs and transmitter RF stages make this the first mobile transceiver capable of *true* full duplex cross-band operation.

Comprehensive scanning features include "PMS" (programmable memory scan) which permits continuous or skip-scanning between two memory channels in the same band. A MHz 'stepping' switch is fitted for quck transition from one band to another. Priority channel monitoring is available whilst on the same or another band!

Independently programmable transmit and receive frequencies, standard repeater shifts (with reverse facility), offers total freedom of operation.

The large green back-lit dimmable LCD offers an aesthetically pleasing and easy to read display of the complete operating status of the transceiver, including memory and reverse repeater indications at a glance. The PO/S meter incorporated in the main display is a distinctive graphical two colour type. (Optional Voice Synthesiser available, see FT270R/RH text.)

FT2700RH

Frequency	:	144-146MHz
	:	430-440MHz
Power out	:	2m 25/3W
	:	70cm 25/3W
Supply	:	7A (25W Tx)
	:	3A (3W Tx)
	:	0.6A (Sq Rx)
Stability	:	2M ± 10ppm, −5 +50°C
	:	70cm ± 5ppm, −5 +50°C

DIMENSIONS (Ex/Inc Projections)
150W, 50H, 130/185D mm, 1.6Kg

GENERAL

Mode	:	FM (F3, G3E)
Supply	:	13.8V ± 15%
Circuit	:	Double Conversion
	:	21.6MHz, 455KHz
Sensitivity	:	0.2μV @ 12dB Sinad
	:	1.0μV @ 30dB Sinad
Selectivity	:	14KHz −6dB
	:	28KHz −60dB
Image	:	−60dB (or better)
Audio	:	4 to 16ohms
	:	2W in 8ohms (10% THD)

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MEM7700	(Memory unit FRG7700)	2pcs only **£75**

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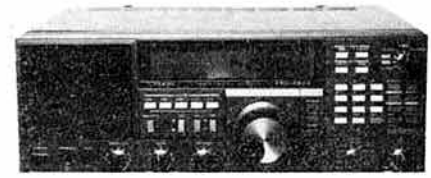
FMB3	Mobile brace for mobile mounts	p&p 50p
MMB7	Mobile bracket for FT7/7B	p&p £1.50p
MMB3	Mobile bracket for FT720R	p&p £1.50p

FRG 8800

£475 inc

FRV 8800

£80 inc



Continuous coverage from 150kHz to 30MHz. Two speed spin tuned VFO plus keyboard plus computer interface control.

The FRG-8800 demonstrates SSB (USB & LSB) CW, AM (Wide and Narrow) and FM narrow as standard, useful for 10M, CB and for VHF.

The FRG-8800 comes with twelve memories, programmed and scanned at the touch of a single button. Any of the memory channels will accept a frequency including the VHF range (optional VHF unit). The mode is also stored in the memory.

Four filters are fitted as standard (SSB/CW, AM, AM-NAR and FM-NAR) chosen for optimum performance, with switchable AGC and variable tone control.

The back-lit green LCD display incorporates easy to read "any angle" 10mm digits.

A twelve function display indicates the status at a glance. It includes memory channel number mode, and frequency to a resolution of 100Hz. Also included is a two dimensional LCD, graphical SIMPO and 'S' meter. A 12 button keyboard allows quick accurate changes of frequency and band.

Dual accurate 12 hour clocks, with AM/PM indicators uses the main digital display and features full back-up facilities (mains failure) and can activate the receiver or tape recorder via relay contacts. The FRV-8800, extends coverage to include 118-174MHz all with the main frame, allowing monitoring of, PMR, marine and air bands, as well as 2M. 240-220VAC to 110-120V, 50/60Hz mains standard, 12VDC operational is optional.

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FT270R £315 inc
FT270RH £365 inc

The FT270R/RH is constructed on a unique massive diecast aluminium ducted heatsink which enables significantly larger output powers to be obtained from a transceiver substantially smaller than any similar radio to date. The FT270RH, with fan assisted cooling provides 45W RF output whilst the conventional R version offers 25W. Both FT270R and RH are fitted with a "low" power switch which provides around 10% of full output.

The FT270R/RH uses a high visibility back-lit LCD, with large 5mm digits, providing a readout of frequency and all important transceiver functions. Pleasant green illumination and newly developed wide angle LCD ensure easy visibility day or night from most angles.

The dual 4-bit microprocessors of the FR270R/RH provide maximum ease of use combined with an extremely wide range of operating functions. Dual VFOs, ten memories and programmable band scan limits are all easily selectable from the front panel.

The FT270R/RH can memorise a number of scanning parameters for maximising performance. Upper and lower limits may be set (for quick scanning of the band). The ten memories may be scanned for a busy channel or for monitoring a priority channel. The scanning can be either manually or carrier controlled.

For easier and safer 'eyes on the road' mobile operation an optional voice synthesiser (FVS-1) is available to give an audible indication of frequency, memory channels and VFO selections at the touch of a convenient microphone mounted button. The FVS-1 is of course ideal for those with impaired vision.

COMING SOON KDK FM-240

- 2M 25W FM Mobile Transceiver
- Revolutionary M.M.I. Control System
- 16 Memory Channels
- Large Easy to Read LCD Display
- Optional Voice Synthesiser
- 140 × 40 × 170mm case

£ T.B.A.

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SPECIFICATIONS — FT270R/RH

Antenna	:	50ohms, unbalanced
Modulation	:	Variable reactance
Deviation	:	±5KHz
Tone Burst	:	1,750Hz
Spurious	:	−60dB (or better)
Maximum BW	:	16KHz
Microphone	:	600ohms, nominal
Temperature	:	−10°C +60°C

OPTIONS
FVS-1, MF-1B3B, SP55, YH1, SB10

Frequency	:	144-146MHz
Power out	:	RH; 45W/5W
	:	R; 25W/3W
Supply	:	RH; 9A/3.5A Tx
	:	R; 6A/2.5A Tx
	:	0.6A (Sq Rx) R/RH
Stability	:	±10ppm (−5 +50°C)

DIMENSIONS: (Ex/Inc Projected)
140W, 40H, 143/175D mm, 1.25kg

FRG 9600
£449 inc
PA4C
£12.65 inc

An all mode scanning receiver covering 60 through 905MHz continuously, with 100 keypad-programmable memory channels.

In addition to FM wide (for FM and TV broadcasts), FM narrow and AM (wide and narrow) the FRG-9600 also provides SSB (single sideband) reception up to 460MHz. A front panel tuning knob simplifies tuning of SSB and narrowband AM. Seven tuning/scanning rates between 100Hz and 100kHz assure fast and efficient scanning while permitting easy tuning of narrowband signals.

The scanning system allows full or limited band scanning and memory channel scanning, with auto-resume. In addition to carrier sensing scan stop, audio scan stop sensing is also selectable to avoid stopping on inactive "carrier-only" channels.

Scanning steps are selectable with the wide steps indicated on the front panel display. Signal strength indicated by a two-colour graphic S-meter. A 24-hour clock/timer, recorder output, cpu band selection outputs, multiplexed (FM wide) output, AF and RF mute and other control signals for maximum expansion potential with future options or for own add-on hardware for special applications.

The direct control link to the cpu in the FRG-9600, allowing virtually unlimited customised control functions; such as multiple, organised memory banks; automatic tuning; and customised scanning systems; using most personal computers and a Yaesu FIF CAT Interface Unit.

The FRG-9600 requires 12 VDC.

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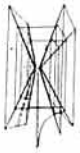

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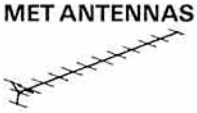

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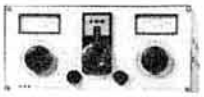

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PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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EDITORIAL

MORSE TESTING—A NEW SERVICE

For many years, the RSGB has been concerned about the difficulties aspiring Class A licensees face in taking the morse test. The fee for the test itself, the increasing cost of travelling as the number of test centres has fallen—and sometimes the need to take a day off work—often represents a formidable barrier with no guarantee that the candidate will pass first time.

At present, morse testing is done on behalf of the responsible Government department, the Department of Trade & Industry, by British Telecom International. However, the DTI, also aware of the problems with morse testing, in 1984 asked the Society, along with the City & Guilds of London Institute (who administer the RAE), to submit proposals for taking over the existing morse test. Rather surprisingly, BTI later also sent in a proposal.

During December 1985 the Society received an invitation to take-over morse testing as from April 1986, and has agreed to do so. This represents yet another step along a path in which the Society is becoming more directly involved with the way amateur radio exists in the UK—which should be good news.

For the morse testing service to be successful—and there is no way it can be allowed to be otherwise—we will have to depend on those people to whom we always turn: the skilled, highly dedicated volunteers who are happy to add their efforts to those of their predecessors for the benefit of all.

Details of the RSGB service will be issued shortly.

THE EXPERIMENTAL PATH TO 50MHZ

As reported in full detail in this issue, from 1 February 1986 all Class A Licensees will be able to operate within 50-50·5MHz, albeit with a fair number of restrictions. This represents yet another major step forward along a path which started in 1975 as part of the preparation for the 1979 World Administrative Radio Conference in Geneva. It also represents considerable effort—and determination in the face of opposition—by the DTI on behalf of the UK radio amateurs and, indirectly, to amateurs throughout IARU Region 1.

Perhaps this latest success is a vindication of the experimental approach to decision-making in this very complex type of problem where the risks are uncertain. The first step was the allocation of 40 permits which allowed operation outside tv hours. Later this was increased to 100 permits. Now the experiment is open to all Class A Licensees, with a promise of a review, in 12 months time, of all the initial restrictions. Obviously the RSGB is anxious that Class B Licensees should have this facility as soon as possible.

One thing that must not be underestimated is the way that UK amateurs as a body respected the terms of the first 50MHz permits. This surely must be a major factor in the success of this approach to this and other licensing changes. However, we must always remember that, by definition, not all experiments can be expected to succeed—we look to all amateurs to make this one a resounding and continuing success.

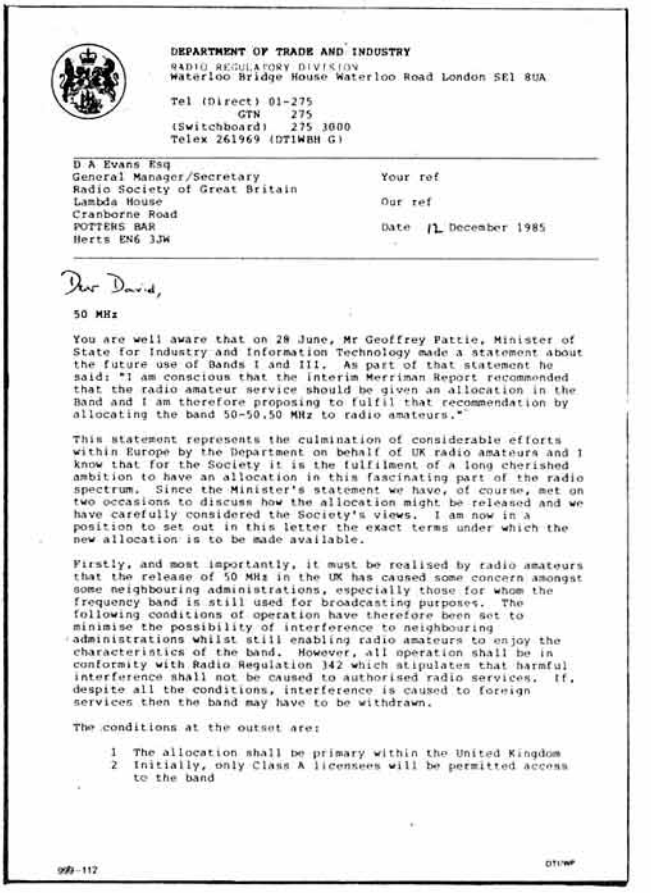
David Evans, G3OUF

50MHz

LONG-AWAITED BAND AVAILABLE 1 FEBRUARY

In this special six-page feature we mark further progress of the 50MHz experiment with two articles written by DTI staff. On this page can be seen the actual letter received at RSGB Headquarters in December 1985 from the Radio Regulatory Division of the Department of Trade and Industry. On the facing page is an article written by the Department giving some technical and political insight into the way in which a 50MHz allocation was obtained for UK amateurs. Also in this feature is the text of the DTI's Information Sheet relating to the 50MHz band. This is particularly valuable insofar as it gives the answers to questions which will be asked about the new allocation; the Information Sheet itself is expected to be available from the Department later this month.

On the following pages: Recent history of the 50MHz band; Radio regulatory factors; Possible interference scenarios; European attitudes to the UK proposals; Technical factors; Class A amateurs; Repeaters; The future; References. Plus: Questions about 50MHz answered by the DTI, with comments by the RSGB.



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Your ref
Our ref
Date 12 December 1985

Dear David,

50 MHz

You are well aware that on 28 June, Mr Geoffrey Pattie, Minister of State for Industry and Information Technology made a statement about the future use of Bands I and III. As part of that statement he said: "I am conscious that the interim Merriman Report recommended that the radio amateur service should be given an allocation in the Band and I am therefore proposing to fulfil that recommendation by allocating the band 50-50.50 MHz to radio amateurs."

This statement represents the culmination of considerable efforts within Europe by the Department on behalf of UK radio amateurs and I know that for the Society it is the fulfilment of a long cherished ambition to have an allocation in this fascinating part of the radio spectrum. Since the Minister's statement we have, of course, met on two occasions to discuss how the allocation might be released and we have carefully considered the Society's views. I am now in a position to set out in this letter the exact terms under which the new allocation is to be made available.

Firstly, and most importantly, it must be realised by radio amateurs that the release of 50 MHz in the UK has caused some concern amongst some neighbouring administrations, especially those for whom the frequency band is still used for broadcasting purposes. The following conditions of operation have therefore been set to minimise the possibility of interference to neighbouring administrations whilst still enabling radio amateurs to enjoy the characteristics of the band. However, all operation shall be in conformity with Radio Regulation 342 which stipulates that harmful interference shall not be caused to authorised radio services. If, despite all the conditions, interference is caused to foreign services then the band may have to be withdrawn.

The conditions at the outset are:

1 The allocation shall be primary within the United Kingdom
2 Initially, only Class A licensees will be permitted access to the band

999-112

DTI/WP

3 The maximum power at all times shall be

Carrier	PEP
14 dBW erp	20 dBW erp

4 Maximum transmitting antenna height to be 20 metres above ground level
5 Antennas shall be horizontally polarised
6 No mobile, portable or 'temporary premises' operation will be allowed
7 There will be no restriction on modes of operation
8 No repeaters will be allowed in the band
9 Existing permits will be withdrawn.

Whilst the Department realises that the release of the band has been widely welcomed by radio amateurs we are conscious that these conditions may perhaps be seen by some as restrictive. In particular, we are mindful that the Society has put forward a strong case for Class B licensees to also have access to the band. We have very carefully considered this point but we have concluded that with the views expressed by some neighbouring administrations there is every reason to take a cautious approach at first and we feel that it is right, at least initially, to limit the numbers using the band. I can tell you how though, that the Department is prepared to keep under review the operation at 50 MHz and provided that no difficulties are experienced with neighbouring administrations in the light of the above conditions then we would be willing to reconsider the position of Class B access to the band in a positive way. I suggest that the Department and the Society re-open this issue again after an operational period of 12 months and that we start to review together then such experience as is available in using the band. It would be helpful in working towards this position if the Society could set in hand procedures for gathering details of operational experience from its membership. At the end of the review period, given operation free from interference, there might also be the prospect of additional spectrum at 50 MHz being made available for amateur operation.

I hope that the Society and radio amateurs throughout the UK will now understand the Department's position on 50 MHz. Given evidence of successful operation under the above conditions then there is every chance that further relaxations can take place within a reasonable time scale. It is up to amateurs themselves to abide by these conditions and make a success of the new band.

A Gazette Notice implementing the above conditions and varying the terms of licences will be published on 20 December 1985 with the conditions coming into force on 1st February 1986.

Yours sincerely,

B A MAXWELL
Head of Licensing Section

By the time this article appears in print, many readers may be aware of the various terms and conditions that will apply in the use of the 50MHz band by amateurs in the United Kingdom.

Many of the restrictions will be questioned by licensees and indeed some have already been widely discussed in the amateur press. The purpose of this article is to provide further insight into the Department of Trade and Industry's thinking and to explain why some of the restrictions have been introduced. It probably goes without saying that the more onerous limitations, from the amateurs' viewpoint, have been strongly debated and contested by the RSGB. However, the Department views the introduction of 50MHz as a continuing experiment which must be carefully nurtured to a hopefully successful conclusion.

RECENT HISTORY

A study of Radio Communication magazine from 1978 to the present day provides an accurate picture of the 50MHz story, including the unsuccessful debates on an amateur allocation in ITU Region 1 - particularly in Europe - at the 1979 World Administrative Radio Conference; the interim and final recommendations of the Independent Review of the Radio Spectrum by Dr Merriman; the decision by the Government to cease television broadcasting in the bands 47 - 68MHz and 174 - 216MHz (TV Bands I and III); the protracted discussions leading to the out of television hours 50MHz amateur experiment; and finally the release of 500kHz at 50MHz to UK Class A amateurs on a primary and exclusive basis in terms of other UK radiocommunications services.

This story reads relatively well in UK terms but what is probably not widely known is the various discussions conducted with neighbouring administrations on the introduction of the land mobile service in the United Kingdom in TV Bands I and III in the presence of the continuing television broadcasting networks in neighbouring countries. These negotiations and discussions figured strongly in the various decisions made with respect to the amateur service at 50MHz.

RADIO REGULATORY FACTORS

The Amateur Information Sheet addressing 50MHz published by the Department and printed elsewhere in the issue of Radio Communication mentions that Article 8 of the Radio Regulations (the international table of frequency allocations) does not provide for an amateur allocation in ITU Region 1, with the exception of certain African countries.

The Department considers that Article 8 is one of the most important constituent parts of the Radio Regulations which together with the International Telecommunications Convention have international treaty status. It was therefore with some unease that a policy was developed which ran counter to Article 8 of the Radio Regulations, ie a 50MHz allocation for UK radio amateurs. Because of this it was decided to strictly enforce the terms of Radio Regulation 342 which states that Administrations introducing services which are not in accordance with the Frequency Table shall not cause interference to other countries' services operating in accordance with provisions of the Radio Regulations. It was factors such as these which decided the Department not to be influenced by Article 32 of the Radio Regulations and in particular RR 2735 which indicates that for bands above 30MHz allocated to the amateur service, the requirement for a proficiency test in manual morse code telegraphy may be waived at the discretion of concerned administrations. The rationale being that 50MHz and indeed 70MHz are not allocated internationally to the amateur service in Europe. Two other factors influenced our decision on the question of Class B licensees, but more of this later.

POSSIBLE INTERFERENCE SCENARIOS

In respect of 50MHz the service most likely to be affected in neighbouring countries is television broadcasting; although

"....and I am therefore proposing to fulfill that recommendation by allocating the band 50 to 50.5 MHz to radio amateurs."

in a number of those countries this part of the spectrum is additionally allocated to the land mobile service on a permitted basis which means that the broadcasting service has the prior choice of frequencies in planning, any use thereafter by the land mobile service would be of a primary nature. It follows therefore that both broadcasting and land mobile services of neighbouring countries shall always be protected against interference from the UK amateur service and that if interference was found to be occurring then the use of the band by the UK amateurs would have to be reconsidered.

EUROPEAN ATTITUDES TO THE UK PROPOSALS

Because of the regulatory factors outlined above it was felt necessary at an early stage to consult with neighbouring administrations on the use of 50MHz by UK amateurs, and to provide details of how protection was to be afforded to their services. It would not be an exaggeration to say that several administrations expressed concern at the UK's proposed use of the band, especially as detailed and sometimes difficult negotiations had already taken place on the UK's use of Band III by the land mobile service.

TECHNICAL FACTORS

It has been asked: "How can a relatively low power amateur signal, or indeed in the case of Band III a land mobile station, cause interference to a high power broadcasting station?" Taken individually, it would seem unlikely for such interference to occur.

The problem can at least partially be explained by means of an example. In the case of 50MHz the broadcasting station currently most likely to be affected is the Antwerp station in Belgium using Channel E2. The B/PAL television system is based on a 7 MHz channel arrangement and for Channel E2 the vision carrier frequency is 48.25MHz and the sound carrier frequency is 53.75MHz. Thus the TV receiver is tuned to approximately 47-54MHz and all emissions found in this band would have a cumulative interference effect on the programme information received. Readers will realise that the amateur allocation at 50MHz is about 7% of the E2 television channel.

The currently accepted method for determining interference to television arising from multiple interference sources emanating from widely separated locations is the simplified multiplication method which uses the statistical (in locations) nature of propagation and the various differing path lengths to determine an overall nuisance field. The television services' protection ratio characteristics are also taken in account, the overall intent being to protect a median wanted field strength for Band I which should never be lower than +48dB (uV/m), for perhaps 99% of time and at 50% of locations.

The Department's experience in the case of land mobile services in Band III has indicated that the addition of multiple interfering sources has a significant effect on the number of systems that can effectively use the spectrum contained within a television channel.

The pertinent question is therefore how the Antwerp service area can be protected, taking account of the factors indicated above, together with the intended use of spectrum outside the 50MHz amateur allocation but within Channel E2 (47-50MHz and 50.5-54MHz), and since the answer is currently unclear it is necessary to adopt fairly conservative parameters for UK amateur stations. This is because the location and number of amateur stations that will be operating is unknown and the overall planning of Band I is not yet completed. To determine the initial technical parameters for UK amateurs a simple model was developed which was then sent to neighbouring administrations for approval. The essential elements are contained in the Department's Information Sheet, but it may be worthwhile considering again some of the points in the light of preceding paragraphs.

"...strongly debated ...by the Radio Society"

CLASS A AMATEURS

Apart from the regulatory considerations and in the absence of statistical information on the possible utilisation of the band by UK amateurs, it has been necessary for the time being to restrict the number of amateurs licensed to use the band, thus the absence of Class B licensees effectively reduces the number of potential interferors by about 50%. A further factor in this regard is that the proposed European amateur licence intended to provide for easier movement across international frontiers gives two classes of licence for which national administrations must indicate an equivalence. Class 1 is for those amateurs who have proved their competence in morse code and authorises the use of all frequency bands available to the amateur service in the country where the station is established and Class 2 which limits utilisation of stations to frequency allocations above 144MHz authorised for the amateur service in the country where the station is to be installed. The Department is currently considering the adoption of the European licence but the difficulty in respect of 50 and 70MHz will be readily appreciated.

REPEATERS

The decision not to authorise repeater stations at 50MHz derives from a specific request from a number of administrations for the UK not to introduce such stations since they are normally located on high unobstructed sites and operate in many cases continuously for long periods, especially during peak television broadcasting hours, thus they pose a significant interference threat.

THE FUTURE

The introduction to this article indicated the Department's view that the use of the 50MHz band on a general basis is still regarded as an ongoing experiment. The Amateur Information Sheet indicates that there will be a review of the initial conditions once the Department has gathered information on operations after a reasonable period of time. For this reason it is essential that the Department is provided with statistical information on how the band has been utilised, especially during periods of anomalous propagation. It is hoped that all users of the 50MHz band will respond positively to any request for information in the future as this will be the only means by which the Department will be able to construct a suitably accurate model to assess the likelihood of interference to services operating in neighbouring countries.

Finally, as stated earlier the worst interference scenario currently is the Antwerp television service area. However should a television transmitter be introduced in the future which requires more protection, the conditions of amateur utilisation would have to be reviewed. Also users of the band should be mindful of the location of all E2 transmitters in operation and where possible avoid beaming towards them, especially during anomalous propagation events which occur during television hours.

In addition to Antwerp there are a number of transmitters operational in Norway whose service areas could be affected by amateur operations from North East Scotland.

The Radio Regulatory Division of the Department of Trade and Industry hopes that all licensees using the 50MHz band are successful in their operations and the Department looks forward to reading in future issues of Radio Communication magazine of information that will improve the knowledge of propagation phenomena in this interesting part of the radio spectrum.

" ...50 MHz... ...is still regarded as an ongoing experiment... "

" ...this interesting part of the radio spectrum".

REFERENCES

(1) Independent Review of the Radio Spectrum (30-960MHz) - Interim Report - The Future Use of Television Bands I and III (Cmnd 8666).

(2) Report of the Independent Review of the Radio Spectrum (30-960MHz) (Cmnd 9000).

(3) Bands I and III - A Consultative Document (Cmnd 9241).

(4) Amateur Information Sheet No 2: Amateur Service Allocation in the 50MHz band (6 metres).

(5) CCIR Report 306-4, Ratio of wanted-to-unwanted signal for AM vestigial sideband colour television systems.

(6) CCIR Report 239, Propagation statistics required for broadcasting services using the frequency range 30 to 1000MHz.

(7) CCIR Report 945, Methods for the assessment of multiple interference.

(8) CCIR Recommendation 418-3, Ratio of the wanted-to-unwanted signal in monochrome television.

(9) CCIR Recommendation 370-4, VHF and UHF propagation curves for the frequency range from 30 to 1000MHz.

(10) CCIR Recommendation 419, Directivity of antennas in the reception of broadcast sound and television.

(11) ITU Radio Regulations, Edition of 1982, revised in 1985.

(12) Draft CEPT Recommendation, Criteria to be used to assist the efficient and effective utilisation of shared frequency bands which are allocated to the broadcasting service (television) and the land mobile service, using assignments which overlap a television channel (television Bands I and III only).

(13) CEPT Recommendation T/R 61-01 (Nice, 1985) Concerning the CEPT Amateur Radio Licence.

The 50 MHz band

- some questions answered by the DTI

The Department of Trade and Industry has allocated the band 50-50.5OMHz to radio amateurs. Mr Geoffrey Pattie, Minister of State for Industry and Information Technology, gave the news on 28 June 1985. He said he was accepting the recommendation of the Merriman Report on the future use of TV Bands I and III that the radio amateur service should be given space on Band I.

The initial conditions of the release of the band are:

* The allocation shall be primary within the United Kingdom

* Initially, only Class A licensees will be permitted access to the band.

* The maximum power at all times shall be: carrier 14dBW erp, pep 20dBW erp.

* Maximum transmitting antenna height to be 20 metres above ground level.

* Antennas shall be horizontally polarised.

* No mobile or portable or "temporary premises" operation will be allowed.

* There will be no restriction on modes or times of operation.

* No repeaters will be allowed in the band.

* Existing permits will be withdrawn.

Here we try to answer some of the questions you may have.

"There is no Region 1 allocation to the amateur service, so how has this new amateur allocation been possible?"

For the purposes of the International Radio Regulations, the world is divided into three Regions. The UK, the rest of Europe, Africa and the USSR are all in Region 1. Within Regions 2 and 3 (but not Region 1 except for certain African countries) the band 50-54MHz is allocated to the amateur service on a primary basis. However, within Region 1 the whole of the band 47-68MHz is allocated to the broadcasting service on a primary basis. There are thus no international rights for UK radio amateurs to have access to 50MHz. However, with the closure of 405-line tv broadcasting in the UK the frequencies at 47-68MHz have become available for re-allocation. Ministers have decided that, in the main, the frequencies should be used for land mobile services. However, the Merriman Report on the future use of the frequencies said that radio amateurs should be given a suitable allocation.

"Why the restrictions on the usage?"

Other European administrations are still using the band for its primary purpose of broadcasting. The UK allocation for radio amateurs has been introduced under the International Radio Regulation No 342 which says that harmful interference shall not be caused to authorised radio services. The initial conditions have been set to minimise the possibility of interference to neighbouring administrations while still enabling radio amateurs to enjoy the characteristics of the band.

The conditions must be followed by everyone. It is in the long-term interests of the hobby that no interference is caused to primary services using the band in countries in Region 1. Interference could result in the complete withdrawal of the hard-won privilege of access to the band.

"Will the restrictions remain?"

Not necessarily. The Department has had to negotiate with other European administrations to prepare the way for this allocation and we are therefore moving cautiously into this new band. Providing no problems are caused to the authorised services using the band in Europe, changes to the initial terms and conditions of use may prove possible.

The Radio Society of Great Britain (RSGB) wanted Class B licensees to have access to the band and this point was fully considered. However, there is a need to minimise potential interference to the services of other administrations. At the outset, therefore, the Department has decided to limit the numbers of radio amateurs using the new band.

"Will there be a review of the 50MHz allocation?"

Yes. We have said to the RSGB that after the first year we will start a review with them and we have asked the Society to gather details of operational experience from its membership. If no difficulties have been caused to

neighbouring administrations, we can reconsider the initial conditions. In particular, we have told the Society that after this initial period we would be willing to reconsider the position of Class B access to the band.

"What use will the band be with the restrictions?"

Restrictions on band usage are common all over the world. They are normally set to give some protection to other spectrum users while still allowing successful operation. At 50MHz on an experimental basis, 100 permits were issued to interested amateurs while the final allocation was being decided. Those experiments have shown some very interesting characteristics relating to sunspot activity, E and F layer reflections, temperature inversions and meteor scatter work. These phenomena all act either to enhance or inhibit radio station communications and beacon signals. By removing the previous restriction to night-time operation (by permit holders) this band should hold yet more interest to amateurs.

"Why have the 50MHz permits been withdrawn?"

The permit holders were the "pioneers" in the band and now all Class A licensees have access. The permits allowed greater powers and more spectrum to be used outside broadcasting hours but the Department's discussions with other European countries, which resulted in the new conditions, tried to minimise the interference possibilities on a 24-hour basis. The time for the permits has therefore come to an end; there can be no exceptions to the restrictions set out earlier.

"Why can't I operate whilst mobile or portable?"

The antenna becomes more effective as height is increased above ground level. Because we must avoid potential interference to the services of other administrations it is necessary to prevent operation from elevated positions such as hills or mountain tops. This also explains the restriction of antenna height to 20 metres above ground level.

"Why is the maximum power 14dBW carrier, 20dBW erp?"

Internationally accepted methods have been used to evaluate the probability of interference to the European primary and permitted services from UK amateur transmissions in the band. Calculations have shown that the permitted powers should give the required protection in order to comply with Radio Regulation 342.

"Why must the antenna be horizontally polarised?"

The band's existing and proposed primary and permitted services have a large majority of vertically polarised systems. If amateur transmissions are restricted to horizontal polarisation an antenna discrimination factor may be used in the interference calculations. This permits a higher effective radiated power.

"Will I be able to operate on 50MHz with a reciprocal licence while I am on holiday abroad?"

Not in Region 1. While this allocation is valid in the United Kingdom, the band is still used in Europe on a primary basis by other users - in particular by television services. With the band not being an internationally recognised amateur allocation in Region 1, UK amateurs are in a privileged position.

RSGB comments...

This "Information Sheet" should be read in conjunction with the DTI's article giving the background to the negotiations leading up to the 50MHz allocation, which is also featured in this issue. A great deal of discussion, negotiation and debate between the Society and the Department of Trade and Industry took place between the initial statement by Geoffrey Pattie in June 1985 and the ultimate release of the band, and it is obviously disappointing that some of the Society's requests were not able to be met initially - in particular, that Class B licensees should have access to the band, for which a very strong case was made out. However, in the light of the fact that European countries continue to use Band I for television broadcasting, the need to avoid interference to broadcast stations and also to stations in the land mobile service is obvious and the Society accepts the technical case for restrictions. We very much hope that in the light of the results of the first year of operation, the promised review will result in the removal of some or all of the restrictions.

Some points arise from the Information Sheet itself which are worth amplifying. With regard to the restriction relating to antenna height above ground, the Society did make the point to the DTI that an amateur living in a high-rise flat who has his antenna on the roof could not comply with the "20 metres agl" condition. The Department has indicated its willingness to treat cases of this nature on an individual basis.

The Information Sheet also mentions the interim report of the Merriman Committee concerning the future of Bands I and III and that it recommended that UK radio amateurs be given access to the band. It should be mentioned that the Society's input to the Committee was very considerable.

Finally, we must stress the importance of abiding by the restrictions. The Department of Trade and Industry faced considerable opposition from other European administrations in its proposal to make a 50MHz allocation to UK radio amateurs. Any interference with the services of other administrations is very likely to lead to immediate withdrawal of 50MHz operating privileges, and this would obviously be nothing short of disastrous. In particular, please be careful to observe the restriction on effective radiated power as meticulously as you can. Always use the minimum power necessary to maintain contact with a particular station, especially if you are beaming towards Europe or Scandinavia, and do make sure that you have realistic figures for antenna gain and feeder loss available. Obviously, effective radiated power levels need to be derived from these two parameters plus the output power of your transmitter - they cannot be measured directly - and it is important to get your arithmetic right!

A MESSAGE FROM THE SOCIETY'S PRESIDENT

It is with a combination of humility and pleasure that I accept the responsibility of being the Society's 52nd President, and I am deeply conscious of the honour of having my name associated with those of my distinguished predecessors. I shall try to maintain their high standards during the next 12 months.

It is my good fortune to be elected to this office at a time when the Society has demonstrated an ability to respond quickly to the many new challenges which we now face. This has only been possible through the enthusiasm and hard work of the many voluntary officials, and as a result of the unceasing dedication of the general manager and his loyal staff. I would like to take this opportunity to thank all those who provide such invaluable support.

In the immediate future the Council, the headquarters administration and the membership will face many new challenges. Organization of amateur radio at a local level is a high priority, so that closer links can be forged between the Society and the grass roots. Topics such as interference, antenna planning and morse testing will soon require special voluntary effort from individuals and the affiliated clubs.

A major task to be undertaken this year is a fundamental review of the Society's Memorandum and Articles of Association, which are in vital need of updating in order to bring them in line with current Society operational and legal requirements.

The dramatic rate of increase of the Society's membership since 1978 has begun to slow down, and now is the time when we must look to recruiting suitable new members into the Society and, indeed, into the hobby. Who better to do this than our own members. As a retired chairman of the Membership & Representation Committee, I would encourage each of you to make a New Year's resolution to introduce one new member into the Society during 1986. It is only through a strong national body that the aspirations of all radio amateurs can be fulfilled. The members *are* the Society, and with your help the RSGB will continue to play a leading role in both national and international affairs in order to protect, preserve, and hopefully extend our frequency allocations.

I am confident that together we can advance the interests of amateur radio as a whole. In this I extend my good wishes for a happy and successful year.

Willie McClintock, G3VPK

Amateur Radio News

RSGB COUNCIL ELECTION RESULT

The result of the ballot to fill six vacancies on Council from 1 January 1986 was as follows:

Candidate		Votes
ORDINARY MEMBERS		
R H Edmondson	G3YEC	1,464
K A M Fisher	G3WSN	1,208
S Gabriel	G3HCQ	924
R S Hewes	G3TDR	1,107
J D Heys	G3BDQ	1,809
R C Locher	W9KNI	667
T I Lundegard	G3GJW	1,283
A McKenzie	G3OSS	2,552
N F O'Brien	G3LP	1,484
G P J Plucknett	G4FKA	1,053
C J R Reed	G8MFP	650
F S G Rose	G2DRT	1,610
C J Thomas	G3PSM	1,469
K E V Willis	G8VR	2,355
ZONE C		
G L Benbow	G3HB	522
J Greenwell	G3AEZ	536

Messrs J D Heys, G3BDQ; A McKenzie, G3OSS; N F O'Brien, G3LP; F S G Rose, G2DRT; K E V Willis, G8VR; and J Greenwell, G3AEZ, were accordingly elected to serve on Council for the three years 1986-88, as was Mr E J Case, GW4HWR, who was returned unopposed.

Region 10 representative

Mr E J Case, GW4HWR, having been returned unopposed as Council member for Zone E, a vacancy now exists for a Region 10 representative.

Any five corporate members resident in Region 10 (Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan) may nominate any other qualified corporate member resident in Region 10 for the office of regional representative. Each nominator may not nominate more than one person to fill the vacancy.

Nominations must be made in writing and signed by all the nominators, and delivered, together with the written consent of the nominee to accept office if elected, to: Mr D A Evans, Secretary/General Manager, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW, on or before Monday 10 February 1986. All nominations will be acknowledged by return of post.

In the event of more than one person being nominated, a ballot will be held, details of which will be published in the April 1986 issue of *Radio Communication*.

Raynet Zone 1 election

Two valid nominations have been received for the Raynet Zone 1 representative vacancy caused by the resignation of Mrs Susan Jebb, G6AJF. They are Mr D Chilton, G6LIJ, and Mr L A Graves, G4BCP.

Any currently registered Raynet member resident in Zone 1 (Cleveland, County Durham, Northumberland and Tyne & Wear) may record their vote for one of the above candidates in the following manner. No special ballot paper is needed, although some prepared voting slips are available from RSGB headquarters and Zone 1 controllers. The text of your vote should indicate clearly which candidate you prefer. Please do not include any other correspondence with your vote.

All votes must reach RSGB headquarters by 5.15pm on Friday 15 February 1986. The vote must be included in a sealed envelope addressed to "The Secretary (Raynet)", and your name and callsign must be written in block capitals on the back of the envelope.

The result of the election will be announced on GB2RS and will also appear in *Radio Communication*.

QSL Bureau news

The sub-manager for the G4UAA-UZZ callsign series has changed his address: it is now: Mr P Godfrey, G8ULU, 16 Thornden Close, Herne Bay, Kent CT6 7RT.

The sub-manager for the G8DAA-OZZ callsign series has now changed: the new sub-manager is Mr F Harris, G4IEY (as for the G8AAA-CZZ series). Thanks are extended to G8TKU, who was the previous sub-manager, for his work.

Earlier twins

In "Amateur Radio News", *Rad Com* November 1985, there was an item on the "twinning" of the Cornish RAC and the Southern Eire ARG, thought at that time to be the first formal twinning of amateur radio clubs in different countries.

We have subsequently been informed of three other such twinnings:

(1) between the Southdown ARS and the Radio Club de Normandie in 1976;
(2) between the Southend & DRS and the Kaagerland Club, PI4KGL, in 1983; and

1986 PRESIDENTIAL INSTALLATION

The installation of
Mr W J McClintock, G3VPK,
as the **52nd President** of the
RADIO SOCIETY of GREAT BRITAIN
will take place during a
SOCIAL EVENING
at the
Furze Hill Restaurant, Margaretting, Nr Chelmsford
on
Saturday 18 January 1986
The ceremony will begin at 7.30pm, when guests assemble

Admission by ticket only, price £4

Applications for tickets should be addressed to Ms H Norman, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW: they must be received by 8 January 1986. Cheques must be made payable to RSGB.

VACANCY

Technical & Publications Committee

As part of its day-to-day business, the Technical & Publications Committee deals with numerous articles and other items covering many years. At present, compiling details of this material has to be done manually. To aid the production of both *Radio Communication* and books, we need to catalogue current and previous technical material in terms of content. We envisage the extensive use of key-wording to achieve sufficient precision.

We would like to have as a full member of the committee someone who, with the assistance of other members of the committee, would be prepared to make this his or her main contribution to the work of the committee. Some library experience could prove useful. The data would have to be held on a BBC B microcomputer.

The committee meets at London House, Mecklenburgh Square, London WC1, at approximately five-weekly intervals on Monday evenings, and usually last from 1830 to 2130.

If you are interested in this opportunity of making a contribution to the work of the Society, or would like further details, please contact the chairman, G3RPE, via RSGB HQ.

(3) between the Rochford DRC and radio amateurs in
(a) Stad Haltern in W Germany, and
(b) Terneugen in Holland.

In every case the clubs speak warmly of the contacts they have made, not only by radio but by exchange visits between them and their "twins", and all recommend that other clubs should follow their example.

To those clubs, and any other "twins", we apologise for giving the impression that the Cornish RAC and the Southern Eire ARG were the pioneers of this excellent idea.

What a whopper!

OH1RY now possesses a three-element Yagi for the 3·5MHz band—it has a boom length of 22m and the three elements are around 40m long. This monster is up to 75m agl! Makes the headquarters dipole at 30ft look a bit small . . .

Mobile Rallies Calendar

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

26 January 1986
Oldham ARC is to hold its first Mobile Rally at Birch Hall Hotel, Rhodes Hill, Lees, Oldham. Open 10.30am (10am for disabled). Talk-in by G4ORC/G1QRC on 144MHz (S22) from 9am. Bring and buy, bar, catering facilities, limited space for car boot sale etc. All enquiries, including trade enquiries to G4ZEP, tel 061-624 7354.
9 February 1986
Bury RS Hamfeast 1986 at Mosses Youth and Community Centre, Cecil St, Bury (only minutes from the M66). Further details as information becomes available.
23 February
Cambridgeshire Repeater Group's 4th Annual Junk Sale Rally Extravaganza at Pye Telecommunications, St Andrews Road, Cambridge. Open 10.30am. Trade stands and "monster" junk sale. Talk-in on 144MHz·S22 by G3PYE. Free car park. Refreshments. Admission 50p. Details G4HCL, tel 0354 740672.
2 March 1986
Doncaster & District Raynet Group amateur radio rally, Adwick Leisure Centre, Welfare Road, Woodlands, Doncaster. Talk-in on vhf and uhf. Open 11am (disabled 10.30am). Details G8XTU, tel Doncaster 531365 home, or 539446, ext 38 work.
2 March 1986
Welsh Amateur Radio Rally, Barry Leisure Centre, Barry, South Glamorgan. Organized by the Barry College of FE Radio Society. Enquiries GW4FOM, tel 0222 565656.
16 March 1986
Pontefract & DARS Components Fair, 11am–4.30pm. Carleton Community Centre, Pontefract, mid-way between Pontefract and Darrington on the A1. Enquiries for bookings to G4ISU, tel 0977 792784.
16 March 1986
South Essex ARS Mobile Rally, Paddocks Community Centre, Canvey Island, Essex. Open 10.30am. Talk-in on S22. Details G4FMK, tel 0268 683805.
23 March
Swansea Rally at Patti Pavilion, next to the County Cricket ground, A4067 Swansea-Mumbles coast road. Open 10.30am to 5pm. Talk-in on S22, GB2SWR. Trade stands, bookstall, bring and buy, cw test, full catering. Admission £1 adults, 50p children. Details GW4HSH, tel 0792 404422.
23 March 1986
19th White Rose Rally, The University of Leeds Details G4NDU or Box 73, Leeds LS1 5AR.
13 April
The Lough Erne ARC rally at the Killyherlein Hotel, near Enniskillen. Opens 1pm. Talk-in on S22 and SU8. Details from GI4CZW (not QTHR), 9 Tanmon Brae, Enniskillen NI. Tel 0365 24500.
11 May
Drayton Manor rally at Drayton Manor Park, nr Tamworth, Staffs (on A4091 one mile south of A5/A4091 junction). Open 11am to 5pm. Talk-in on 144 and 432MHz, G3MAR/A. Details G8BHE, tel 021-422 9787 or G8GAZ, tel 021-357 1924.
11 May 1986
The Swindon Rally at Oakfield School, Marlowe Ave, Swindon, Wilts. Open 10am. Talk-in on S22 and SU8/GB3TD. Morse tests, refreshments, family entertainments, trade stands, exhibits. Details G8SFM, tel 066689 307.
18 May 1986
The 29th Northern Mobile Rally, Great Yorkshire Showground, Harrogate. Details G3CQQ, tel 0943 602118.
1 June 1986
Spalding and District ARS Rally at Springfields Gardens, Spalding. Opens 10am. Talk-in. Details G4OO, tel 0775 86382.
8 June 1986
Elvaston Castle Mobile Radio Rally, Elvaston Castle Country Park, five miles south-east of Derby on B5010. Talk-in by GB2ECR on 144MHz and 432MHz. Morse tests available. Details from G4PZY, tel 0332 767994 or G4CTZ, tel 0332 799452. Trade enquiries to G4HIJ, tel Ashbourne 43241.
29 June 1986
28th Longleat Amateur Radio Mobile Rally at Longleat Park, Warminster. Preliminary enquiries to G4FRG tel 0272 848140.
13 July 1986
Sussex Mobile Rally, Brighton Racecourse. Opens 10.30am. Talk in via GB2SMR on 145·550MHz and 3·5MHz. Details from G8JVE or G4UAW, evenings.
20 July
Anglian rally at Colchester. Further details G6HQI, tel 0206 862403.
20 July
Cornish Radio Amateur Club rally at Camborne School, Camborne. Open 10am to 5pm. Talk-in on S22. NB new QTH. Details G4MSV, tel 0736 763549.
27 July 1986
Scarborough ARS Rally at The Spa, Scarborough. Open 11am. Talk-in 144MHz (S22), and 432MHz (SU8) and RBO-GB3NY. Further details from rally secretary G4UQP.
3 August 1986
Rolls-Royce ARC Mobile Rally, Rolls-Royce Sports and Social club, Barnoldswick, Skipton. Access from A59 and A56. Open 11am. Morse tests available. Enquiries to G4ILG, tel 0282 813271 ext 337, daytime, or 0282 812288 evenings.
10 August 1986
Hamfest '86 at the Flight Refuelling Sports and Social Club grounds, Merley, Nr Wimborne, Dorset. Details Ashley Hume, G0CDY, 71 Victoria Gardens, Ferndown, Wimborne, Dorset BH22 9JQ, tel 0202 872503.
24 August 1986
Preston ARS 19th Annual Rally at Lancaster University. Details G3DWQ, tel 0772 53810.
7 September 1986
Lincoln Hamfest, Lincolnshire Showground. Further details to be published at a later date.
19 October
South Bristol ARC present the Second Bristol Radio rally at Hartcliffe Youth Centre, Hareclive Avenue, Hartcliffe, Bristol. Open 10am to 5pm. Bring and buy, traders, talk-in and all usual facilities. Special event station, GB2BRR. Details G1LDJ, tel 0272 667179.

Special Event Stations

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

1986, GB4MTR
GB4MTR will be operated during 1986 on the 70MHz band by 13 different stations each in a different county. The callsign will be operated from the stations of: G4VOZ LEC, 1–28 January; G4ENA GLR, 29 January–25 February; GW4HBK GWT, 26 February–25 March; G4ENB BFD, 26 March–22 April. Volunteer (4 meter QRV) stations are required, particularly from the north of England. An award will be available. For further details contact G4WND or G4SEU.
1 March, GB2SDD
The Saint David's Day special event station celebrating the National Day of Wales will be operational from midnight 28 February to midnight 1 March. Activity will be on all hf and vhf amateur bands. QSL cards to amateurs making contact with the station and the BSC Port Talbot Sports and Social Club will be pleased to respond to reports sent in by swls. For details of the special award and further enquiries, contact R R Jones, GW4HOQ.
13-14 March, 1986, GB4PHT
Operating from the Portland Heritage Trust during Portland Carnival, operation will be on 3·5, 14 and 144MHz ssb, cw, rtty, Amtor. A special effort will be made to contact amateurs in the other Portlands worldwide. Details G4RAK, tel 0305 822753.

Other Events

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

18 January
1986 Presidential Installation, Chelmsford. For further details see panel above.
16 March
RSGB National VHF Convention; Sandown Racecourse.

DIRECT-CONVERSION CW TRANSCEIVERS

Steve Price, G4BWE*

THE CONTENTION of many that "we live in a complex age" is no better illustrated than by merely glancing at the circuit diagram of a Yaesu FT757, or similar, hf transceiver. Quite understandably, the majority of radio amateurs have long ago buried any dreams of operating an entirely home-constructed station, and the "do it yourself" aspect of our hobby is confined almost entirely to the building of ancillary equipment and the erection of antennas. The problem—assuming that the present situation is, at least, to a degree undesirable—clearly deserves analysis. Leaving aside for a moment the ramifications of contemporary technology such as microprocessor control and digital frequency synthesis, I believe that it was the emergence of the transceiver itself which put paid to much home-construction. There was, lest we forget, a time not so far distant when transmitters and receivers existed only as separate entities. Although relatively few amateurs have ever constructed a double- or triple-conversion superheterodyne receiver, a significant number of operators would previously have built their own hf transmitter for use in conjunction with a commercial receiver. The dawn of the transceiver, bringing the inestimable advantage of single-knob tuning, plus many other unified, even automatic, control functions, changed things completely and irrevocably. Many potential constructors have since found that the necessity to build everything into one small box can represent a psychological hurdle which proves impossible to assail.

Finally, the adoption of ssb as the prime mode for hf telephony aggravated matters further, by throwing a whole generation of amateurs who had been weaned on no-nonsense a.m., into a state of confusion and bewilderment. Optimists may take heart, however, from the realization that the complexities of ssb generation can be completely ignored if the constructor sets his sights on the building of a cw-only transceiver. Not only will such a transceiver be considerably simpler to construct, but it will also provide an extremely high degree of communication effectiveness, for it is still an acknowledged fact that cw is the superior mode for weak-signal and dx working.

The remaining questions concern the application of sophisticated digital-frequency synthesis techniques and microprocessor control. Quite simply, these most recent developments have not brought about any fundamental change in the operating principles of contemporary hf transceivers. This is because the signal chain, comprising various amplifiers, mixers and filters, remains totally analogue and we have not yet arrived at a point where the digitization of the signal itself, and the consequent application of digital filtering etc, becomes entirely practicable. Obviously, the partial digitization of the vfo "side chain" has produced many operational advantages—digital readout and spot frequency memories, for instance—but as these convenience features are largely peripheral to the core of the transceiver function, they may legitimately be ignored by constructors striving towards an economic and uncluttered design.

Many of us learned about trf (tuned radio frequency) receivers while studying for the RAE, and it is worth remembering that in the 'twenties and early 'thirties the trf held sway over the superheterodyne. More recently, a technique allied to the trf principle, direct-conversion, has aroused considerable interest among radio enthusiasts, particularly those searching for simpler, but nonetheless high performance designs. A great advantage of the d-c receiver is that it may be converted painlessly into a practical cw transceiver featuring single-knob tuning and automatic transmit/receive changeover.

Direct-conversion

Fig 1 shows the essential elements of a direct-conversion receiver, and most readers will be familiar with the principles involved. Briefly, the local oscillator is tuned to a frequency very slightly offset from that of the wanted cw signal so as to generate an audible beat note whenever the transmissions

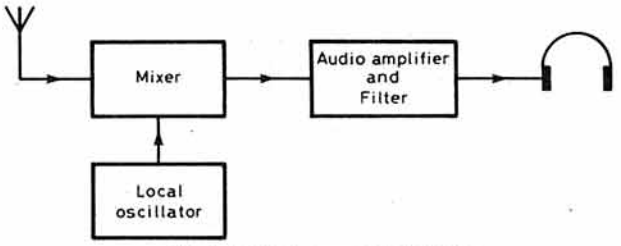

Fig 1. A direct-conversion receiver

carrier is present. By down-converting the signal from transmission frequency to audio in a single step, we produce a very elegant cw receiver which utilizes only one mixer and substitutes the normally expensive crystal or ceramic i.f. filter found in superhets with an audio filter that may comprise just a few CR networks and some cheap ic op-amps.

Inevitably, there is a penalty attached to such simplicity—the frequently-discussed "audio image". For any local oscillator setting, audible products will be generated by signals having carrier frequencies either slightly above, or slightly below the oscillator's frequency. This double response means that the bandwidth of the d-c receiver is effectively twice that of an equivalent superhet. Also, as the receiver is tuned across the band each transmission is heard twice—once when the vfo frequency is lower than the signal, and again as the oscillator is incremented to a point just above the signal.

The audio image is clearly a bugbear of direct-conversion that must be taken into account by anyone contemplating the design and/or construction of such equipment. However, readers may rest assured that the d-c technique is entirely practicable, and the slight degradation in receiver performance should rightly be set against the simplicity and low cost achievable with direct-conversion.

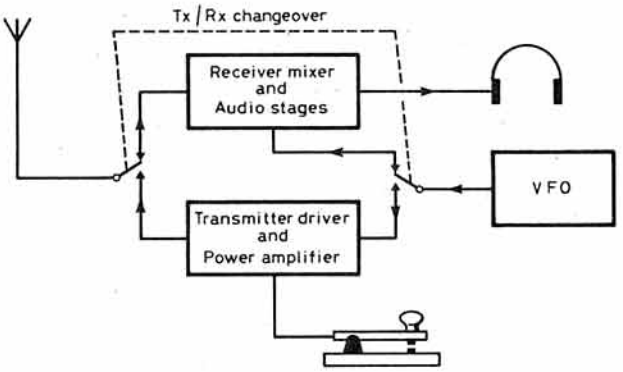

Fig 2. A direct-conversion cw transceiver in simple form

Fig 2 illustrates a basic cw transceiver featuring direct-conversion in the receiver. Because the vfo operates at signal frequency, much of the complexity associated with superhet rigs is avoided and transmit/receive changeover becomes particularly straightforward.

The remainder of this article is devoted to the description of practical circuitry developed for an hf direct-conversion cw transceiver. I have adopted a modular approach where each section, or functional block, within the rig is self-contained and may be built and tested separately. What follows will appeal more to the fairly-experienced constructor and experimenter. Precise layouts, component lists etc have been avoided. So has description of circuitry that may be taken for granted; eg the audio output stage and mains psu.

*458 Soundwell Road, Kingswood, Bristol BS15 1JU.

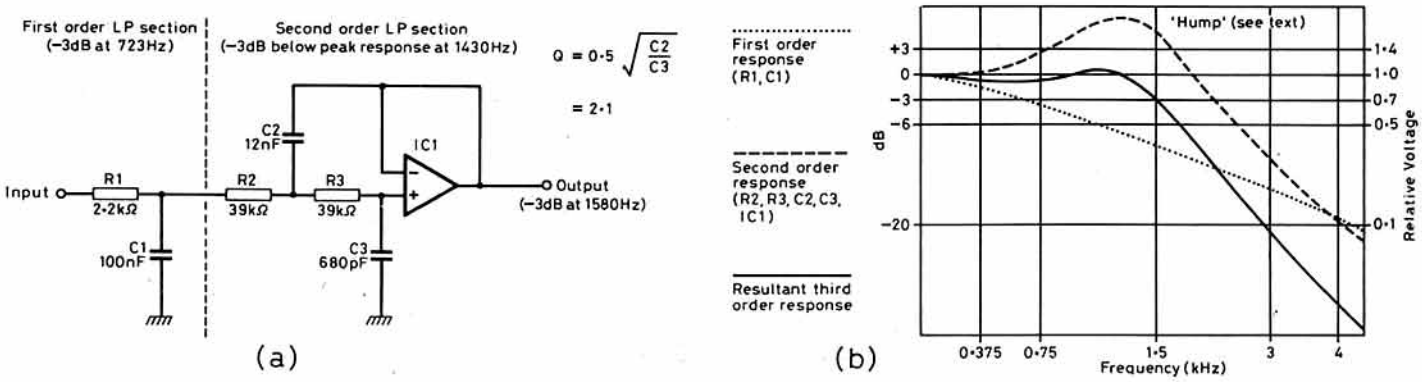

Fig 3. The third-order lowpass filter and associated response curves

Receiver

The direct-conversion receiver has perhaps suffered through having the label "simple" attached to it. Indeed, many designs featuring an incredibly low parts count have found their way into the amateur radio literature, and it is true to say that a complete d-c transceiver may be built using the veritable "handful" of junkbox components. Such ingenuity and thrifty enterprise is, of course, to be applauded, but it does have the unfortunate side effect of masking many fundamental design considerations. If, instead, we treat the direct-conversion receiver as being merely a straightforward engineering solution to the problems of hf reception, considerable headway can be made. After all, the d-c receiver, although possessing fewer stages than the superhet, does still require a local oscillator, various filters, an amplifier and a mixer. Therefore, all the performance criteria associated with such functions; eg oscillator stability, filter bandwidth and shape factor, amplifier distortion and noise, mixer intercept figures etc, are entirely relevant to the d-c receiver also.

Let us consider the filter first. The mixers output will comprise a very wide spectrum of products stretching from virtually dc (direct current this time!) at the low end, to frequencies of the megahertz order at the high end. The human ear is only sensitive to frequencies within the range 30 to 20,000Hz, and so the subjective bandwidth of a d-c receiver, without any form of filtering, could be said to be approximately 20kHz. However, this bandwidth is far wider than that necessary for ssb telephony, which requires no more than 2·7kHz, let alone cw. Also it is most important to realize that a high-level mixer product at, for instance, 35kHz, although inaudible in itself, might cause overloading of an amplifier and, therefore, the generation of both second- and third-order products associated with such distortion.

In the typical junkbox rig referred to earlier, a single pole lowpass filter, interposed between the mixer and audio amplifier, often constitutes the only post mixer filter used within the entire receiver. Although better than nothing, such an elementary filter cannot possibly provide the shape factor desired in a high-performance receiver. Frequencies up to 10kHz will be plainly audible, a gross disadvantage in itself, and for reasons just discussed the dynamic range of the receiver will be considerably compromised.

Before investigating better and necessarily more complex filters, it is important to decide what constitutes the optimum response shape. The constructor's first instinct, in the case of a cw transceiver, might be to opt for a multi-stage bandpass filter resonant at around 800Hz and possessing a bandwidth of no more than 300Hz. While it is true that such a filter could provide excellent isolation of the wanted signal, do we really want to be limited to such a narrow bandwidth? The problem, clearly, is that with particularly sharp filtering, tuning of the receiver becomes rather difficult and the limited range of frequencies appearing at the receiver's output creates an acute sense of isolation from the rest of the band.

The second filter option involves the all-singing, all-dancing approach, where a tunable filter featuring variable bandwidth and variable centre frequency is employed. This, I will concede, represents the ultimate. But there are many problems in implementing such a system. The circuitry required would be quite complex and any attempt to simplify the design is bound to result in compromised performance.

After much thought I decided on a multi-section, fixed-frequency active filter of the lowpass type having a −6dB response at approximately 1,400Hz. This filter, which provides over 60dB of attenuation in the first octave above cut-off, is supplemented by a simpler highpass filter which rolls off more gradually below 400Hz. The complete filter system therefore possesses a −6dB bandwidth of just over 1kHz and is capable of isolating cw signals very effectively, but without sounding too sharp. Needless to say, if a narrower bandwidth is ever desired, perhaps for dx chasing or contest work, then an add-on active filter of the type I have previously described [1, 2, 3] may also be employed.

Fig 3(a) shows the third-order lowpass section which is used as a building block for the main filter. R2, R3, C2, C3 and IC1 comprise a second-order lowpass filter that will work quite happily in isolation from R1 and C1. The Q or damping factor of the second-order section is determined by the ratio of C2/C3. A Q value of 1 would be obtained by simply reducing this ratio to 4:1, and the resultant amplitude response is then almost perfectly flat up to the cut-off frequency, at which point the filter begins to gradually roll off. However, if the Q is increased to around 2, the filter rolls off more sharply beyond the cut-off frequency, thus producing a better "close in" shape factor. The snag is that as the Q is increased beyond a value of 1, a resonance, or "hump" begins to appear in the amplitude response at a point just prior to cut-off. This irregularity could possibly be tolerated in a single-stage filter of moderate Q, but if a number of such filters are cascaded the hump grows proportionately in amplitude and we end up with something looking more like a rather sharp bandpass response. The problem is solved in the third-order filter of Fig 3 (a) by introducing a first order section comprising R1 and C1. The values of these two components are chosen so that the first-order section has a −3dB response approximately one octave lower than the second-order network. This has the most desirable effect of smoothing out the dreaded hump, and also increases the attenuation achieved beyond the cut-off frequency. Fig 3 (b) illustrates the technique by way of a graph, and reveals that an attentuation of around 20dB is obtained in the first octave above cut-off. In order to realize the desired performance, the complete lowpass filter employs three almost identical third-order stages cascaded.

Those readers who are versed in the mysterious and often highly-mathematical subject of filter design may wonder why a more developed, higher-order circuit has not been chosen. The reason for this lies in the fact that a seventh-order Chebyshev lowpass filter offering the same performance would demand the use of two per cent, or even one per cent tolerance components in order to guarantee a well-controlled response curve. Just as many components would probably be required, if only because the call for certain precise values might well dictate the use of series or parallel combinations of values actually available in the E12 or E24

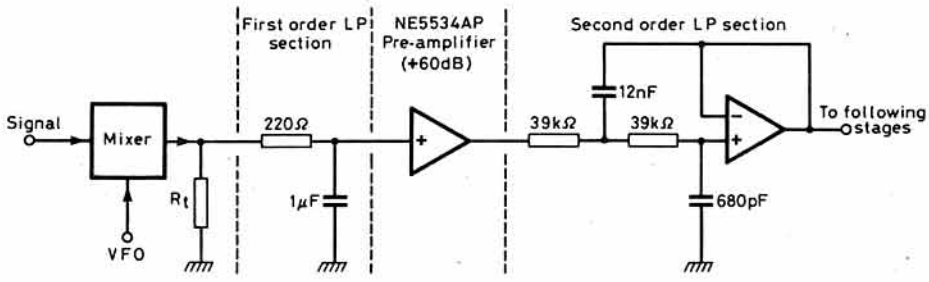

Fig 4. The receiver module front-end in skeleton form

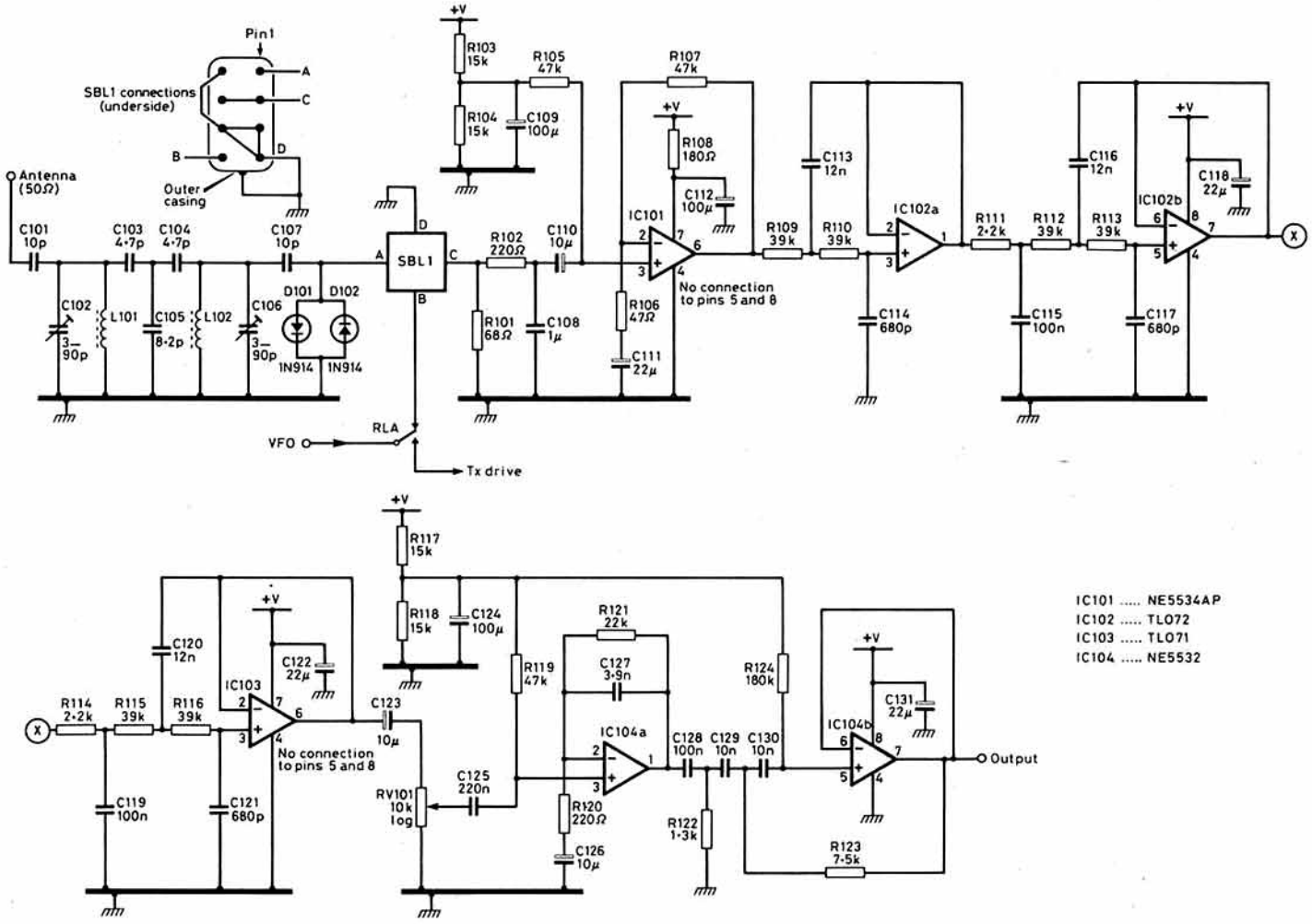

Fig 5. The receiver module for 14MHz, L101 and L102 are both 20t 22swg enamel wire, tightly wound on Amidon T68-6 dust-iron toroid cores

series. In contrast, the triple third-order filter works quite happily with standard five per cent E12 series resistors and capacitors.

As the active lowpass filter has a net gain of zero within its passband, considerable amplification must be provided by other stages in order to raise the microvolt level of weak signals so that they become audible in headphones or through a loudspeaker. Most of this gain is obtained by utilizing a high-performance bipolar op-amp, type NE5534AP. The suffix "AP" denotes selection for low noise, and in practice this means a noise voltage some 15dB lower than that generated by bi-fet op-amps such as the TL071.

Fig 4 shows the receiver front-end in skeleton form. The first "gain block", featuring an NE5534AP preamplifier, is interposed between the first-order and second-order sections of the initial third-order lowpass filter. The values of the first-order section are scaled by a factor of 10 (giving 220Ω plus 1µF) thereby ensuring very low noise and providing a better match to the mixer output port.

The mixer is a packaged Schottky diode ring type SBL1, and this device works best when all three ports (input, output and local oscillator) are terminated by a 50Ω resistive load. Resistor Rt is therefore incorporated so as to ensure that this condition is met in respect of the output port. Readers may question the use of a relatively expensive balanced mixer rather than one of the cheaper alternatives such as a simple dual-gate mosfet circuit. The central reason for this apparently extravagant choice is that single-ended mixers suffer from a deficiency best described as "envelope detection". Briefly, all mixers function by virtue of the fact that they are essentially non-linear. Unfortunately, the very non-linearity which enables the mixer to generate sum and difference products can also give rise to the partial rectification of strong carriers. In a superheterodyne receiver, the fact that a strong a.m. broadcast signal may be envelope-detected by the first mixer causes no real problems because the resultant audio is completely rejected by the i.f. filter(s) that follow the mixer. In a direct-conversion receiver, however, the envelope detected signal cannot be rejected for the simple reason that the receiver's filter is designed to pass audio frequencies.

The SBL1 mixer employed in my receiver module operates in the switching mode and employs "fast" Schottky hot-carrier diodes to reduce the transition time between the ON and OFF states. This performance feature, coupled with the doubly-balanced nature of the transformer coupled diode ring, provides a very high immunity to envelope detection.

The preamplifier voltage gain is 60dB; this may seem rather high, particularly when bearing in mind that there is only a single-pole filter section between the mixer output port and the amplifier's input. However, we must set against this gain two significant losses. First, there will be a two-section bandpass filter connected between the antenna and the mixer input port. This filter introduces a loss of approximately 6dB within its passband. Second, the SBL1 mixer has a conversion loss of around 6dB also. Subtracting these two losses from the preamplifier gain figure results in a net front-end voltage gain of 48dB. Also, it should be noted that the first-order filter section has a −3dB response point at roughly 700Hz. Therefore, the gain at this frequency drops to a quite manageable 45dB, and the receiver should therefore be capable of handling signals that develop 20mV rms across its 50Ω antenna input.

Fig 5 shows the complete circuit diagram of the receiver module, and Fig 6 supplements this by illustrating the system in block form, complete with gain distribution figures. Components C101 to C107 plus L101 and L102 comprise the signal frequency bandpass filter. The top coupling at each end of the filter provided by C101 and C107 has been calculated to present a 50Ω match. The filter is set-up by merely adjusting C102 and C106 (both miniature plastic foil trimmers) for maximum signal at the centre of the cw segment of the band. Although utilizing a fair number of fixed capacitors, this filter has the advantage of not requiring either tapped inductors or coupling windings.

The prototype receiver operates on 14MHz, but it is a simple matter to re-calculate the component values for other bands; all necessary design data being contained in Appendix 2 of *Solid state design for the radio amateur* [4], which I have employed for the development of the 14MHz filter. The two silicon diodes, D101 and D102, protect the mixer from excessive input

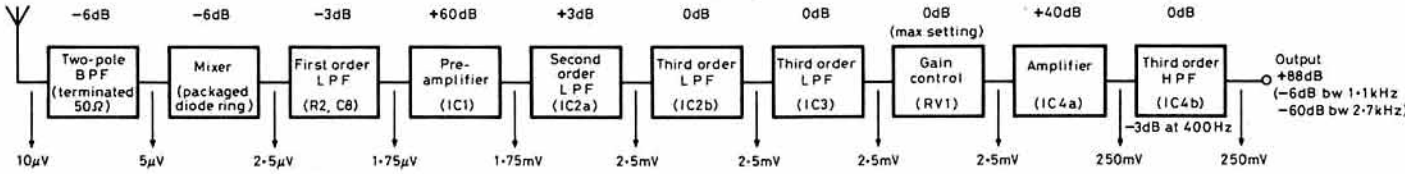

Fig 6. Block diagram of the receiver module showing gain distribution and voltage levels for a 10μV signal which produces a mixer output at 700Hz

voltage. VFO drive is routed to the mixer via a small changeover relay. On transmit, the relay coil is energized, thereby transferring oscillator drive to the transmitter module.

R101 terminates the output port of the SBL1 mixer, and R102 plus C108 form the first-order filter section discussed earlier. Series, rather than shunt feedback is employed around IC101, as this results in lower noise. The negative feedback is provided by R107 and R106. IC102a, R109, R110, C113 and C114 constitute the initial second-order section featured in Fig 4. The remaining third-order filters are built around IC102b and IC103. In order to avoid any confusion, it should be noted that IC102 is a dual op-amp (TLO72) whereas IC103 is a single op-amp (TLO71). RV101 is the gain control which precedes the second "gain block" (40dB) built around IC104a. IC104b, R122, R123, R124, C128, C129 and C130 form a third-order highpass filter with a −3dB response at 400Hz. This filter significantly attenuates the lower audio frequencies and thereby helps eliminate any residual mains hum and 100Hz ripple.

IC104 is a dual version of the NE5534 and was chosen for two reasons. First, it became apparent while testing the prototype receiver in conjunction with an LM380 audio output stage that hiss generated by IC104 was subjectively noticeable. Needless to say, such noise cannot be attenuated by reducing the volume setting, and so the lowest-noise op-amp is desirable in this position. Second, the NE5532 is fully capable of driving resistive loads down to 500Ω, whereas other op-amps can only manage, typically, 2,000Ω. This makes it possible to connect high impedance headphones directly to the output of IC104b. If headphones are to be used in this fashion, a 10μF blocking capacitor must be wired in series with the output.

Readers will no doubt have realized that the receiver does not employ any form of agc. Those who feel that agc is desirable, perhaps even essential, may rest assured that in practice the absence of agc has not proved particularly detrimental. Indeed, the fact that signals are presented to the listener with their true relative amplitudes preserved induces a satisfying sense of realism and makes a welcome change from the rather "processed" sound of most commercial receivers.

Many constructors will wish to add some form of audio power amplifier so that the receiver can be coupled to a loudspeaker. My prototype transceiver employs an LM380 ic output stage, but problems were experienced initially due to feedback caused by the LM380, which draws fairly high currents, modulating the receiver module supply rail. The solution is to feed power to the audio output stage via a separate voltage regulator. It is also important to incorporate the bias and supply rail decoupling electrolytics shown in Fig 5. My transceiver uses a 15V supply rail, and the psu, which is built into a separate screened case, incorporates two 7815 ic regulators. The main reason for choosing a voltage slightly higher than the virtually standard 13·8V was so that the transmitter output stage (described later) could develop more power. However, all the circuits described should function perfectly well on 13·8V.

Fig 7 shows the circuit of a switchable 20dB attenuator for use between the output of IC104b and the audio power amplifier. This network complements the volume control (RV101) and enables the receiver's gain to be controlled with ease over a very wide range.

The fixed resistors employed in the receiver module are standard five per cent tolerance carbon or metal film types of 0·33W rating. Non-electrolytic capacitors used in the audio filter sections are five per cent tolerance

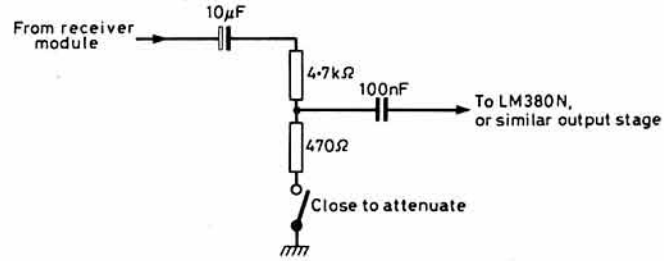

Fig 7. A switchable 20dB attenuator

polyester types (Siemens B32560 and B32561), except the 680pF value, which is polystyrene (Siemens B31310). Other types of capacitor can be employed (eg Mylar) so long as they are of five per cent tolerance. Ceramics are an exception, however, and should be avoided.

The receiver module possesses a sensitivity and signal-to-noise ratio which should prove adequate for all applications on bands from 1·8 to 7MHz. It may, however, be possible to improve the performance on the higher frequency bands by the addition of an rf amplifier. A single jfet amplifier stage, suitably integrated with the input bandpass filter network, might be tried. RF gain achieved in this way should be restricted to between 10 and 15dB. It will also be a good idea to incorporate a bypass switch for the amplifier, or alternatively, a switchable input attenuator.

VFO

Many direct-conversion transceiver designs published in recent years have relied on crystal control in order to achieve simplicity and guaranteed frequency stability. A limited tuning capability can be provided by "pulling" the crystal, and much ingenuity has been applied by the originators of vxo circuits in an attempt to bridge the gap between crystal and vfo control.

Few would argue, however, that a properly-designed vfo is the only

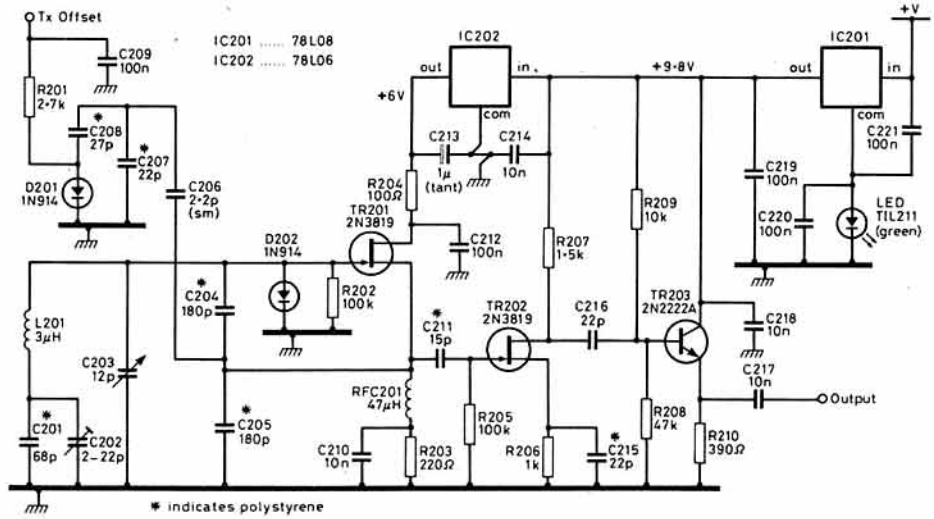

Fig 8. The 14MHz vfo. L201 has 14t 22swg enamel wire, close-wound on a 0·66in diameter plastic former. The RFC is a Toko 7BA potted type

serious alternative to frequency synthesis for a rig intended to cover the whole of a particular hf band, or even just the band's cw segment. Having opted for a vfo, I played safe by adopting the tried-and-tested Clapp arrangement, which is essentially a series-tuned Colpitts oscillator. Fig 8 gives the circuit, and there are few surprises here. IC202 generates a stable 6V supply for the oscillator (TR201) and IC201, working in conjunction with a green l.e.d, provides a 9·8V rail for the amplifier and output buffer (TR202, TR203). C203 provides tuning over a range of 250kHz and allows casual monitoring of ssb transmissions higher up the band (although it must be borne in mind that the audio filter employed in the receiver module is rather narrow for correct reproduction of speech).

C202, a plastic film trimmer, allows band-edge setting after final assembly of the vfo in a rigid, screened box. A slow-motion drive for C203 is, of course, essential, and a reduction ratio of about 30:1 should be the constructor's aim. Applying supply voltage to the top end of R201 provides the 800Hz lf shift necessary on receive. Temperature compensation may be obtained by replacing C201 with a parallel combination of 47pF (polystyrene) and a 22pF npo ceramic.

The basic circuit can be scaled for bands other than 14MHz, or, alternatively, a completely different design utilized. Be careful, however, when selecting a vfo circuit, to ensure that the output amplifier/buffer is capable of delivering 5mW into the 50Ω load presented by the SBL1 mixer.

Transmit/receive control system

In order to attain the operational convenience of a typical commercial transceiver, we must provide some means of enabling the morse key to control automatically the transmit receive changeover function. There are a number of additional facilities that it is desirable to incorporate, and the circuit of Fig 9 is designed to achieve the following:

(1) The provision of a keying input circuit that will interface with a wide variety of both hand keys and electronic keyers. The standard chosen is a keying potential of 5V positive to ground with the key-down current limited to 100μA.
(2) A stable changeover timing circuit that provides a variable delay over the range 0·5 to 2s.
(3) A relay driver to energize the changeover relay coils automatically, as and when required.
(4) Generation of a keying waveform to feed the transmitter keying transistor.
(5) Control of the tx/rx offset potential which shifts the vfo frequency 800Hz lf on receive.
(6) Generation of a sidetone for transmit monitoring.

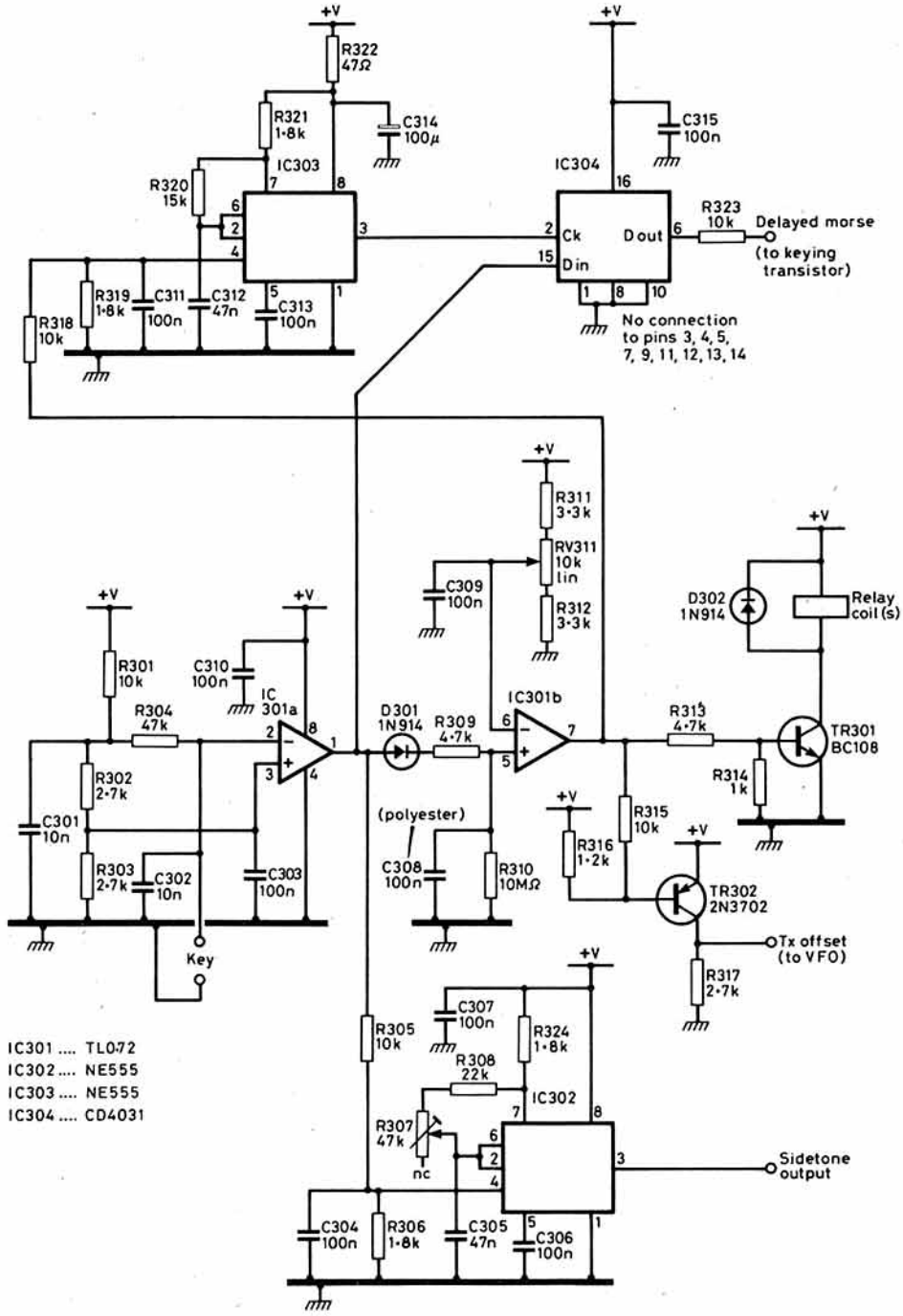

Fig 9. The transmit/receive control system

IC301a functions as a comparator and operates in conjunction with the voltage divider chain comprising R301, R302 and R303. The inverting input of IC301a is held at a positive potential of approximately 5V via R304. The non-inverting input of the op-amp is directly connected to the junction of R302/R303, thus establishing a potential of +2·5V on pin 3. This results in the output of IC301a being forced low, and in practice gives rise to an output of about 1V at pin 1. Depressing the key grounds pin 2 of IC301, with R304 limiting the keying current to 100μA. The non-inverting input of the op-amp is now at a higher potential than the inverting input (ie +2·5V as opposed to 0V) and so the output of IC301a is taken high. The keying waveform is fed to the sidetone oscillator (IC302) via the potential divider R305/R306. The pitch of the sidetone is determined by the values of R307, R308 and C305. Making R307 a preset component therefore provides a means of adjusting the sidetone pitch. The sidetone output may be coupled to the input of the audio output stage via a high-value series resistor, the precise value to be determined by trial and error.

IC301b operates as a monostable and produces the changeover delay in the following manner. Each depression of the key will cause the output of IC301a to go high, as previously explained. D301 therefore conducts and almost instantaneously charges C308, via R309, to very nearly rail voltage. The positive potential now present at the non-inverting input of IC301b will exceed the potential developed by the variable divider network (R311, R312 and RV301) at the inverting input of the op-amp. This causes the output of IC301b (pin 7) to go high and so turns on the relay driver (TR301) via R313/R314. C308 will stay almost fully charged for as long as morse is being sent, thus ensuring that the changeover relay coils remain energized. When the operator ceases sending, C308 begins slowly to discharge through the high-value resistor R310. Eventually the voltage remaining across C308 will fall below the voltage on pin 6 of IC301b. At this point the op-amp output drops quickly to about 1V, and TR301 turns off, thus de-energizing the relays. RV301 controls the changeover delay time.

TR302 acts as an inverter to create the necessary control voltage for the vfo offset (see previous section). Morse appearing at pin 1 of IC301a is also fed to the data input of a 64-stage static-shift register type CD4031 (IC304). Morse is clocked through the shift register at a predetermined rate and re-appears at the output (pin 6) approximately 50ms later. Transmitter keying

is accomplished via R323. Introducing the 50ms delay enables the changeover relays to pull-in prior to the commencement of transmitter keying, and so prevents any clipping of the first morse character. IC303 is the shift register clock oscillator and is enabled during transmit periods via R318/R319.

Transmitter

The transmitter module (see Fig 10) consists of an emitter-follower input buffer (TR401) followed by a Class A driver (TR402) which has a tuned-circuit collector load. The Class C power amplifier (TR404) is driven from TR402 via a link winding (L402) which provides low impedance drive to the base of the pa transistor. The output filter consists of a symmetrical pi-tank (C411, C412 and L403) which presents a 50Ω load to both the TR404 collector and the antenna. Using a 15V supply rail enables a genuine 2W of rf output to be obtained from the transmitter.

The 2N3553 pa transistor is not the cheapest device that could have been specified for this application, but it has the advantage of being considerably more rugged than many inexpensive alternatives. Power is fed to TR404 via an rf choke having an inductive reactance of approximately 500Ω at the frequency of operation. C409 and C410 provide effective decoupling of the pa supply rail over a wide range of frequencies, thereby lessening the possibility of parasitic oscillation. The driver supply rail is keyed by TR403, which operates as an emitter-follower current amplifier. C407, working in conjunction with R323 in the transmit/receive control system (see Fig 9) provides a time constant to shape the keying waveform and so prevents key clicks.

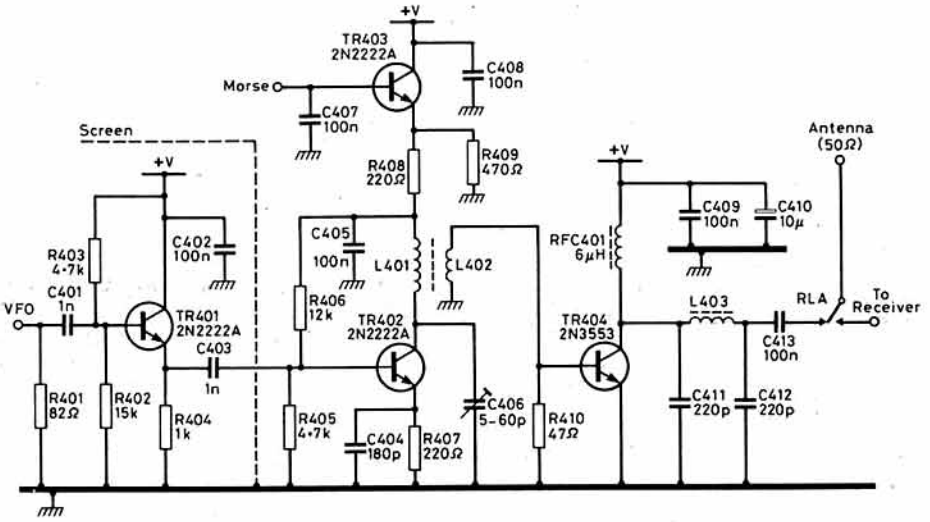

Fig 10. The transmitter module. For 14MHz, L401 has 27t 24swg enamel wire wound on an Amidon T50-6 toroid core. L402 is 3t. L403 is 12t of 22swg, also wound on a T50-6 core. The RFC (6µH) consists of 36t of 24swg enamel wire wound on an Amidon T68-6 core

I am very fond of using Veroboard for prototype home-construction projects, and find this to be by far the quickest method of getting even quite complex one-off designs working satisfactorily. However, for the transmitter module, double-sided pcb is strongly recommended. The high ft of the 2N3553 (400MHz) could easily give rise to vhf parasitic oscillation unless a well-defined, low-impedance earth-plane is provided. Double-sided pcb solves the problem most elegantly, for it is a simple matter to leave the top side of the board mainly un-etched and use this surface as the earth-plane. The most critical earth connection is that to the emitter lead of TR404, and this should be made as short as possible.

It is advisable to screen the input buffer (TR401) from the rest of the transmitter circuitry by using a small piece of tinplate or pcb soldered to the earth-plane. In the prototype transceiver, the transmitter module is located within its own screened compartment which also contains the antenna changeover relay and an SO239 antenna socket. The receive contact of the changeover relay is coupled to the input of the receiver module using a suitable length of miniature 50Ω coaxial cable type RG174. RF drive is obtained from the vfo changeover relay located in the receiver module (see Fig 5), also using RG174. The relays are miniature types with 12V dc coils, and both are energized by the relay driver transistor TR301 (see Fig 9); ie their coils being wired in parallel. The changeover arrangement conforms exactly to that illustrated in Fig 2, and no other transmit/receive switching is employed, apart from the voltage control of the vfo offset.

The transmitter module is commissioned as follows:

(1) Power is applied to the module in the absence of vfo drive, but with the base of TR403 connected to the positive supply rail via a 10kΩ resistor. The output of the pa is initially coupled into a 50Ω dummy load, and an ammeter reading either 0-500mA or 0-1A is wired in series with the supply rail. An hf receiver having a few feet of unscreened cable connected to its antenna socket is placed near the transmit module and tuned around the spectrum so that the presence of any parasitics may be detected. The generation of parasitics will almost certainly result in a considerable increase in the current drawn by the module, which under quiescent conditions should be no more than about 60mA. If all goes well, the 50Ω dummy load should be disconnected and the test repeated. Random adjustments made to C406 (another plastic film trimmer) should have no effect on stability.

(2) Providing that the module has remained absolutely stable up to this point, the dummy load may be re-connected and vfo drive applied. C406 (drive tune) is now adjusted for maximum input current, which should lie somewhere in the region 200-330mA. A small heatsink must be provided for TR404, but this will only get warm after 10s of continuous drive and should never become too hot to touch.

(3) A morse key is now placed in series with the 10kΩ resistor used to link the base of TR403 to the supply rail. The hf receiver is tuned to the vfo frequency, and the transmit module is keyed while listening to the results. If small degrees of chirp are detected, try de-tuning the driver slightly using C406. Remember, however, that if these tests have been carried out on a workbench with the vfo in close proximity, a certain amount of interaction is almost inevitable. Proper screening within the finished transceiver should lessen such problems. Finally, tune the receiver across the hf spectrum while the transmitter is being keyed. Apart from the obvious effects of receiver overload, no spurious emissions should be detectable; apart, perhaps, from transmitter harmonics.

An rf voltmeter, or an rf probe connected to a standard multimeter, may be coupled to the 50Ω dummy load and used to measure the output voltage. A reading of between 13 and 16V peak indicates that the pa is delivering about 2W output. There should be no reading with the key up. Constructors who do not possess either an rf voltmeter or rf probe can simply replace the dummy load with a 12V 2 to 4W filament bulb; keying the transmitter will cause the bulb to glow brightly in sympathy with the morse. There should be no trace of illumination with the key up, however, and the occurrence of such almost certainly indicates parasitic oscillation.

While the above tests are being carried out, it is advisable to have a 500mA quick-blow fuse wired in series with the psu output.

The transmitter module will work on any band, provided that the RFC, L401, L402, L403, C406, C411 and C412 are scaled accordingly. For multi-band operation, a separate switch-selected pi-tank must be employed for each band. The exception to this rule occurs where any two bands are significantly less than an octave apart. It is then acceptable to scale the pi-tank for the highest frequency band of the two and then use it also for the lower frequency. The RFC inductance should be calculated to produce a reactance of between 400 and 500Ω on the lowest frequency band to be catered for. The tuned driver stage may prove a hindrance where multiband operation is concerned, and so it is probably best to replace L401, L402 and C406 with some form of wideband coupling transformer, thereby making TR402 an aperiodic amplifier.

The large number of 10 and 100nF decoupling capacitors employed in the transmitter module, control system and vfo are ordinary ceramic types and their tolerance is unimportant. Where a 2N2222A transistor has been specified, it is possible to employ a wide variety of small signal npn types as alternatives, eg 2N706, BC107 or BC108.

(Continuec' on page 33)

A rotator speed controller

B L Lonnon, G3ZUM*

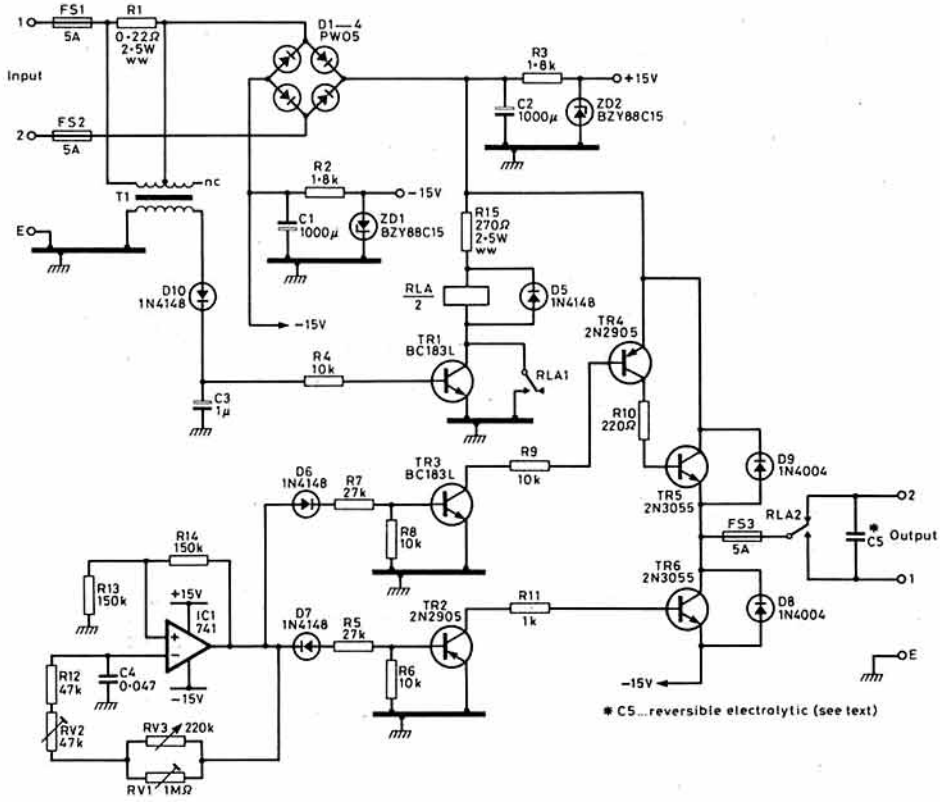

Fig 1. Circuit diagram

Introduction

One of the problems of using a rotator to drive a directional antenna is the inordinately long time taken to traverse an appreciable angle; most rotators take about 75s to traverse 360°. The purpose of this article is to describe an add-on unit which will allow the rotator to operate at different speeds.

Most commercially-available rotators use a 24V synchronous motor, whose speed is governed by the frequency of the applied alternating voltage. To vary the speed, therefore, the frequency of the applied voltage must be varied; the limits over which this can be achieved will vary from one make to another, but a useful range should be obtained. For example, my CDE CD45-2 gave the following results:

normal rotation time at 50Hz..... 70s per revolution;
with speed control unit..... 30 to 85s per revolution.

The unit does not require any modifications to either the rotator or control box.

Circuit description

The circuit diagram is shown in Fig 1. According to the direction of rotation required, the control box will apply voltage to one of the input terminals of the speed control unit. Diodes D1-D4 and capacitors C1 and C2 provide a split supply.

Zener diodes ZD1 and ZD2 provide stabilized rails for IC1. A 741 op-amp is used for IC1 and is wired as an astable multivibrator, the frequency of which is controlled by the front panel variable resistor, RV3. Limits are set by RV1 and RV2. A pair of 2N3055 transistors are fed by their appropriate drive circuits from the output of IC1. The inductive motor load is clamped by diodes D8 and D9. Direction control is performed by RLA, a high current switching double-pole relay. It is driven by transformer T1 and associated circuitry. T1 is an audio interstage transformer, which provides an inexpensive alternative to a current transformer. Contacts RLA1 perform a latching function for the relay, which is necessary for rotators fitted with limit switches, to prevent hunting at the end stops. The current rating of the motor switching contacts, RLA2, is 5A inductive and is thus more than adequate for a rotator motor.

Construction

Subject to demand, a complete kit of parts, including printed circuit board and metalwork will be available [1], and the unit will thus be within the capability of anyone new to the art of construction.

The order of construction recommended is:

(1) Temporarily fit the four threaded spacers to the pcb and insert the bridge rectifier assembly, from the *copper* side. With the spacers and the bridge in contact with a flat surface, cut off the bridge wires, flat with the component side of the board. Now remove the spacers, placing the *component* side of the board on the flat surface, and solder the four leads.

(2) Solder the rest of the components in place, except TR5, TR6 and C5. Ensure that polarity-sensitive components are orientated correctly.

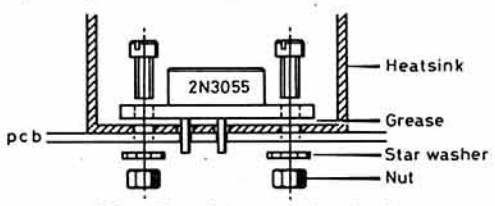

Fig 2. Transistor mounting details

(3) Place a small amount of thermally-conductive grease on the mounting surfaces of TR5 and TR6 and assemble as shown in Fig 2.

(4) Before fitting C5, refer to Fig 3 to determine which diagram agrees with your rotator and, if C5 is required, fit the same value as shown in your control box. These are available from the supplier in [2].

(5) Fit the two grommets in the box and bolt in the pcb, having checked all solder joints and for any solder splashes etc. Bolt down the bridge (a box spanner will fit down the hole in the pcb). Mount the front panel control RV3 and wire it to the two terminals on the pcb, near it.

After some years as an swl, Brian Lonnon was licensed as G8CCE in 1968 and G3ZUM in 1970. After a time in industry, he entered the teaching profession as a physicist in the mid-seventies. Design and construction of electronic equipment began at the age of 10! It has remained a great interest ever since. Originally interested in 144MHz, he now operates on the hf bands on rtty, ssb and cw. He is a member of the Farnborough & DRS, and his other main interests are computing and the Army Cadet Force.

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Components list

R1	0·22Ω 2·5W w/w	TR1, 3	BC183L
R2, 3	1·8kΩ 0·4W metal film	TR2, 4	2N2905
R4, 6, 8, 9	10kΩ 0·4W metal film	TR5, 6	2N3055
R10	220Ω 0·4W metal film		
R11	1kΩ 0·4W metal film	DI–4	Bridge PWO5
R12	47kΩ 0·4W metal film	D5, 6, 7	IN4148
R13, 14	150kΩ 0·4W metal film	D8, 9	IN4004
R15	270Ω 2·5W w/w	D10	IN4148
RV1	1MΩ preset		
RV2	47kΩ preset	ZD1, 2	BZY88C15
RV3	220kΩ panel mtg pot		
		IC1	741 op-amp
T1	LT44 (Eagle)		
		RLA	OM1 12V pcb mtg
C1, 2	1,000μF axial electrolytic	FS1, 2, 3	5A 20mm
C3	1μF 10V axial electrolytic	**Miscellaneous** Eight-way pcb connector, six 20mm pcb fuse clips, pcb, two heatsinks 7·2°C/W, metal box, knob, assorted hardware	
C4	0·047μF polyester or similar		
C5	Reversible electrolytic (see text)		

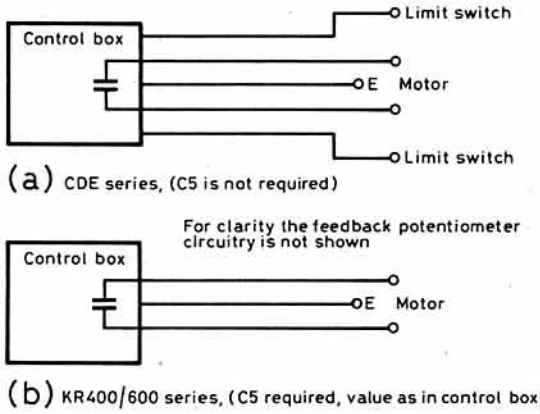


Fig 3. Rotator wiring diagram

Setting up and testing

Consult Fig 4 and wire up the unit accordingly:

(a) CDE series:

(1) Disconnect the two wires coming from the limit switches and connect these to the output terminals 1 and 2 of the unit.

(2) Connect two wires from the unit input terminals to where the two wires were removed in (1).

(3) Connect an earth wire from the control box to the unit.

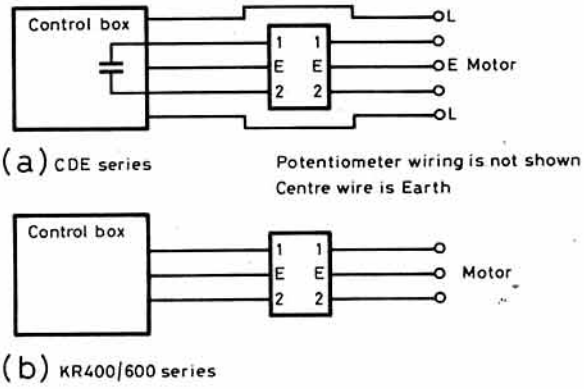


Fig 4. Connection details

(b) KR400/600 series:

(1) Remove the two wires coming from the motor and connect these to the output terminals of the unit.

(2) Connect two wires from the unit input terminals to where the two wires were removed in (1).

(3) Connect an earth wire from the control box to the unit.

Turn RV3 fully clockwise (maximum speed) and adjust RV2 for the maximum speed, consistent with even running of the rotator. Turn RV3 fully anticlockwise and adjust RV1 for the slowest speed, consistent with even running.

The following points should be noted:

(1) RV1 and RV2 need to be set with the antennas on the rotator.

(2) The starting torque at higher speed settings will be much less than at normal speed. Therefore, the motor could fail to commence rotation and this might lead to its being burned-out. It is sensible, therefore, to start at low speed and progressively increase to the desired setting. This problem is unlikely to occur except in the case of very large arrays.

(3) Starting at low speeds and accelerating to that desired will greatly reduce the strain imposed on the rotator. Similarly, decelerating to the required bearing will help prevent overshoot, leading to greater accuracy in the positioning of the antenna system.

In my case, the unit has certainly proved its worth to the extent that I wonder how I ever managed without it!

References

[1] Details of the kit may be obtained from G3ZUM by sending an sae to the address given on page 32.

[2] Maplin Electronic Supplies Ltd, PO Box 3, Rayleigh, Essex. □

DIRECT-CONVERSION CW TRANSCEIVERS

(Continued from page 31)

Taking things further . . .

Multiband operation may be achieved by providing a separate, switch-selected, receiver input filter and complementary transmitter lowpass filter for each band. Obtaining vfo drive on more than one band is less straightforward. Nevertheless, with careful design it should be possible to produce a bandswitched vfo of the type employed in the Atlas 210x and 215x transceivers [5]. Other alternatives include the use of a frequency multiplier chain driven by the vfo (for harmonically-related bands), or a simple pre-mix synthesizer using the vfo in conjunction with a crystal oscillator and mixer.

Looking at the project in a wider context leads to the realization that d-c transceivers are not necessarily limited to cw. By extending the vfo offset facility it is feasible to provide for various fsk/fm modes, including rtty, amtor, sstv and data—perhaps in conjunction with a home computer.

References

[1] "The G4BWE audio filter". *Rad Com* November 1981, pp1016–9.

[2] "The G4BWE cw filter". *Rad Com* March 1983, pp226–9.

[3] "The G4BWE tunable cw filter". *Rad Com* September 1984, pp775–8.

[4] *Solid State Design For The Radio Amateur,* Wes Hayward, W7ZOI, and Doug De Maw, W1FB. Published by ARRL.

[5] *Atlas 210X/215X Owners Handbook.*

[6] *Active Filter Cookbook,* Don Lancaster. Published by H W Sams.

Suppliers

Resistors and capacitors obtainable from Electrovalue Ltd, 28 St Judes Road, Englefield Green, Egham, Surrey TW20 0HB.

Semiconductors obtainable from Technomatic Ltd, 17 Burnley Road, London NW10 1ED.

Amidon toroid cores obtainable from Bonex Ltd, 102 Churchfield Road, Acton, London W3 6DH. □

Technical Topics

by Pat Hawker, G3VA

RECENT COMMENTS in *TT* that the hobby of amateur radio needs to include at least some element of diy and homebuilt equipment, if it is to survive and flourish and continue to provide genuine self-training, have brought in several letters. Most writers agree that ideally it would be fine if newcomers could be persuaded to start off by building their own simple hf transmitter or at least "assemble" a radio station from a number of separate units, put up a simple wire antenna and cut their teeth operating cw on the 1·8, 3·5 and 7MHz bands—rather than starting off with a 144MHz factory-built fm transceiver. Then, later, graduating to even more complex equipment, possibly hf ssb with rotary beam antenna, automatic tuning units etc—equipment of a complexity far beyond anything required to pass the RAE. Domestic appliance users seldom understand (or need to) the equipment they use, whether this be a colour tv set, a vcr machine or a microwave oven. You do not learn to understand radio equipment purely from books and operating via the local vhf repeater!

This is not, in any way, to decry modern factory-built equipment or to suggest that many of us could build equivalent equipment. It is not a question of expecting newcomers to stick to homebuilt equipment, but simply to imply that to understand how a transmitter works in practice needs more than using an on-off switch. However, John Tuke, GM3BST, highlights a real problem when it comes to the homebrewing of complex equipment. He writes: "I think one of the main disadvantages of homebrew equipment is the very low (if any) secondhand value. If one were to construct a transceiver with all the operating conveniences, compact size and facilities to be found on modern Japanese black boxes, the cost would not be all that different from the purchase price of the factory item. But its resale value would be very, very different. If one *did* make such a rig it would mean in most cases being stuck with it for life, as few of us could afford to build another every few years. Commercial gear, on the other hand, does have a secondhand value, and can be traded in like a car.

"I think the 'homebrew' ability today is more sensibly directed to auxiliary equipment, much of which is either highly priced commercially or almost impossible to obtain. For example, I have homebuilt facsimile receiving and transmitting equipment, homebuilt rtty modems together with character recognition circuitry, auto-start, auto-stop etc. It is all home designed and practical to build—but there is no way I could build an FT757 transceiver!

"Just for fun about a year ago I built a 'short-wave receiver' using component parts from the 'thirties; baseboard and panel construction, 1-v-1 (ie rf amplifier, regenerative detector and audio output using three 2V battery valves). It covered 6 to 15MHz and I found that weak signals which were not adjacent to strong ones had a signal-to-noise ratio marginally better than my FT757! Of course it would be foolish to pretend it could cope with today's 14MHz band, but it was fun to play about with 'reaction' once again."

Reliability

As factory equipment becomes more and more complex, there is little chance of home servicing except by those in the profession. There is also an increasing tendency for users to label as "hardware faults" what are in reality operator errors or failures to integrate different pieces of equipment correctly. There is also the problem that few of us have the test equipment necessary to check whether a new rig is really up to spec.

I remain amazed at the degree of reliability that *is* achieved in complex transceivers, but there are still cold solder (dry) joints, mechanical problems with switches, sockets, potentiometers, and inevitably some missing or wrong components, incorrectly positioned components etc, as a result of human or software errors.

An example of the problems that can arise, even with well-designed and carefully-produced equipment from a reputable manufacturer, turned up in a *QST* (January 1985) review of the Icom IC751 hf transceiver claimed, in 1983, as "the most advanced, highest performing hf transceiver for the amateur world today."

Reviewer Paul Pagel, N1FB, reported: "Although the review transceiver worked flawlessly during the review period, obtaining a working IC751 proved to be a real task. The following is a log of the problems we encountered:

"On 11 August 1983 we received IC751 serial number 1114 from Icom on loan for review. During lab testing we discovered that an i.f. section was out of alignment, and returned the unit to Icom on 16 August. Icom sent us IC751 serial No 1227 on 21 November 1983. During lab tests we discovered that this unit suffered from reduced power output as frequency increased. Power dropped from full output on 1·8MHz to zero output on 28MHz after the rig was on for a few minutes. We returned the unit to Icom for repair on 23 November. The problem turned out to be defective final power amplifier transistors. After this repair, the unit operated normally.

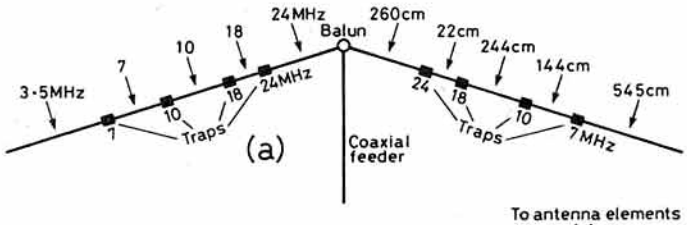
"Meanwhile we purchased an IC751 from an authorized Icom dealer on 27 December 1983. During lab testing we discovered that this unit (serial No 1982) would not go into transmit. We returned the rig to the dealer who found a burnt-up resistor. Serial No 1982 was returned to us 24 January 1984. Again, lab testing revealed a problem. This time the IC751 would not transmit fm properly—the output power dropped rapidly in transmit. We again returned the rig to the dealer, who found a defective 8V regulator. On 5 March 1984 we were able to perform the necessary lab testing and begin the review."

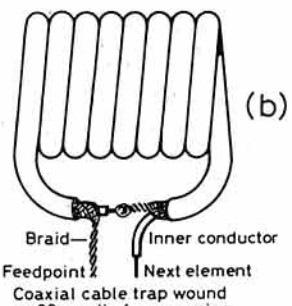
WARC-bands trapped dipole

Although not everyone favours the use of traps, the trapped dipole does have the useful feature that it is possible to achieve a sufficiently low swr on each band to make it unnecessary to use an atu with most transmitters, unless any solidstate protective circuits have a low threshold. But few designs of trapped dipoles cover 3·5, 7, 10, 18 and 24MHz using eight traps constructed from coaxial cable. Such an antenna has been described by Brian J Warman, VK5BI, in *Electronics Australia* June 1985, pp100–1. He has not attempted to cover 14, 21 or 28MHz for which bands he uses a triband beam array. The total span of the dipole is about 25m and could thus fit many gardens, yet providing a resonant antenna for 3·5MHz: Fig 1(a).

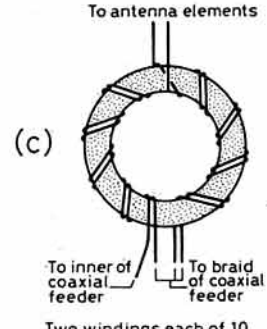
The traps comprise RG-58U cable wound on formers cut from a 1m length of 32mm polypipe; VK5BI suggests checking its rf properties by putting a bit in a microwave oven for 1min: there should be no reaction. Ten metres of RG-58U are used (Fig 1(b)) to the following dimensions:

7MHz trap	1,800mm of cable	110mm of pipe
10MHz trap	1,330mm of cable	90mm of pipe
18MHz trap	830mm of cable	70mm of pipe
24MHz trap	710mm of cable	70mm of pipe





Coaxial cable trap wound on 33mm dia former using RG-58U coaxial cable (see text)



Two windings each of 10 turns, 1mm dia enamelled copper wire

Fig 1. "WARC-bands" trapped dipole by VK5BI covers 3·5, 7, 10, 18 and 24MHz. Element lengths shown on the right, while the corresponding bands are shown on the left. (b) Details of coaxial cable traps. (c) Winding details for optional balun

The pipe is first drilled with three holes: one 5mm hole, 25mm from one end to secure the beginning of the coil; two 2mm holes 10mm from each end to attach the antenna wire. He proceeds as follows:

"Strip 75mm of jacket off each end of the length of coaxial cable followed by 50mm off the centre conductor. I have found the neatest way of finishing off the braid is to part the strands near the jacket and then fish the centre conductor out through this hole. In this way the weaving remains intact and makes for a very neat finish. Push one end of the cable through the 5mm hole at the end of the former until 5mm of the jacket is inside. Wind the cable to form a coil on the former, then mark a hole at the finish to allow 5mm of jacket to be pushed inside to finish the coil. Pull the remaining cable through this hole. You will now have approximately 70mm of cable inside the former at each end.

"Solder the centre conductor from one end of the coil to the braid at the other end. Fig 1(b) shows the general idea, but note that the connection will be inside the former, not on the outside as shown. (The figure has been drawn this way for clarity.) The remaining braid connects to the element coming from the feedpoint (centre) of the antenna, while the remaining inner conductor goes to the next element."

VK5BI used a ferrite-ring balun (Fig 1(c)) between the feeder and the element, primarily to reduce current flowing on the outer conductor of the cable to minimize tvi on vhf tv channels. It would probably have little effect in the UK, but be sure to seal the end of the cable to prevent moisture ingress.

The antenna sections comprise:

24MHz	2 × 260cm
18MHz	2 × 22cm
10MHz	2 × 244cm
7MHz	2 × 144cm
3·5MHz	2 × 545cm

plus in each case allowance for terminating the wire to the trap (about 30mm extra).

VK5BI stresses that trap dimensions are correct only for RG-58U cable, although even in this case it would be advisable to check resonance with a gdo, before drilling the second 5mm hole in the former, by temporarily connecting the inner conductor at one end to the braid at the other end. Resonance points to aim at are: 7·1, 10·1, 18·1 and 24·9MHz. Similarly, it is advisable to gdo-check element lengths as they are assembled progressively from 24MHz.

Loops and dipoles

Few authors ever seem to agree on the theoretical gain, radiation resistance etc of full-wave loop, quad and delta antenna elements. Since, for real antennas, the characteristics will be affected by such questions as height above ground etc, it could be argued that the published variations are of limited practical significance. However, James L Dietrich, WA0RDX, with the support of Walter Maxwell, W2DU, has tackled this problem once more, and has come up with a useful tabulation of four basic loops as a basis for the determination by trial and error of characteristics in a real situation.

Table 1—Summary of loop and dipole characteristics

		Gain over isotropic (dB)	Gain over dipole (dB)	Radiation resistance (Ω)	Rel level at vertical (dB)
λ/2	Dipole	2·15	0	73	0
1λ	Square loop	3·14	0·99	117	−3·01
1λ	Circular loop	3·49	1·34	133	−3·74
1λ	Diamond loop	3·14	0·99	117	−2·70
1λ	Delta loop	2·82	0·67	106	−2·09

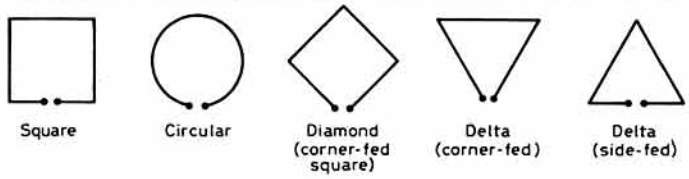


Fig 2. Five full-wave loop shapes. The delta loop is an equilateral triangle, each side one-third of a wavelength (from QST)

In general, it will be noted from Table 1 and Fig 2 that the greater the area enclosed by the loop, the greater the gain. Unfortunately, at least for hf, the large circular loop is the most difficult form to construct. Loops with a perimeter greater than 1λ will show more gain, just as a 3λ/2 dipole has gain over the conventional λ/2 dipole: Fig. 3.

It is worth stressing that the "gain" of an antenna derives from its directivity in the horizontal and vertical planes. An isotropic antenna is an imaginary antenna that radiates equal power in all directions. In practice

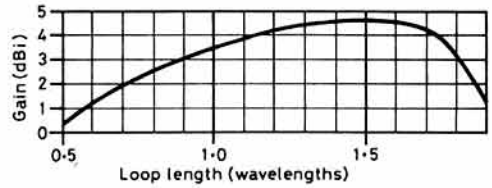


Fig 3. Computer gain versus length of a circular loop in the direction broadside to the loop. In practice, loops less than a full wave in circumference will have increased losses due to low radiation resistance

radiation patterns and "gain", as well as radiation resistance etc, are affected by height and ground conductivity, and also by nearby buildings, structures, trees etc.

The original zepp

An interesting sidelight on the once-popular (and still occasionally used) zepp antenna is shed by a letter from Alois Krischke, DT0TR/OE8AK, in *Ham Radio* November 1985, p8. He points out that the zepp antenna, so-called on account of its use on the German Zeppelin airships, is now more than 75 years old, having been patented by Dr Hans Beggerow in Germany as early as 1908. Its classical form is a full-wave, current-fed antenna with a λ/4 section folded back on itself to form a λ/2 radiator with a quarter-wave matching transformer.

The usual form in the 'thirties was to have the λ/2 radiator as a horizontal element (Fig 4(b)), but it is interesting to note that in the original patent it was shown as a vertical radiator suspended from a balloon, just like an inverted J-pole or Slim-Jim antenna: Fig 4(a). DJ8TR suggests that the design had a particular value for use in balloons and airships: the current-fed matching section was a big improvement over the dangerous practice of using a high-voltage feed in close proximity to the oxyhydrogen gas with which balloons were often filled. The zepp radiator was essentially fed from one end of the radiating section and poses the problem of a "balanced" transformer feeding an unbalanced radiator, though it has to be admitted that the system usually works quite well.

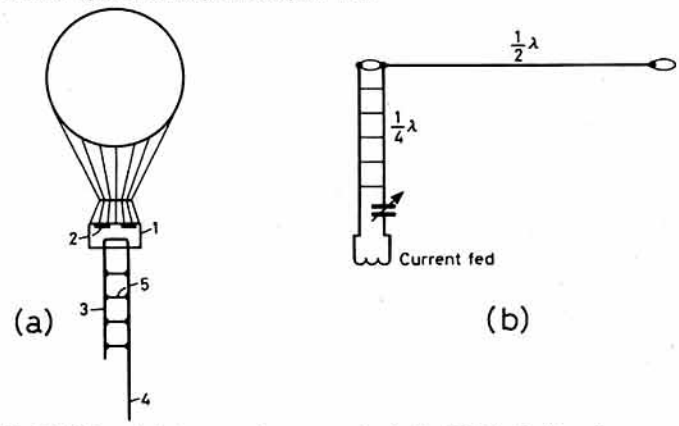


Fig 4. (a) The original zepp antenna as patented in 1909 by Dr Hans Beggerow for suspension from a balloon or airship. (b) Commonly used form of zepp in the 'thirties

Antennas where open-wire tuned feeders are connected to the centre of a dipole antenna were in the past often (and sometimes still are) incorrectly referred to as "centre-fed zepps". They constitute dipole or multi-band doublet antennas and are, as noted frequently in *TT*, highly reliable antennas. In this connection John Tuke, GM3BST writes: "I don't have room for a centre-fed doublet where I live now (I use an HF5 vertical), but in the past I have used large centre-feds, and they all seem to work well. I think dimensions are really quite unimportant unless you are stringing them between 100ft-high masts where one can get true radiation patterns because the antenna is well in the clear. But for the average location, directivity means little because of the low elevation and interference from surrounding objects. If I had room, I would be back with a centre-fed antenna with open-wire feeders—you can't beat them!"

Self-amalgamating and adhesive tapes

Philip Hutchinson, sales specialist (cable & electrical products) of Rotunda Ltd of Holland Street, Denton, Manchester M34 3GH, has shed further light on questions raised in *TT* during 1985 concerning the use of self-amalgamating and adhesive tapes. He writes: "Rotunda Ltd is the only UK manufacturer of self-amalgamating tapes, and the largest UK producer of pvc adhesive tapes.

"I have been reading, with interest, the articles published in *TT* January, March, May and June 1985, in particular applications and problems associated with sealing tape and self-amalgamating products. I would like to answer some of the queries posed.

"The first point is that two of the three self-amalgamating tapes mentioned (CC Marine and RS Components) are one and the same: polyisobutylene (pib) self-amalgamating tape (Rotunda Ref 2501) initially designed for use as a sealing tape in the telecommunications industry. The major user in the UK for this type of application is British Telecom, who have approved it for water and corrosion sealing on moulded plastic sleeves jointing to their Specification No BTRB 071309. In this application the seal is further strengthened by overwrapping the pvc adhesive tape (Rotunda Ref 2702). PIB is also used as an insulation tape and has a voltage breakdown of 40kV/mm.

"As a waterproofing and sealing tape, pib has proved itself in a wide range of environments from the North Sea (tested to 6,000 psi in a saline water tank for water ingress) to the harsh arctic conditions of Canada: Bell-Canada/Ontario Hydro being among the major users.

"In all outdoor sealing applications u-v performance (ie resistance to ultra-violet radiation) is the critical characteristic which governs efficiency. Rotunda 2501 pib is u-v resistant and is expected to perform outside for a very long span of time as a waterproof/corrosion proof seal. For extreme and high voltage applications above 1kV, a layer of outdoor pvc tape (Rotunda Ref 2705) is advised, mainly as an abrasion protection. As far as application of pib is concerned, I completely agree with T A Sear, G4MGD, who outlined the basic requirements for a good seal (*TT* June 1985, p464). The pvc tape again being an added precaution against abrasion.

"In the May 1985 *TT*, Ken Lanyon, GM4GSJ, outlined the use of ptfe tape for sealing joints and terminations. I believe that a pib self-amalgamating tape would give a better seal due to its self-amalgamation which eliminates layers. In a recent study on water 'treeing' in power joints (where water ingress prevention is one of the most important factors) self-amalgamating tape was found to be the best type of tape used because once applied it forms a solid rubber seal without layers. In the same issue, G E Birkhead, E19DZ (G4KOQ), referred to a 3M 27 glass cloth tape, which is not readily available on this side of the Atlantic. Rotunda Ltd makes a similar tape (Ref 3107 glass cloth tape) which is available from our stockists.

"As well as the two previously mentioned companies, Rotunda products are available from our regional stockists. These include: Nu-Pax of Wythenshawe; Intech Tapes of Burgess Hill; Pebody & Muston of Leicester; Graham Tennant of Darlington; and Tayforth Storage Systems of Glenrothes. Apart from self-amalgamating tapes, Rotunda make polyethylene adhesive tapes, waterproof cloth adhesive tapes, cloth adhesive tapes, electrical jointing tapes, pvc electrical insulating tapes, pvc industrial adhesive tapes, double-sided adhesive tapes etc."

Elements of non-uniform cross-section

Some 50 years ago mf broadcast antennas moved away from T designs supported by two high masts and tended to become mast-radiator designs. Some of the more ambitious stations used masts that tended to start thin,

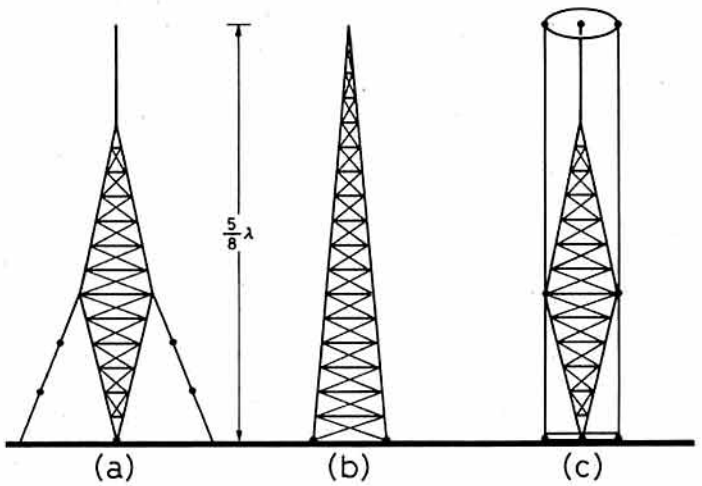


Fig 5. (a) Form of broadcast antenna tower promoted by Blaw Knox in the early 'thirties and used in a number of American stations until the problems were realized. (b) Another form of tower with non-uniform cross-section occasionally used in early 'thirties. (c) How wires were suspended at WCAU to restore proper current distribution

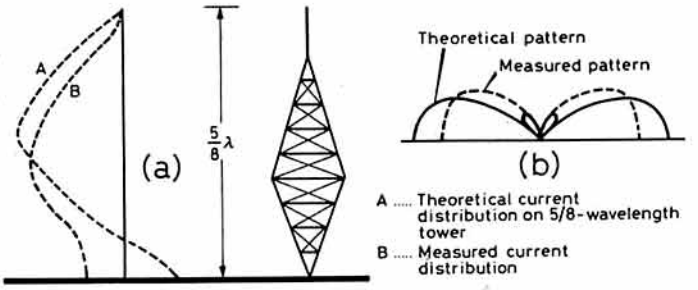


Fig 6. (a) Showing the non-sinusoidal current distribution that was found to occur with towers of non-uniform cross-section. (b) Field strength measurements made on WABC from aircraft that showed how vertical radiation pattern differed from theory

become wider at the centre and then taper off in the top section: rather like a squeezed diamond, though usually termed a "vertical guyed-cantilever antenna": Fig 5 (a). Alternatively tapered self-supporting towers were used.

It was left to the redoubtable Dr George Brown and Herman Gihring of RCA to show that the vertical radiation pattern of a typical 5λ/8 antenna of this type, a 500ft high installation at WCAU in Philadelphia, differed significantly from that of a 5λ/8 mast-radiator of uniform cross-section, with the result that its coverage area was well below expectations. In the course of this work the RCA engineers built an hf model antenna 7ft 10in high (1:64 scale) as a result of which the WCAU antenna was successfully modified (Fig 5 (c)). Since the results of the investigation were published in April 1935, mf tower antennas have been either structural steel towers of uniform cross-section or guyed flagpoles. The story is told in George Brown's very entertaining and outspoken autobiography *and part of which I was—recollections of a research engineer.*

I was reminded of this work by finding a detailed reference to it in the monthly "Techniques" column by Bill Orr, W6SAI, *Ham Radio* November 1985. He points out that the RCA work proved that the current distribution along a non-uniform cross-section element is non-sinusoidal, and that the theory governing the design of elements of constant cross-section does not apply. (W6SAI notes that the unexpected characteristics of a tapered element, although discovered from an hf model, escaped the notice of radio amateurs for many years.) This does not imply that an hf or vhf horizontal antenna element should never be tapered, but it does mean that you cannot use the conventional formulas for physical length etc, or assume that the vertical radiation pattern of a monopole will be exactly the same as for a uniform thin mast radiator.

W6SAI states that, for resonance, a tapered element, surprisingly, tends to be *longer* than for uniform cross-section. It was left to the late Jim Lawson, W2PV, to come up with computer programs that can be used to calculate the resonant lengths of tapered elements, but this can be done by trial-and-error provided that you recognize beforehand that its trimmed length may be longer than that given by the usual formulas.

In his refreshingly blunt manner, George Brown has written of this incident: "The vertical guyed-cantilever antenna promoted by Blaw-Knox was no doubt a mechanical marvel, but it was an outstanding example of the arrogance of ignorance. Apparently no consideration was given to the electrical performance of the structure before inflicting it upon a number of broadcasting stations who accepted the design in good faith . . . we all expended thousands of hours of engineering time to achieve a result which now comes routinely by using towers of uniform cross-section."

On the other hand, it provided an outstanding example of the value of using small model antennas at a correspondingly higher frequency, a technique that had been suggested by Professor Tykociner of the University of Illinois in 1925.

Antennas for long, long waves

Around the turn of the century, when radio communication was in its infancy, Marconi and his associates moved away from the ultra short wavelengths used for the earliest experiments by Heinrich Hertz, Lodge, Marconi and Chandra Bose to the lf and vlf spectrum with wavelengths of several thousand metres. Soon the "short waves" of 200m and down were declared useless and, in the USA, given to the newly-licensed "amateurs" in 1912.

To radiate signals on vlf/lf it was soon found that the more wire you could put up in the air the more power you could radiate. Antennas similar to those in Figs 7 and 8 were used. Even so the antennas were short in terms of wavelength. In the late 'twenties the most powerful transmitter in the world was Rugby Radio, GBR, on 16kHz (wavelength 18,750m) which could be relied upon to reach all parts of the globe due to the propagation of the signals via the earth-ionosphere waveguide. Such signals even

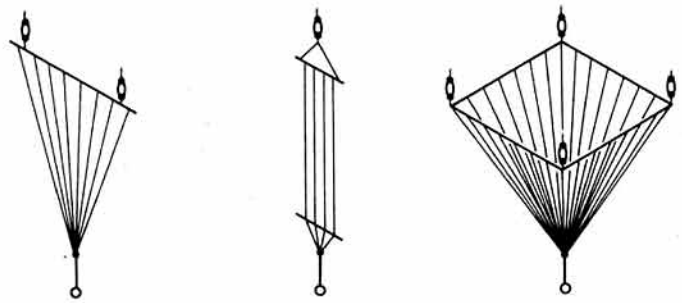


Fig 7. Fan, grid and square cone antennas popular at the turn of the century for long-wave transmissions

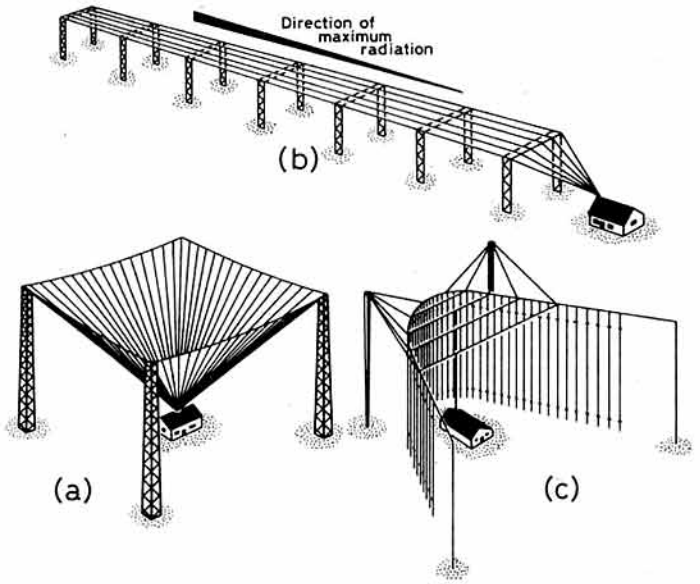


Fig 8. (a) The Poldhu antenna of 1901. (b) Inverted-L antenna of 1905. (c) Early hf directional antenna with parabolic reflector at Poldhu, 1923

penetrated some distance below the surface of the sea, permitting vlf to be used to broadcast messages to submarines.

However, vlf signals have a limited penetration in salt water, and for the past 20 years or so there has been work going on to exploit the elf spectrum below 3,000 hertz, including, for example, Project Sanguine (*TT* July, 1974) using frequencies as low as 45Hz. To radiate electromagnetic waves at such frequencies you need to send enormous power along many miles of wire—and then you are lucky to radiate, say, 1W! But the attenuation is so low (down to about 1·5dB per 1000km) that such signals can be picked up (even well below the sea's surface) on quite compact loop antennas. The snag is that you can send data only at about 1bit/s or less.

Ivan James, G5IJ, recently drew my attention to some fascinating work in northern Norway to use the hf "ionospheric heating" transmitter at Ramfjord to "modulate" the enormous natural currents in the polar electrojet. This then forms an extremely long antenna radiating up to about 1W in the frequency range 1 to 1·5kHz for hf effective radiated powers of

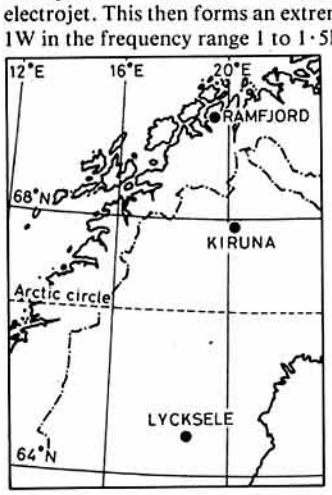


Fig 9. Map of Northern Scandinavia showing the location of the hf ionospheric heating transmitter at Ramfjord and the elf receiving sites at Kiruna and Lycksele

270MW (*Nature* 12 September 1985, p114 and pp155-6). This may not seem a highly efficient system but it avoids the problems of having to erect antennas up to a hundred miles or so long! The prime purpose of hf ionospheric heaters is to produce field-aligned scatter of vhf signals based on the non-linearity of the ionosphere producing cross-modulation (first observed in the 'thirties as the "Luxembourg effect"). Ionospheric heaters provide a practical way of extending the range of vhf transmissions. During the tests the hf transmitter was modulated at 1 and 1·5kHz and the ionospheric "mixing" resulted in elf signals being received at Kiruna and Lycksele: Fig 9.

Those PoW receivers

For sheer grit and "ham-ingenuity" it would be difficult to equal the efforts of those who built and operated their own equipment under the dangerous conditions of enemy occupation; in several countries all radio receivers were supposed to be handed in, and it was a serious offence to be found in possession of a broadcast receiver let alone communications equipment. But perhaps an even more difficult problem arose for those pre-war amateurs who became prisoners-of-war and found themselves involved in secret efforts to listen to the BBC news bulletins in huts that were regularly subjected to meticulous searches and sometimes having to "acquire" components by bribery, blackmail or theft where they could not be built from junk.

Amateurs who successfully built camp receivers include Herb Dixon, ZL2BO, in Hong Kong, Tom Douglas G3BA, in South-east Asia and, in Germany, "Shack" (Ernest Shackleton, G6SN) who in the 'thirties had been a regular contributor of "workshop notes" to the RSGB's *T&R Bulletin*, and had similarly contributed the workshop chapter for the RSGB's *Amateur Radio Handbook*.

Tom Douglas, talked about his experiences in Burma in the 1979 "Open Door" television programme and, since then, to a number of local societies.

Herb Dixon was a lieutenant in the RNZNVR who was taken prisoner in Hong Kong at the end of 1941. He played a leading role in the construction and operation of no less than three hf receivers that picked up bulletins from the UK for many months until September 1943. In one camp a derelict Austin 7 provided wire, nuts and bolts, and the rim of the horn formed part of a vernier tuning dial; headphones were constructed; flux obtained from pine-gum; solder scrounged from tag boards of defunct power equipment; fellow prisoners contributed more than 300 precious torch batteries. Valves were located in and smuggled out of a prison operating theatre when an unwitting PoW complained of a pain, lost a perfectly sound appendix but brought out three valves in his bandages. In one camp the receiver was hidden in a watertight container in a lavatory cistern; at the North Point camp a hole was dug under a hut under cover provided by the Canadian Brass Band. But on 21 September 1943, after a four-hour search, a receiver was discovered. Herb Dixon was one of nine officers interrogated and sentenced to long terms of imprisonment under extremely harsh conditions; he served two years before the war ended.

Captain Ernest Shackleton, was, in peacetime, a professional radio engineer with GEC. He was taken prisoner early in the war while serving with the Royal Signals; this was at St Valery-in-Caux in 1940. He then spent three months in hospital at Rouen recovering from wounds before ending up at Rotenburg-am-Fulda (Oflag 9A/Z). His story, published in the *Ilkley Gazette* in 1945, provides a vivid glimpse of what "ham ingenuity", when combined with professional skills, can do.

At a camp at Warburg the Germans permitted the prisoners to buy a "talkie" film projector, but insisted on having a sentry present with the equipment. This projector was later taken to Oflag 9 and impounded for several months. Then a film arrived, but the exciter lamp for the sound track was found to be broken and the Germans (fortunately) lost interest in the projector.

"We were able to remove a valve and a few capacitors etc. Variable capacitors were made from scrap; the spindles from clinical thermometer cases, the plates from Rowntree's cocoa tins rolled out flat on a table with a beer bottle. Two toothbrush handles provided insulation. Valve holders were made from a Bakelite ash tray laboriously cut and drilled with a penknife, with the contacts made from more cocoa tins, which were just the right size. Coil formers were toilet roll tubes impregnated with candle wax. Plug-in coils covered the broadcast bands needed to cover the varying seasonal propagation conditions.

"At first the set was fitted under floorboards and operated by two knitting needles that engaged with the capacitor extensions. Mains lead, telephone leads, antenna wires went via cracks between boards. The set could be closed down immediately and everything quickly made to look entirely innocent should any of the guards approach the hut.

"A warning system was devised by having a small group of prisoners apparently engaged in conversation some way from the hut. If a guard was

spotted, one of the group simply sauntered away. This was observed by a look-out stationed just outside the room with the radio. He then opened the door and walked inside. Opening the door was the signal to close down the radio immediately.

"Following intensive searches, the set was moved to the canteen, where a similar system of 'stooging' was operated. Here the set was built into the wall behind a false side of a cupboard, but in an extended search about half the set was lost, only to be replaced in about 10 days, and the nightly 'secret listening service' resumed."

This set remained in operation until the final liberation of the camp in late March 1945. It was eventually recovered and later presented to the Imperial War Museum, though it is now some years since it was on display there.

There have been suggestions that one or more secret transmitters were built and operated in the PoW camps, but I have never seen any evidence of this and certainly do not recall any w/t links (a secret "letter code" *was* used). In 1945 "Shack" gave the following account of *preparations* to have a transmitter ready for use, and it is just possible that he was then reluctant to admit that one had actually been built. Those who knew him believe this may have been the case, but his 1945 story was as follows:

"In the summer of 1944 it was realized that there were possibilities of the camp being over-run in the near future, and some means of communication with the advancing Allied forces seemed desirable. The remaining cinema talkie gear was carefully examined and parts ear-marked for a future transmitter should such be found necessary. However, as the German guard and camp officers lived in the same building, and it was not known whether or not a short-wave receiver existed there, it was decided that any transmission by the prisoners would be highly dangerous. Plans were ready for the construction of a transmitter and this could have been built and working within 48 hours of orders from the British camp authorities. Unfortunately the Arnhem landings were not so successful as had been hoped, and before the Allied forces neared the camp the British officers had been marched some 150 miles east. Consequently no transmitter was ever built or existed in that camp."

Acknowledgements to Neil Glover, G3AAV, one-time Royal Signals and SAS, for reminding me of the radio equipment improvised by G6SN, and also to Diana Condell of the Imperial War Museum for providing extracts from the *Ilkley Gazette* of October 1945 and for pointing out that while "escape" activities by PoWs were legitimate under the Geneva Convention, prisoners caught in direct communication with the "enemy" would have been liable to be shot as "spies". She shares my doubts that any w/t links were established from the camps.

Many miniature receivers were made in the occupied countries. I recall being shown a very compact mains-operated hf receiver with an "acorn" type valve, built into a small tobacco tin and capable of good reception of 6 and 7MHz broadcast transmissions. Built by a member of the Dutch underground, it survived a careful search of passengers on a train, during which the resourceful Dutchman took the tin out of his pocket and pretended to be refilling his pipe.

Monolithic vhf crystal filters

Many years ago in *TT* and *Amateur Radio Techniques* I drew attention to the development of miniature hf and vhf bandpass monolithic crystal filters by American firms such as Collins, Bell Telephone Laboratories, Piezo Technology etc. Such filters have tended to be used primarily as "roofing filters" in commercial mobile-radio receivers etc.

An article in the Japanese industrial journal *JEE* (October 1985) by Yoshiaki Ogawa and Toshiki Suganuma of Nihon Dempa Kogyo, "MCFs move toward low price, miniaturization, and indispensable for hf communication" translated into rather quaint English text, claims that the mcf (Fig 10) has now been found to be suitable for mass production, and discusses in some detail i.f. filters centred on 58·1125MHz (a recently-adopted standard i.f. for Japanese mobile communications equipment) and also 45MHz, with characteristics that would appear to make them suitable for roofing filters in both hf and vhf communication receivers.

The 58MHz filter is an overtone filter with an ultimate rejection of more than 80dB, pass bandwidth of ±8·5kHz or less at −3dB, ±25kHz or less at −25dB, 4dB or less insertion loss, 2dB or less ripple, 3,000Ω terminal impedance, and mounted in an HC-45/U holder. The 45MHz filter is suitable for nbfm receivers with a −3dB passband of more than ±3dB passband of more than ±16kHz. These monolithic filters are thus roughly the size of a modern single crystal.

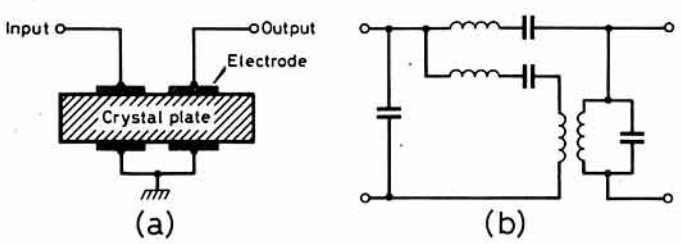


Fig 10. Monolithic crystal filter: (a) structure, and (b) equivalent circuit

Spanning a fixed path

There is a major difference between operating hf radio as an amateur and as a professional. Most amateurs, most of the time, tend to seek casual contacts either over convenient strong-signal paths or as weak-signal long-distance paths. Professionals, on the other hand, are often more concerned at being able to communicate over a specific path over as much of the time as possible, and consequently to be able to predict accurately the optimum frequency to use at any given time to pass traffic to specific destinations. Despite the fact that in "developed countries" most medium-distance traffic now goes either via broadband microwave radio-relay systems and most long-distance traffic via satellite, "hf circuits" are still important (on grounds of economy) in many developing countries and also, increasingly again, for "Defence" communications.

It is, in fact, an interesting exercise for amateurs, particularly those interested in scheduling contacts with friends, to check out how reliably they can make contact with a given single-hop location (ie less than about 4,000km) at any time of the day or night: parts of the USSR, Germany etc are easy for anyone equipped for 1·8 to 21MHz. Locations within night-time skip zones are less easy.

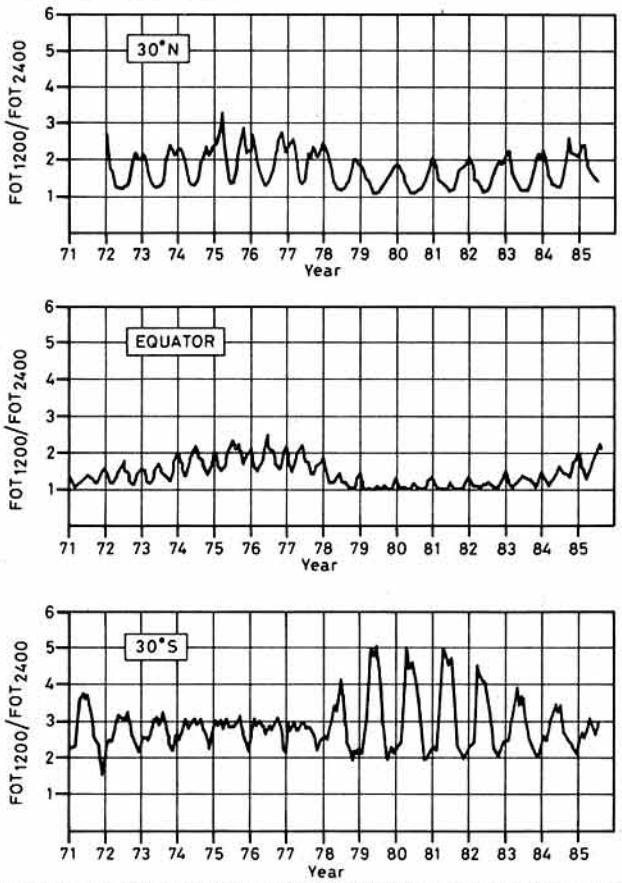


Fig 11. Variations of the FOT at 1200 and 2400 in three geographical areas for propagation over a 1,200km path (single hop)

I note that B A Austin, ZS6BKW, has been studying, primarily from a professional viewpoint, this problem: "Ionospheric and geographical effects on the choice of tactical and point-to-point hf antenna systems" (*Electronics Letters*, 7 November 1985, Vol 21, No 23, pp1107-8). He shows that the span between maximum and minimum frequencies needed to work over given single-hop distances is dependent on both the ionospheric conditions and on the geographical location of the terminals. In effect he notes that pairs of stations in northern latitudes and equatorial zones can maintain contact at any time of the day or night using antennas having less system bandwidth than those in the southern hemisphere.

He has analysed the FO1200/FO2400 hours local time for three geographical areas: 30°N, 30°S and the Equator, for longitudes 0° to 50°E

and for a 14-year period from 1971 to July 1985 covering more than a sunspot cycle, including the December 1979 maximum and June 1976 minimum, based on predicted SSN numbers of the South African National Institute for Telecommunications. Fig 11 shows the variations of FO1200/2400 in three geographical areas for a 1,200km (745 miles) path. Whereas for equatorial 1,200km circuits an antenna system with a 2:1 frequency range would suffice, post-1979 operation at around 30°S necessitates in winter a near 5:1 span of frequencies. The 30°N variation does not exceed about 3:1. Unfortunately he does not appear to have analysed the situation at, say, 55°N where I suspect the span would need to be significantly more than 3:1. Again, his analysis is based on predictions rather than actual measurements. It would still seem to be open to others to investigate this problem in the light of actual experience—although it is easier to cover 24h continuously on a computer simulation than actually on-air!

Dump the decibel?

It always seemed to me a curious decision by the UK licensing authorities to change from "watts" to "dBW" in the amateur licence at a time when there was no mention of decibels in the RAE syllabus! In my opinion, plain, old-fashioned "dc input" or, as a second choice, "rf output" in *watts* was perfectly satisfactory. I suppose, like the camel, it was a decision made by a committee!

C W McCutchen, writing in the "Technically speaking" column of the *IEEE Spectrum* (September 1985, p17) seems to feel far more strongly than I do about the decibel, and not only in this specific connection. He writes:

"The decibel is an obsolete nuisance. When the only non-integral powers of numbers easily available were those of *e* or 10, the decibel was useful for working out the attenuation of cables. It was then convenient to describe the amplifier gain in decibels, *N*dB gain in the amplifier compensating for *N*dB loss in the cable. But there were costs that we are still paying. The decibel is not the physical quantity that does things. What the designer and the wise user most need to know is potential.

"The only remaining accomplishment of the decibel is mystification. In acoustics this is a resounding success. Layman talk about decibels and are misled. How many know that a 130dB sound has 100 times the pressures and 10,000 times the energy of a 90dB sound? And how many engineers truly understand these magnitudes?

"Let us forswear the mumbo jumbo. Let us say what we mean, be it volts, watts, dynes/cm^2, or watts/cm^2."

I can think of few better ways of confusing newcomers to amateur radio than to regulate power in terms of dBW actually reaching the antenna elements, but perhaps that was the intention. I can think of no other valid reason!

Admittedly, the logarithmic base of the decibel makes it convenient and meaningful for antenna gain (though it is easy to confuse dBd with dBi) but one could still use a log scale of $\times 1$, $\times 10$, $\times 100$, $\times 1000$ etc without bringing in the decibel. Personally I would not wish to see the decibel vanish, except in the regulation of amateur transmitter powers!

Low-cost "mechanical" audio filter

An ingenious low-cost form of audio filter to improve cw reception published in the Australian *Radio Experimenter* has been brought to my attention by Dave Bevan, G4DMR, on his return from a trip down-under.

In effect, in place of the usual metal diaphragm of an old-style headphone, new diaphragms are fashioned, with tin snips, from a piece of (non-ferrous) aluminium (say 1/32in thick) in which a small rectangular slot is then cut in the centre. A metal (ferrous) reed of the type used in musical instruments such as the accordion or harmonica, is then riveted (or fastened with a very small nut and bolt) at one end of the slot in such a way that it extends into the central opening for the same vibrating distance that it would in a musical instrument.

A headphone modified in this way will respond to signals at the resonant frequency of the reed (eg 440Hz (A) or what you consider a suitable beat note). Note that modern stereo-type and low-impedance headphones are not suitable. Headphones modified in this way will be highly insensitive to frequencies other than the resonant frequency of the reed; the writer puts it that the silence is uncanny.

I must admit that while I can see that this idea might work very well on low-speed morse, I cannot help wondering whether the decay time of a vibrating reed would not cause unacceptable "lag" at higher morse speeds. This point is not covered in the *Radio Experimenter* article, and it would be interesting to have some feedback from anyone tempted to give the idea a whirl. Since, if it does not work satisfactorily, the original diaphragms can be replaced no damage would be done. A friendly music shop might even be prepared to supply a spare reed at virtually no cost.

Tips and topics

Francis Rose, G2DRT, found it difficult to find a source for a Varian/Eimac SK1920 thermal heat link from the 8873 valve in his Heathkit SB230 linear to chassis until he located a UK manufacturer of beryllium oxide ceramics: Consolidated Beryllium Ltd, PO Box 5, Marble Hill Road, Milford Haven, Dyfed SA73 2PP; (tel (06462) 7681).

OBITUARIES

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

Mr J C Cornwell, G4NHV
Mr Cornwell, who died recently, had a long and active career in radio and communications. He derived much joy and contentment from the hobby and in the fraternity of the air waves.

Mr A L Daines, G2TN
Alf Daines, who died on 25 September, was well known on topband and 144MHz. He was well liked by all who knew him and was always ready to help those in need. In the war years he was an observer in the Radio Security Service.

Mr T Ford, G3HCK
Tom Ford, who died recently, had been a member of the Southdown ARS since its foundation.

Mr A Harris
Albert Harris died on 8 October aged 70. He had been a club member of the Leighton Linslade RC since the early days and was a founder member of BATC. He was awarded honorary life membership of the club in recognition of his work in the field of amateur radio, although he never held a transmitting licence. Albert was a keen experimenter and during the war held special duties relating to the evaluation of enemy radio installations.

Mr B Holt, GW3NWV
Bob Holt died on 2 October aged 75. He was well known by the USA County Hunters Club and held the unique achievement of working all the 3,095 USA countries twice—the only European to do so. He was also well known on the YLISSB system and gave many people their first GW contact. He was a keen member of the Holyhead RC, and was an efficient and polite operator.

Mr G Jarret, GW3PEA
Glyn Jarret, died in early September. A member of the Blackwood ARS, he was active on most bands and as much at home on the key as he was on phone. He was an active supporter of WACRAL and regularly acted as controller of the 3·5MHz Sunday morning net. He was looking forward to spending much more time on the air, having recently retired.

Mr H Maycock, G5SK
Henry Maycock died on 2 October aged 80. He was first licensed in the late 'twenties and his main interest was cw. He was one of the earliest members of FOC.

Mr R Paul, GW6CGR
Ray died on 20 November. He was deeply involved in amateur radio and as well as being the treasurer of the Porthmadog & DARS, he was a GB2RS news reader. A waterboard engineer by profession, Ray was often to be heard on the local repeaters as well as 144MHz ssb and rtty every evening.

Mr L Sisson, G3EBR/V2AZE
Les Sisson died on 31 October aged 64. He served in the RAF and later became an engineer with the BBC, who seconded him to the Caribbean Relay Company for three years before his retirement. He had been chairman of the Eden Valley RS and ran local RAE classes.

Mr A Tinker, G1EMS
Tony Tinker died late in October. Although a white stick operator, he was an active member of the Grimsby ARS. While only recently licensed, he was well known on the 144MHz band and will be sadly missed for his lively conversation and cheerful manner.

Mr R V E Walshe, GI4RY ex G2IT
Bert Walshe died in December 1984 and was reckoned to be one of the world's oldest and longest established radio amateurs. Bert achieved WAC in 1926 and one of his most cherished awards was "200 cities in Japan". He was active in construction throughout his amateur career and fondly remembered by his many friends in GI and throughout the world.

Also:
Mr C Caswell, G6PPV, on 13 October.
Mr S W Edwards, G8TMI, On 11 September
Mr C Davis, G4UCA, on 21 October
Mr R Leathem, RS50943, on 15 September
Mr J J Lockyer, G3OVA, on 18 September
Mr A Wolfe, RS38659, in July

RAE and morse courses 1986

(See also *Rad Com* September 1985 p685 and October 1985 p767)

Birmingham. Selly Park Adult Centre, Pershore Road, Birmingham 30. Second term morse tuition, Wednesdays, 7.15–9pm. Commences early January. Information Roy E Williams, G4IUX, tel 021-475 8403.

Huddersfield. Almondbury High School, Fernside Avenue, Almondbury, Huddersfield. Morse tuition commencing 7 January, 7–9pm. Enrolment at first class. Details from course tutor, tel Huddersfield 643870 or Adult Education, tel 38454.

Huddersfield. Greenhead College, Huddersfield. RAE and morse courses commencing 6 January. Both courses are based on 30 weeks tuition culminating in either the C&G examination or the BT test. Further details, Kirklees Adult Education office, tel Huddersfield 538454.

NEWS & VIEWS

VHF/UHF

*Ken Willis, G8VR**

ANOTHER YEAR BEGINS, and they seem to pass more quickly than ever. It seems only yesterday that columnists were warning of the possible dire consequences of having reached 1984, and here we are in 1986! I wish all readers a really good year ahead.

Let's hope also that some fresh ground is broken and new records set up on the vhf/uhf bands before 1986 runs its course.

Readers may recall that some time ago suggestions were invited for a new title to take account of the fact that 50MHz was looming large in our expectations. Numerous titles, serious and otherwise, were received, but in the event the Editorial Board decided to re-vamp the titles and layout of all the regular "columns", one result of which is the new title, *VHF/UHF*, which appears to cover our requirements adequately. Unfortunately no increase in space can be made available in the present economic climate, so sometimes it will be necessary to omit or curtail information sent in by readers. Please do not let this deter you from writing or phoning, since even if your information is not printed at once, it adds to the general picture, and often will prove valuable later in the context of some new event.

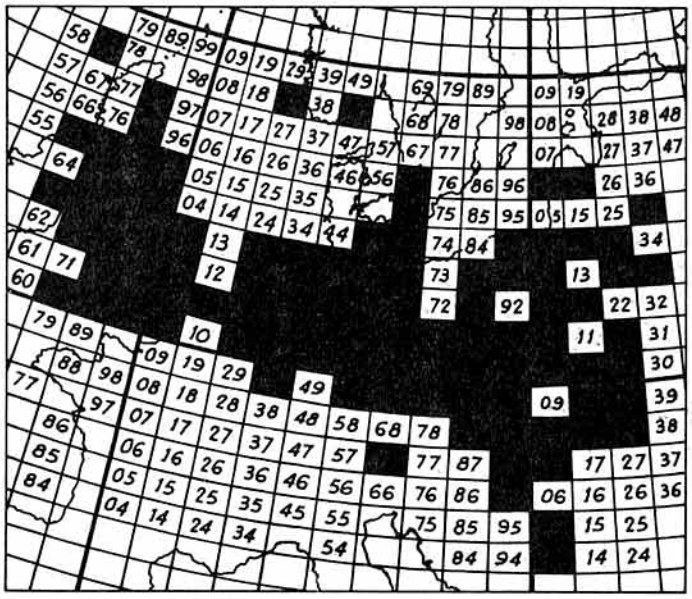
Sporadic-E

As I write this, snow and sleet are clouding the windows, so last summer seems but a dim memory. However, Ray Cracknell, G2AHU, sent me a listing of the sporadic-E events experienced this year by SV1DH in Athens. There were 23 days of sporadic-E which produced openings on 144MHz, the total duration of the propagation being 808mins. You can have a lot of contacts in a time as long as that! There were also two days when field aligned irregularity (fai) propagation was present (I know I have promised when space permits to discuss this!) and this lasted 23mins in total. It appears that down on the Mediterranean they do rather better than we do for Es, and this is often borne out by listening on the vhf net during the summer when YUs, HGs and the like can often be heard adjourning to 144MHz for openings which produce nothing in the UK.

To summarize SV1DH's report, his first reception of tv via Es was on Channel R1 on 28 April, with first fm broadcast by this mode on 1 May. He does not say if this was from the UK or elsewhere. Es openings on 144MHz occurred on 2,5,6,9,17,24,26 and 27 June, and on 2,6,13,25 and 31 July. The last fm broadcast was on 22 August, with the last tv reception on 30 August. Countries involved in the Es were F, I, D, HB, YU, ON, G, LX, OE, PA, EA, UG6, UA3, UA4, UB5, UY5, UT5, SM, OK, SP, HG, Y, IT9 and IS0. There was fai between SV1DH and DL5MCG on 27 June and 2 July around 1740–1850gmt. It was on 5 June that many UK stations worked into SV for the first time; the event in Athens started at 1058 and ended at 1336 that day, and the countries worked included F, DL, HB, LX, OE, GN and PA, as well as G.

Tropo

The sustained tropo opening in late October was indeed a big one, as reports which continue to come in confirm. A welcome letter from Bo, SM7FJE (JO66OI/GQ56b), says that due to his workload he (and by implication his father, the well-known SM7AED) could spend only a limited time on 144MHz from their station during the event, but in total achieved 1,016 contacts with 23 countries (and 28 countries heard) in the three days 24–26 October. Seventy separate squares were worked on 26 October alone; among the countries contacted were G, GD, GI, GM, GW, EI, D, LA, ON, OK, PA, SP, Y, UB, UC, HG, OE, UA2, UP, UQ and YU. The illustration shows the massive spread of the event as seen from Sweden, propagation apparently being very much towards the south and southwest.



Squares worked (98 in all) by SM7FJE/SM7AEI) during the October tropo opening

The University of Aston ARS chose this time to become operational after some years of limited activity. Using an FT290R with a Mutek front-end, and a MM 100W linear, plus the choice of either a Jaybeam 144MHz colinear or a 16-element Tonna, they first got on the air on 24 October during the afternoon and evening. The first contact was with OZ1EYE (59 both ways) followed by several more OZ stations and LA6VBA. Later SM7FJE was contacted, which opened the gates to a steady flow of Swedish contacts. When they made a QSY to 144·800MHz to call a local station, SM6OUH replied at S9 despite the fact that he was using only 8W. So many fm-only stations miss out on dx contacts by assuming that only ssb and cw can work long distances. There is almost always someone, somewhere listening on the fm simplex channels during such events. The prize for Aston, however, was a contact with OH0AZY (JP90XC) with 57 reports both ways. Dave Grainger, G4UQM, reporting on behalf of the University ARS, said that they are located on top of the main university building, some 130ft above ground, and have at their disposal two 80ft towers 273ft apart which should be good for both vhf and hf operation.

At second hand I have heard that G4SXU (Harrogate) worked *two* EA9s in North Africa in this event—that's really dx!

Locators again

I had hoped that this topic could be closed as far as this feature is concerned, but late correspondence, some of it from overseas, prompts me to raise the matter again, since I have been taken to task by some correspondents for my apparent dislike of Maidenhead. It is true that I find the new system somewhat ponderous for my particular needs. It is also true that on the bands one hears a mixture of both old and new systems, so on occasions as a matter of courtesy one must use one or the other forms according to the needs of the remote station.

Bernard Zweifel, HB9RO, Swiss vhf manager, says first of all that there is no such thing as "Maidenhead". The correct title, approved by IARU at the Cefalu conference is simply "Locator", or, on cw, "LOC". In his letter which outlines some of the background to the development and adoption of "Locator", he disputes the fact that the system was not given a proper airing before it was adopted, and says it was first raised at the Maidenhead (England) meeting in 1980, was discussed but not introduced at the Brighton conference in 1981 so that operators could first get used to the idea, but finally accepted at the Cefalu conference in 1985. He deplores the present controversy and remarks "If some wish to revert, or bring in a new system, have your association bring your proposals to the next preparatory meeting in Vienna in 1986, or to the IARU Region 1 conference in 1987.

Gordon Pheasant, G4BPY, much prefers "Locator", and points out that the "anti-lobby shows scant concern for the interests of amateurs in JA, W, PY, LU, VK, ZS etc", and that it is "incredibly selfish to suggest that we go back to the old system". Gordon said that the matter was discussed at the Midlands VHF Convention in the VHF Forum, and on a show of hands "the majority (though not overwhelmingly) were in favour of giving Maidenhead a fair trial".

John Danks, G5DS (Surrey), says he never cared much for the "old" system since to him it appeared illogical and difficult to expand. He finds

*6 Lerryn Gardens, Broadstairs, Kent CT10 3BH.

Locator very useful on the hf bands, where he is now operating packet radio since he can rapidly calculate distance and bearings to any part of the globe, while many packet radio operators overseas are now including the locator in their transmissions. John likens the anti-lobby to those who would like to see a man carrying a red flag walking ahead of a railway train or car as in days of yore!

Chris Bartram, G4DGU (Devon), is in "profound disagreement with the position I am taking on locator systems", and he promises to write about this shortly.

As I said in November *4-2-70*, you should write to your vhf manager or to the VHF Committee if you have valid points to raise, for it is not for me to take sides in this issue.

70MHz

More information has come to hand regarding the special event station GB4MTR on 70MHz which will be operated by a different fixed station each month for 12 months to encourage more activity on the band. The following stations will start the ball rolling for the first four months of 1986: G4VOZ (Leics) 1 to 18 January, G4ENA (Glos) 29 January to 25 February, GW4HBK (Gwent) 26 February to 25 March, and G4ENB (Beds) 26 March to 22 April. Volunteers are required for active 70MHz operators, especially from the north of England, GU, GJ, GD and GI. Those interested should contact G4WND or G4SEU, both QTHR.

Jack Hum, G5UM, the vhf awards manager, who is himself a keen 70MHz operator, thinks that activity on the band is increasing, and as evidence of this quotes the recent award of 70MHz Standard awards to G4YUZ (Herts) and G5DQA (Kent). G5DQA is likely to be G0DQA very soon, according to Jack. On one of the cards submitted, G5UM noted that to get a contact on 70MHz, one station had used a 3·5MHz dipole!

Here at G8VR an aged all-valve transverter affectionately known as "Nostalgia Four" can easily be adapted to 50MHz, while a QQVO6-40 amplifier, also homebrew, will tune to both 70 and 50MHz, which may cause the purists to flinch where the LC ratios are concerned, but it makes for a very convenient system and avoids tying up too much shelf space in the shack.

Recent awards

In October, mention was made of the fact that Geoff Brown, GJ4ICD, had sent out more than 55,000 QSL cards over the years. This mammoth task has had its reward in the many awards received by Geoff, but his most recent deserves mention. He is the first to be awarded the 100 squares/20 countries certificate on 432MHz, and it took six years to accumulate the cards required to claim it.

Do you feel depressed because you have a poor location, and feel that you cannot compete with the "big guns" on your favourite band? If so, the achievement of G4DHF (Bourne, Lincs) may encourage you. Dave is a well-known 144MHz dx operator who has just claimed the 200 squares—30 countries award on that band (No 5 issued). His location is in the centre of town at zero feet above sea-level. All equipment at G4DHF apart from the IC730 "prime-mover" is home-built, including 4×9-element Yagis, a GaAsfet preamplifier and a linear amplifier comprising a pair of 4CX250 valves. Take-off is far more important than height, though if you have both you should rank pretty high up the lists of squares and countries worked. On this same general topic, a QSL card from UC2AA was received by another Dave, G6NBY (Burton on Trent), who worked him in the summer during a sporadic-E opening while using a mere 2W into a nine-element Tonna. Dave's location is 130ft asl (he doesn't say if the take-off is good) and he works on the principle that if you can hear them and get in before the pile-up, you can work them. One thing about Es of course is that it is more like hf band propagation when it occurs, so locations are less important, as evidenced by the many dx contacts made during such events by mobile stations in downtown areas, often eclipsing some of the bigger stations with ambitious antenna systems.

VHF/UHF activity in the USSR

Not so many years ago, vhf activity in Russia would for us have been of purely academic interest, but with modern equipment and the high level of band occupancy, contacts with Russia and Eastern-bloc countries are relatively commonplace, even occasionally on tropo as well as aurora, Es and meteorscatter. In a recent issue (No 07/1985) of the Russian publication *Radio*, much information is given which indicates the rapid growth of vhf/uhf activity in the USSR.

Quite a large number of Russian amateurs are now equipped for moonbounce operation, and are working around the continents by this mode. For those who do not find much of interest in eme, the fact that the stations mentioned have this capability shows that they would be expected to be potent performers during auroras or Es openings. For example, on 144MHz, UR2RQ (southern Estonia) has 8×16 elements and RQ2GAG, (a "regular" here in auroras), uses 8×15 elements. Another station heard here from time to time is UA1ZCL, who is quoted as having "a gigantic antenna, 16×9 elements measuring 8·75×7·5×4m". Using this he has worked 202 stations via the moon, 112 from Europe, 77 from North America, five from Asia and four from Oceania. *Radio* reports that there is little activity as yet in the USSR on 432MHz eme, but UR2RQ, UR2GAG and others are preparing big antennas for this band. RB5GBX and a group of local amateurs have produced an antenna comprising 8×26 elements on 432MHz, and have already heard G3LTF, G3SEK and others on the band. Some of this information is, of course, dated, due to the time taken for the USSR publication to reach the translator and eventually be distributed by him.

Radio goes on to say that only a few years ago the first vhf beacon appeared in the Soviet Union, whereas now there is a "whole network". However, the only one mentioned is UB4YWW on 144·370MHz (!) with a power of 3·5W to a horizontally-polarized omnidirectional antenna from a location 285m asl. Have any readers in the UK ever heard anything of USSR beacons by any mode?

In a later issue of *Radio* (No 08/1985) there is evidence of the increased use of microcomputers in the USSR by the amateur fraternity, with mention of a program which keeps the log (up to 3,000 QSOs in memory) and prints out QSL cards. Of more interest to the vhf/uhf community, however, is aurora information from this Russian source. In the first four months of 1985, only 23 auroras were detected in Russia compared with 70 in the same period in 1984 and 80 in 1983. However, most of the auroras were "strong" and on occasions "dipped down to fairly low geomagnetic latitudes" so that some very good dx was worked. It is interesting to note how the LAs and SMs work into the USSR on auroras which are not detectable here, and is further indication of what we miss in the UK by not having a land-mass to the west of us instead of a large expanse of ocean. On 28 January 1985, UA1ZCL called "CQA" at 1940gmt and was called by OY9JD (Faeroes) who was 599—a T9 note despite auroral conditions, and clearly what we now call auroral Es, though the Russians simply refer to it as Es propagation.

There is much further evidence in this particular issue of *Radio* to indicate that vhf/uhf activity in the USSR is reaching a very high level, with better receivers, antennas and higher power than in the past, all of which is good news for vhf addicts in the UK. Perhaps the most interesting tit-bit is a report of a 432MHz contact by UC2AA, who is no stranger to UK operators when the band opens in his direction. *Radio* says that when UC2AA got home from work on 23 September 1984, he found an aurora in progress and worked PA2VST (59A + 20dB) at a distance of 1,518km, receiving a 33A report. Later he contacted OH3RW on the same band, but "he was twice as close!". These are not good times for major auroras, but those of you with a bit of power on 432MHz could do worse than try a few calls on the band during such events, when they do occur.

From here and there

Jack Hum, G5UM, passes on two comments from claimants for vhf/uhf awards. The first:—"If I change my licence and call from Class B to Class A, must I start collecting cards all over again"? Answer: no, it is the location which counts, not a change of callsign, so a mixture of cards bearing Class B and Class A calls from the same site will suffice. Next, Dave Johnson, G4DHF, asks whether Shetland could not be classed as a separate country for vhf/uhf award purposes since "there is all the difference in the world working GMs in the Borders and the rare occasions when Shetland is workable". I was under the impression that Shetland was already regarded as a separate country for several European awards, though not so for DXCC purposes on the hf bands. I know several European stations who have worked into Shetland who have included it in their lists as a separate country, and I agree with Dave that it is at least as worthy as working into GM, GI, GW, GU and GJ, according to where you are located of course.

Jochen Fischer, DH2NAF, of Box 1101, D-8078, Eichstatt, West Germany, has produced an all-European vhf/uhf/shf contests calendar which can be obtained from him on receipt of two ircs. It covers all 1986 events in considerable detail.

Gordon Pheasant, G4BPY, makes a plea for beacons to send their locators so that they can be pin-pointed more accurately. Many do so already, of course, but Gordon thinks it would be especially useful on 28MHz, using Maidenhead notation of course!

Brian Goldsmith, GW6YIY (Powys) is publicity officer of Oswestry & District ARS, and he wishes to announce a new award by his club (the Border Award), which is available to stations working or hearing 10 stations in Shropshire and five in each bordering county, plus a contact with a club member, on bands 144MHz and higher. Club stations are G4TTO and G1ORA. Send a sae to Brian, QTHR, for further details. The

certificate is a handsome one and will grace the shack wall of anyone who qualifies to receive one.

Thanks to both John Young, GM4DQD, and Ken Bowdler, G1CHF, for supplying information on a rig requested by Tom Ferguson, G1OST. It's nice to see *4-2-70* in its role as a human memory bank. If you have any problem try asking readers—it's odds on someone will know the answer!

The use of morse by Class B operators, instituted last April, has apparently been both popular and successful to date, with many operators saying that as a result they have now passed the morse test following confidence-building practice on the air.

GM4WLL suggested, last month, that Wednesday night be nominated as an activity night on 70MHz. He has since heard that G4SEU and others are active on Tuesday evenings, and suggests therefore that this might be a better choice, and he will be QRV on Tuesdays accordingly. He also wonders whether there is scope for a 4-Metre Group since the 6-Metre Group has proved so successful. Readers comments would be appreciated by GM4WLL, QTHR.

Doug Barnsley, a BRS member who retired to Spain a few years ago from Kent, took the equivalent of the RAE in the Spanish language last year and has just been issued with callsign EB5FYQ (Alicante). It took just a year between passing the examination and being given a callsign! He has a mountain in his backyard, but with an eight-element Jaybeam at 85ft and a TS700 with preamp, has heard quite a lot and should be useful in future for keeping us informed of active EA5 calls on the vhf bands.

VHF awards manager, Jack Hum, G5UM, asks me to remind readers that contacts through satellites or repeaters are not eligible for awards, since some applicants still include these in their lists. Jack has been inundated with requests for the claim form for the 432MHz Monday Night Award which suggests that it is very popular. He has recently issued a 432MHz certificate to G6UWO which he endorsed "This achievement was made using only 1W of transmitter power and in the J3E mode". G5UM says that similar wording can be added to certificates if requested.

Halley's Comet and meteor activity

Following a report in December *4-2-70* on the apparent "non-event" on 20 October of meteor activity due to the position of Halley's Comet (see *4-2-70* July 1985), John Branegan, GM4IHJ, has written an intriguing letter which sets out what really occurred, and for those (many) of us who missed it, it makes very interesting reading. John writes:

"In September last, the ICE space probe was due to intercept the comet, and I was watching this closely in view of the October crossing of the (comet's) track scheduled on 9/10 October. In the second week in September I received a message from the USA to say that the comet was off-course due to perturbation by Jupiter, so the probe had to be retargeted. I was told that the earth-crossing of the comet track would now occur on 8 October around 1300gmt. I was lucky enough to be able to watch right through from 5 to 11 October.

"First signs appeared on 7 October with enhanced ms from 0705 to about 1000gmt, but the first really big change started on 8 October at about 0605gmt. There was no European tv on, but Polish fm from Gdansk was already coming in strongly and almost continuously. By 1000 there was a full-scale meteor shower in progress with almost continuous European tv. The peak occurred between 1000 and 1200gmt with a storm almost as good as most Quadrantids at peak. Reduced activity continued into the afternoon.

"On 9 October there was some enhancement around 0900gmt, but I thought it was all over. However, on 10 October we nearly, but not quite, had a re-run of the storm, peaking around 1000gmt. Next day all was back to normal. I understand that the evening of 8 October saw a very good mini-meteor storm over Tokyo. Naturally, this led me to hope for great things on 22 October as the earth re-crossed the comet's track, but I had been warned by Nasa contacts that we were not passing anywhere near the centre of the track. I just hope that some *real* ms men caught the activity".

Beacon notes

GB3SUT on 432MHz from Sutton Coldfield should be operational soon. GB3REB, the new beacon from the Medway towns on 70MHz, awaits authorization from the licensing authority, on receipt of which it will be ready to go on the air. It is understood that permission has been granted for the installation of a 50MHz beacon in Malta. This would obviously provide a useful monitor in a direction much favoured by summertime sporadic-E.

Another 50MHz beacon under consideration is one for the Cornwall site presently used by GB3CTC. If this comes to fruition, it would probably be set-up to beam towards Africa and the USA, either simultaneously or on a time-switching basis, to cater for future multi-hop Es or F2 openings. There are currently some problems to be sorted out at this site on the antenna mounting on the existing mast.

The VHF Forum meeting at the Midlands VHF Convention last October. L to R: G4JLG (VHF Contests Committee), G3ZNU (chairman, VHF Committee), G3UBX (Convention chairman), G3SEK and G4DGU. A report on this convention will appear next month. *Photo*: G8DJC

The VHF Committee still has plans to establish a Northern Ireland beacon on 144MHz, with one or two possible sites in mind. Although outside the scope of this feature, GB3RAL has replaced the old (Sussex) beacon GB3SX on 28MHz, the site being the Rutherford Appleton Laboratory. This band is, of course, of great interest to those working crossband between the UK and Europe (or further afield), so it will provide a useful marker for vhf stations outside the UK. Reception reports to G4CEB.

From SM6EOC/SM6AFH comes news that the Icelandic beacon in (old) square QX45f will soon be operational. Some delay was encountered due to permission being granted for only 25W, but matters have now been sorted out apparently.

Finally, Lerwick beacon on 144MHz is again off the air due to antenna problems, it being switched off on 20 November.

Aurora

John Branegan, GM4IHJ, reports auroras on 5 and 7 October, 9, 10, 13 and 17 November, but says: "None of the auroras was strong, so I could not get any useful real-time checks of my auroral modelling software". John still uses Wick radar as a monitor (see earlier *4-2-70* columns for information on this radar). With the present state of the solar cycle, any auroral activity is welcome, though what is observed in Scotland and the north is frequently quite undetectable further to the south. Lars Melin, SM0KAK (his call was previously given in error as SM0KAX), says that in all of his auroral work between 1980 and 1985 he used only 3–15W to an antenna giving 10–13dB gain, so don't feel that high-power is essential to work auroras, though it undoubtedly helps. Lars is also well-placed, compared with many UK stations, to take advantage of these events.

Repeater news

A revised administrative structure to deal with repeater matters has been proposed and approved by Council with the aim of reducing the workload of the Repeater Management Group and to provide a more localized control, now that the network has reached such large and sophisticated proportions. It is proposed that 20 regional representatives be elected, each to report to the RMG rather like the Raynet organization. Due to the geographical disposition of repeaters in the UK, it was not felt that the repeater regions should conform with current RSGB regions, so there should be no conflict between current regional representation and the proposed repeater regional system. The change is scheduled for July 1986, and further details will be published in due course. Time will be required, of course, to hold the necessary elections when the regional boundaries have been announced. Another change recently announced by RSGB HQ is that in future repeater matters will no longer be handled by the membership services department at headquarters, but instead Ms Heather Norman, assistant to the general manager, will deal with repeater business. Heather has long experience of the Society's affairs, and is in an appropriately senior position to deal with what is recognized to be an important aspect of the RSGB's activities.

By the time this appears in print, Huntingdon repeater should have started up on channel RB5.

Kent Repeater Group's Newsletter No 42, dated November 1985, is now available (contact G0AMZ, QTHR). The text refers to idiots who take pleasure in trying to ruin the network of KRG's repeaters in ways which have become all too familiar, at least in some parts of the south. Another point raised by KRG is that the repeaters are often dominated by fixed stations, and they point out that the UK repeater network is planned by IARU/RSGB and licensed by DTI on the basis of aiding communication between mobile stations. □

RAYNET

*Geoff Griffiths, G3STG**

444 teleprinters and Raynet

Can I remind all group controllers and members who have acquired Creed 444s from British Telecom via various Raynet sources that they were made available for our use on the condition that they were used by members in connection with Raynet activities and training. It should be clearly understood that under no circumstances may they be patched into the public telephone system, or used hard-wired other than for local training exercises.

Technical Information Service

The TIS library had been carefully nurtured and built up into a worthwhile service by Bill Colclough from its inception until the time of his death earlier this year. The purpose of the service is to record, store and distribute those useful pieces of information on hardware, construction and servicing which prove so useful to groups. It is intended to provide a two-way flow of information on, for example, rtty, talk-through, emergency power supplies and transmitters, and weather protection.

I am very pleased to report that Philip Howarth, G3YAC, has taken over the administration of this service, and he will be very pleased to receive requests for information or items for inclusion. As always, an sae would be appreciated.

For those members who need information which can best be gleaned from Blue Box Manuals, then an sae to Brian Smith, G4ETN, may well solve the problem.

Zonal activities

Looking back over 1985, I realize that I have had the opportunity to visit various zonal gatherings in the Southwest, East Midlands, East Anglia, Home Counties and the Northwest, with a promise made to visit Aviemore this year for the Scottish Raynet Symposium. Everywhere I have been met with a warm welcome and lots of penetrating questions, excellent comment and lively debate. I am more convinced than ever that these meetings serve a very useful purpose, and I would recommend to all groups that they re-read the notes distributed with the July issue of *Zonews* on holding a zonal meeting.

What *Zonews*, I hear you say! If you haven't had a chance to see a copy of *Zonews* dated October, then beat a path to your controller's door and ask for a loan copy. It makes fascinating reading, and gives a real insight into the national Raynet picture. If, when you read it, you discover that the activities in your territory are not reported, then reach for your pen. All contributions for the next issue should go to David Lankshear, G3TJP, the zonal co-ordinator.

Zonal representation

Members will find elsewhere in this issue details of the election procedures for the three-year appointment in Zone 1. I hope that, as usual, members will give careful thought to the man they choose for this important task. (Let me hasten to add that there is no yl candidate this time.) All too often it is very easy to support automatically the local candidate, but this sometimes tends to polarize the zone by club or geographical boundaries, rather than being sure that the successful candidate is the right sort of character for the job. And if you don't remember what a ZR's job is, then check with page 1.3 of the *Raynet Manual*.

Training

There is an old saw which goes something like: "I can be a good Christian without ever going to church." I wonder if you can be a good Raynet member without ever going near your Raynet group? Training with the team is a very necessary part of preparation for public service. Training leads to adoption of common standards of operation and competence which are essential for the team to operate together "professionally" in exercise or emergency. Regular attendance implies commitment to the group, and a willingness to work at a variety of tasks, whether it be message-handling, tea-making, log-keeping, building terminal units, running new feeders or erecting antennas. First-aid, map-reading and role-playing all form important parts of a members' training which are sorely needed when in the thick of a stressful operation.

There may equally be a valuable role for the less active group members as well. Those stalwarts who over the years have put in the hours of training and work which have built up the group to its present strength, may no longer feel able to put themselves on the group's front line, but who wish to keep themselves up to date in order to form a second line of operators should the need arise.

May I remind controllers that they, too, have a commitment to train themselves. How many have a thorough background of understanding of the national and local organization of their user services? How many are qualified and trained in the arts of first-aid, telephone operating, heavy rescue, mountain rescue or the Hazchem code?

The Raynet Committee is discussing the whole subject of training in background understanding of many areas which may affect the way in which group controllers can contribute through their groups to the user services, and developments along these lines will be reported from time to time in this column.

National activities

1985 saw much more in the way of national activity for some members. There was the international disaster work connected with the Mexico City earthquake and with the Colombian volcano eruption, and later in the year the operation of the national communications network in support of the safety traffic during the RAC/Lombard Rally.

It probably became painfully obvious to many members during this last activity that many of the qualities of a successful field day team's organization were essential, and the need to be able to rely upon neighbouring groups for assistance with operators and equipment was highlighted. These are needs which would be only too obvious were the Raynet teams to be called upon by the user services to operate during a long scale disaster which required communications across county or regional boundaries and over large distances.

Are you really sure that you could operate a station at short notice from that handy hill at 500ms asl and handle rtty, phone or talkthrough without any mains power. And could you really form part of a relay chain from Taunton to Manchester? At 3am? A topic for your next zonal meeting perhaps?

Finally. . .

Can I wish all Raynet members a very happy and prosperous New Year. May all your exercises go as smooth as silk, may all the jammers lose their pectin, and may you all send in your exercise reports on time. □

*11 The Grove, Asfordby, Melton Mowbray, Leics LE14 3UF.

SWL

*Bob Treacher, BRS 32525**

AS WE ENTER another year, I send New Year greetings to all listeners of the Society. What will 1986 hold? We will be just a little nearer the top of the sunspot cycle, although conditions on hf are likely to be just as bad. Lower frequency conditions should be better. VHF/UHF propagation will be as intriguing as ever, with sporadic-E taking everyone by surprise as usual. A few more swls will sit and pass the RAE, and some will be ever nearer whatever their particular goal is. Whatever your wish for 1986, I hope it reaches fruition.

HF news

CQWWSSB provided perhaps the best hf conditions of 1985 with all six bands in extremely good shape. Entries for my HF Challenge are still being received at the time of writing, with some entrants claiming over 100,000 points, but it is clear that those putting in serious listening were rewarded. Without going into great detail, the hotshots on each band seem to have been: 1·8MHz ZL2BT ZL3GQ—superb signals from both stations to give many a new one; 3·5MHz BT1BK, HS0A; 7MHz KL7RA (five different KL7s are mentioned in logs), 8R1Z, HC8X; 14MHz BT1BK; 21MHz HC8X, HS0A; 28MHz VK9XJ. It will be interesting to see how many countries were active.

The challenge results will give this information, but with Robert Small, BRS8841, and me logging over 120, the figure is likely to be quite high. Dave Whitaker, BRS25429, logged 42 VE/W stations on 1·8MHz; the band was very noisy on the morning of the 26th, but on the 27th conditions were quite good with YV, VP2 etc also audible.

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1985 HF COUNTRIES TABLE

(Updates only)

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS8841	230	60	152	214	160	155	50	791
BRS52543	203	58	126	164	135	142	67	692
BRS25429	211	54	108	171	134	147	76	690
BRS32525	189	37	94	114	104	137	75	561
BRS87259	182	18	64	154	62	114	27	439
BRS31976	146	7	12	69	16	116	44	266
BRS20249	124	8	43	95	49	54	12	261
BRS44083	126	22	21	122	21	49	4	239
BRS62088	72	0	0	53	14	37	16	120

1985 VHF/UHF TABLE

(Updates only)

Station	QTH loc	70MHz Squares	70MHz DXCC	144MHz Squares	144MHz DXCC	432MHz Squares	432MHz DXCC	Total
BRS25429	IO93	0	0	107	22	84	20	233
BRS52543	IO83	22	6	95	23	52	18	216
BRS32525	JO01	0	0	95	25	13	4	137
BRS31976	JO01	7	2	94	26	0	0	129
BRS62088	JO01	0	0	30	12	2	1	45

Mention of 1·8MHz dx reminds me of the 1985 dx season on that band where some listeners caught over 20 new countries in January and February. With conditions likely to be poor on hf, conditions on the band should reach the same peak as last year. In January, dx was available on ssb as follows: **0500** HC; **0600** HK, 6Y5, 9Y4; **0700** HP, YV. In February, conditions to the Caribbean were particularly good: **0400** KP2, KP4, PJ2; **0500** CO, HK0, TI, YV; **0600** HH, J8, PY, V4, 9Y4; **0700** VP9. With these tips, I expect plenty of dx reports for this band, and expect to see scores heading to three figures to join Dave Whitaker. It is rumoured that ZL2BT arranged to bring some Pacific Islands on to the band in mid-November, but conditions were too poor on the chosen day. It remains to be seen if any other Pacific dx is reported in the next few months.

Outside contests, the big activity in November was to celebrate King Hussein's 50th birthday. Many JY stations were heard, and I imagine plenty of stations have sent their 10 ircs to claim the award. Mick, BRS87259, had sent his claim at the time of writing. Also of note was VI0CC from Heard Is. Again, rumour has it that they were on the top end of 3·5MHz at 1645 on 17 November, along with VK0DJ (Mawson Base). It is unclear if they were audible in Europe. W7 and VK2 had, however, been heard between 1500 and 1600 in mid-November, so the band was showing good signs of life very early. The peak for such dx is usually at the turn of the year. Elsewhere, Robert Small heard J28EI/S (Sept Freres Is) on 14MHz, and VE3FXT/3D6, OH1RY/C56 and A4XZH/15. A certificate was available for hearing five A4 stations signing with the /15 suffix. Mick Hudson heard SU1HK and P29AR on 14MHz. Karen Hunter, BRS88043, is a newcomer to the page. She mentioned KL7XO and VK0GC on 7MHz. The VK0 is now QRT, and unfortunately a lot of people missed him on 3·5MHz during his stay on the island, but he had a superb signal on 7MHz, often peaking 59 when I heard him. Malcolm Harrington, BRS20249, caught V85HG (Brunei) for a new one on 14MHz. He spent CQWW improving 7 and 3·5MHz scores for the year. Apologies to Mike Dawson, BRS44083, whose last letter appears to have become a casualty of our move. However, current scores safely entered this time, Mike! On the QSL scene, Robert Small reported direct replies from HC8E, 6Y5NR/KP1, FT8XA (7MHz) and YB3DO/9 (Timor Is).

VHF/UHF

Having moved house in mid-September, I was reasonably sure that I would not miss too much on vhf. However, others had different ideas, and the best tropo conditions for perhaps 10 years occurred! Dave Whitaker fared extremely well, especially on 432MHz on 24 October. His prize catch was 57 signals from OH0NC (Aaland Is-KP00AB, 1,462km). Many other Scandinavian stations were logged, helping Dave to 84 squares on 432MHz this year. Some of the long dx logged included OZ1CFT (JO75JC, 1,059km), SM6KUT (GS36j, 1,036 km) SM0DJW (JO88XV, 1,311km), SM7NNJ (JO86DQ, 1,164km) SM4CJK (GT48d, 1,072km), SM4IVE (JO79SD, 1,189km) and SM7FMD (HR24e, 1,092km). On 144MHz SM1LPU (JO97EM, 1,302km) was the furthest heard, with several other SMs in HT (JO79) being over 1,100km.

Martin Parry, BRS52543, also had a successful time, logging OE2KMM (GH), OK2BWY/P (HK), DC8QB (EO) and Y23BD (GM). On 144MHz, Y38WA (HN) looked the best on offer, with plenty of OZs and Baltic DLs.

Mick Toms, BRS31976, had little time for dxing during the tropo in question, but his log contained 18 different countries and 60 squares on 144MHz, including HB9, OK, Y2. From the information received it looks as though Dave caught by far the best of conditions, but how I wish that the antennas were up at my QTH!

Challenge trophies

Those having a go at the LF Challenge might be interested to know that plaques will be awarded to the best entries. Plaques for the best logs received for the HF Challenge should be on their way by the time this is read.

UBA SWL Competition

0000 1 January to 2400 31 December

Listeners should log as many DXCC countries as possible on 3·5, 7, 14, 21 and 28MHz during the year. Each counts one point on each band and each counts once as a multiplier. There are three categories: phone, cw and rtty, and all are single-operator. A special log must be used, and this is obtainable from: UBA SWL Manager Marc Domen, ONL6945, Gebr Blommenstraat 14, B-2200 Antwerpen-Borgerhout, Belgium, in exchange for three ircs. Interim logs must be submitted three times during the year—postmarked before 1 March, 1 June and 1 September.

White Rose Contest

This very popular contest, organized for swls only, is to take place from 1200 18 January to 1200 19 January. Its aim is to attract listeners to the lower frequency bands, and conveniently is held during my IF Challenge. Only 7, 3·5 and 1·8MHz can be used, either ssb or cw. VHF licensees can also participate. The rules have been changed, and can be obtained by sending an sae to G3ZGA, QTHR.

Finale

News, views, final table scores for 1985 for the March issue should reach me by 13 January with late copy no later than 20 January. □

MICROWAVES

*Mike Dixon, G3PFR**

Operating news

Reports covering the October opening are still coming in! Particularly welcome are two reports from the southwest, an area where, until recently, there has been comparatively little reported activity.

The first was from Dave, G6LEU (near Truro), who said that "regrettably I had to go north on business at the height of the opening but managed seven contacts on 12 October (into squares IN78/95 and JN05, 18 and 25) and between 0730 and 1130 on 13 October a further 15 covering squares JO 21, 31, 32 and 54 and JN09, 18, 27 and 37. The French beacon FX4UHX in IN94 square was heard at 5/7". He added that he now has a nightly sked at 2100 with G6FK which "has been very successful over a not-very-good path", and that he has now worked EA1BLA on no less than 15 separate occasions.

Cyril, G3VVB (St Austell), said: "Things are starting to move on 23cm in Cornwall, but it's hard work weaning them away from GB3NC!" On 13 October he worked a number of G stations and many Continental callsigns covering JN18, 19 and JO10, 11, 21, 31, 41 and 51. Cyril commented: "G3XDY complained bitterly that he could hear me working the Continental stations but couldn't himself hear them", a similar remark to that made by G8PSF in his report on the September opening! Cyril's equipment "is nothing special: FT221, MM transverter, 25–30W, no preamp, UR67 cable and two bayed Jaybeam 15/15 antennas".

John, G4BYV, worked DF7VX (JO41,542km) on 1·3, 2·3 and 3·4GHz and DK5AI (JO51,665km) on 2·3GHz to bring his squares score to 15 on 3·4GHz and 42 on 2·3GHz.

Steve, G4KNZ, wrote to say that he has now arrived safely in New Zealand and has also received his new callsign, ZL2AZQ, which he fully intends to activate on all bands once he has settled. Peter, G3PHO (ex-ZL2LA), made the comment that Steve should have plenty of opportunity to exercise his microwave operating skills, since "he will have access to many drive-on sites of 1,000m elevation, there are often excellent over-sea duct conditions across the Tasman Strait to Australia, and there is an active group in Wellington which held the world record on 3·4GHz for a long time, using 'steam' klystrons and polarplexer transceivers".

Don, G3JHM (Alton), and Les (Bushey, G3BNL Heath), using phase-

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

locked 24GHz equipment, have had a one-way QSO over this 64km obstructed path which they have previously worked on 10GHz, while further north Ray, G3NKL (Preston), and Dennis, G3FNQ (Southport), have pushed their wideband 24GHz dx up to 127km using simple Gunn oscillator/in-line mixer equipment in conjunction with "penny-feed" 18in dishes.

Awards

Jack, G5UM (Microwave awards managers, reported the following recent "batch" of awards:

1·3GHz (over 600km): G4LBV (No 94), G6MGL (95);
1·3GHz "Senior" (six countries, 40 counties): G3XDY (No 13);
2·3GHz Five Squares: G3XDY (10);
10GHz (over 150km): GW8DPB/P (73), G4ELM/P (74), GW6NVC/P (75) and GW3MWN/P (76).

The last-mentioned award handsomely exceeded the 150km mark, being for a contact between Eric, operating from Snowdon, and G1BHQ operating GM from Cairnsmore of Fleet, a distance of 214km. A previous attempt at this path had to be abandoned due to apalling weather, but on this occasion (29 August) the weather was warm and sunny. Eric reported regular slow, deep QSB on signals and that four more 150km+ contacts were made: to G3PHO, G8AGN, G4LFS and G4IHZ near Holmfirth. Eric's equipment was a 10mW Gunn to a 16in dish with a separate "in-line" receiver with 18in dish, whose 1·5mW signal was also heard over the 214km path.

Jack now has supplies of the new "compact" (10 by 8in) microwave award certificate, although I believe that the old, larger certificate will continue to be available for some time for those who prefer it.

The "split" continues

Two matters currently arousing quite strong feelings both at home and abroad are the questions of wide-band operation on 10GHz and the use of the QTH locator system versus the "Maidenhead" locator.

While the majority of 10GHz wide-band operation is now taking place on 10·38GHz (nominal)—and the reasons for this choice were fully explained in this column some time ago—there are still a number of experienced operators, particularly in the south, who use 10·1GHz. This is most confusing for novices to the band: suffice it to say that the great weight of activity over the past couple of "seasons" has centred in the midlands and north of the country and that here virtually all wideband activity is on the higher frequency! While it is recognized that cross-Channel contacts (particularly to France) may only take place on 10·1GHz, it is strongly recommended that 10·38GHz is used for *all other* wideband activity and 10·368GHz for narrowband work. By so-doing, maximum compatibility is ensured. A common remark originating from the Continent is: "What has happened to narrowband operating in the UK?". It is much easier to optimize such things as dish feeds if the two frequencies are close together, and operators might thereby be encouraged to have a go at narrowband.

With regard to the other controversy, all that can be said is that the Maidenhead locator system *has* been widely adopted as being much more meaningful than the somewhat illogical QTH (non-decimal!) system. Not only is it of worldwide application and lends itself to easy computerization, but it is also considerably more accurate. These factors, together with the fact that it was adopted at the IARU Region 1 meeting by a large vote, should indicate that its use is approved by the majority of operators. Most of the "flak" has come from a small but influential group of amateurs in Germany and Holland, but there have been equally strong "pro" noises from Sweden and Switzerland. Certainly there seem to have been very few, if any, problems arising from its adoption in the UK—or at least none that I have heard of! Indeed, many portable operators are now "doing their sums" on pocket micros, actually in the field, something which is almost impossible to do with the QTH locator.

Microwave Committee news

At the meeting of the committee on 9 November, the Microwave Manager, Dain Evans, G3RPE, confirmed the unsatisfactory licensing position in Belgium, and also indicated that there was a serious collapse imminent in the French society, REF. He also reported on coming preparations for the European vhf/uhf managers' meeting in March 1986 which will present an opportunity to air views before the next major IARU Region 1 conference in 1987. There was discussion of papers to be presented to this preliminary conference.

The microwave components service will be administered from RSGB HQ, so that it is possible to use an integrated accounting system, making for easier control of the service and, possibly, bringing the advantages of bulk purchase to the scheme. It is intended to extend the scope of the service as finances and demand allow. □

DATA COMMS

*Ian Wade, G3NRW**

FOR THOSE interested in data communications there exist a number of specialist groups offering various services, and an alphabetic listing of the most well-known groups in the UK is given in the panel below.

Looking briefly at each of these: AMRAC is the Amateur Radio & Computer Club, formed last year in South Hampshire. Its particular interest is in packet, and is actively considering proposals for an AX.25 packet repeater in its area. Amsat-UK specializes in amateur satellite operations, with increasing interest in all kinds of dc, including telemetry, rtty and packet. With packet satellites on the horizon, this is a group worth looking into.

BARTG, founded in 1959, is the British Amateur Radio Teleprinter Group, and is the largest specialist dc group in the country. As the name suggests, its early interests were in the steam engines of rtty: teleprinters. Today, however, the emphasis has shifted very much towards computer-based dc, although mechanical teleprinters and fax systems are not forgotten. Its quarterly magazine *DATACOM* runs to over 100 pages on all aspects of dc, including practical circuits, hints and tips, theoretical papers, operating and contest news. RAMTOP specializes in the BBC micro, and in its newsletter regularly publishes hardware and software details of dc projects using the Beeb. SARUG is a similar group, specializing in Sinclair micros, and recently celebrated its fourth birthday. It too has a newsletter with much practical information on how to use these machines for dc.

There are undoubtedly other dc groups in the UK that I have not included in this list. If you would like publicity for your group, drop me a line and tell me all about it.

Data communications special interest groups

AMRAC: Mr Trevor Tugwell, G8KMV, 50 Mayridge, Fareham, Hants PO14 4QP.
Amsat-UK: Mr Ron Broadbent, G3AAJ, 94 Herongate Road, London E12 5EQ.
BARTG: Mrs Pat Beedie, GW6MOJ, PO Box 3, Llandeilo, Dyfed, Wales SA19 6EW.
RAMTOP: Rev Richard Butcher, Great Billing Rectory, Northampton NN3 4ED.
SARUG: Mr Paul Newman, G4INP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ.

Reading about dc

I am often asked if I can recommend a book on the basics of dc. An excellent reference book is *Understanding Data Communications*, published by Radio Shack in the USA (book reference number 62-1389), and available in this country from Tandy stores at £3.29 (and also, incidentally, from Maplin at £14.95!). Its 272 pages cover the basic concepts of dc, including details of asynchronous and synchronous protocols, error control, packet switching and networking. The book is easy to read and well illustrated. Highly recommended for those wishing to stretch their minds beyond rtty.

On a more practical front, *Practical Wireless* publishes a very useful collection of reprints of rtty articles by Jeff Maynard, G4EJA, and Dick Ganderton, G8VFH. Entitled *Introducing RTTY*, this 32-page booklet contains practical circuits for terminal units and computer interfaces, plus techniques for writing simple rtty programs.

Amtor transmit/receive changeover

A requirement for successful Amtor operation is that the time needed to switch between transmit and receive should not exceed about 20ms. To see why this is so, take a look at Fig 1(a). Amtor works on a fixed 450ms cycle (time a-e on the diagram); that is, each message block of three characters is sent at 450ms intervals, regular as clockwork. Each seven-bit character is transmitted at the fixed speed of 100 bits/s, so the complete three-character block takes 210ms to send (ie 3 characters × 7 bits × 10ms/bit = 210ms: time a-b on the diagram).

The remaining 240ms (b-e) out of the 450ms period is available for the receiving station to send a single seven-bit acknowledgement character, signifying receipt of the transmitted block. The time at which the transmitting station receives this acknowledgement depends principally on how far apart the two stations are. If they are only across town, the acknowledgement will be received almost immediately (Fig 1b), but if they are several thousand miles apart the propagation delay becomes significant, and the acknowledgement may not be received until just before the next cycle starts (Fig 1c).

*7 Daubeney Close, Harlington, Dunstable, Bedfordshire LU5 6NE.

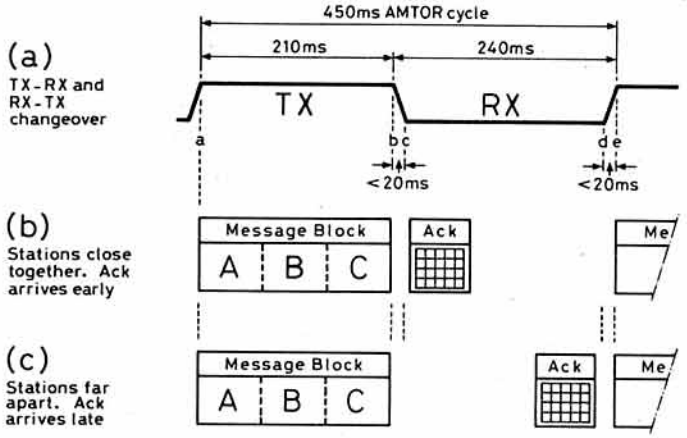

Fig 1. Amtor system timing

The need for fast changeover now becomes apparent. If the transmit-to-receive changeover time (b-c) is too long, and the stations are close together, the acknowledgement may be missed because the transmitting station is still switching from transmit to receive and is not yet ready to receive the acknowledgement. At the other extreme, the transmitting station must start to switch from receive back to transmit a few milliseconds before the beginning of the next cycle, so that it is ready to transmit again at full power exactly 450ms after the start of the previous block. Clearly, if the receive-to-transmit changeover time (d-e) is too long, changeover will have to start earlier, and so there is a risk of losing an acknowledgement from a distant station.

The practical implication of all this is that the changeover time should be as short as possible. If it is more than about 20ms, it will not be possible to work stations which are very close, or which are more than about 21,000km apart. This means that it may be necessary to modify the changeover circuitry, and/or replace changeover relays, and/or modify the receiver agc characteristics to ensure that the 20ms limit is not exceeded. Also, there may be extra complications with a vhf installation comprising, perhaps, an hf transceiver, a vhf transverter, a linear and a masthead preamplifier. All of this has to switch together inside 20ms for successful Amtor operation.

Different radios require different treatment, or, if you are lucky, none at all. (If you have an old clunker of an FT200 like mine, all you have to do is set the "VOX Delay" and "Relay Sensitivity" controls on the back panel to minimum, and you're in business). To find out if your radio needs modification, the first step is probably to contact the person who sold it to you. If he can't help, you could try contacting Alan Clemmetsen, G3VZJ, of ICS Ltd (the suppliers of the AMT-1 and AMT-2 Amtor controllers). Alan has Amtor modification details for a number of radios, and if you tell him which radio you are using and enclose an sae, he will oblige with the relevant information if he has it.

RTTY survey

"I have a micro, and want to run rtty. What else do I need?" This is probably the most common question from newcomers to dc. For any given micro, there are probably several different ways of setting up a rtty system, depending on how much is to be controlled by software, and how much by hardware. To make it easier to find out what is available, I am preparing a survey of hardware and software rtty packages for individual micros. The survey will include a full list of features of each package, plus any special requirements for terminal units, cables, connectors, power supplies, audio filters, and so on. If you can supply rtty software and/or hardware for any micro, either privately or on a commercial basis, please write to me, enclosing a large sae, and in return you will receive a questionnaire asking for the details. The findings will be published as soon as possible in this column. □

HF

*John Allaway, G3FKM**

ANOTHER NEW YEAR—and this one hopefully about to see the bottom of sunspot Cycle 21. May it be a very successful one in every way for the readers of this column!

Sam Kennard, G4OHX, forwarded a listener report card (from a Society member) which contained no date or signal report and even referred to him as "om" in spite of the fact that Doug always gives his name during every QSO. He wonders if this was the star report of 1985?

Operation Raleigh

The first year of Operation Raleigh having been completed, the ship *Sir Walter Raleigh* is currently in Puerto Montt, Chile, undergoing a refit.

G4TAW left the UK at the end of December and, provided the Chilean authorities give permission, will be QRV from southern Chile until approximately mid-May, when it is anticipated that the ship will sail from Chile across the South Pacific. The amateur compliment for this leg of the voyage will comprise G4TAW plus G4AAL and G4RUL, so GB0SWR/MM should be extremely active.

It is hoped that land-based operation from Pitcairn Is and, possibly, Henderson Is—the latter believed to never have seen any amateur radio operation before—will take place. This depends to a very great extent on the priorities set by the operation organizers on the spot. In a four-year operation as complex and diverse as Operation Raleigh, only one thing is certain—nothing is certain until it actually happens!

Watch this space for more expedition and Pitcairn news nearer the time.

DX on 7MHz

Concerning 7MHz early morning dx, the G3AOO group (see picture) acts as a reference for conditions to VK and ZL. Don Birch and his associates have operated daily for many years around 7,098kHz and provide a wonderful service for anyone—listeners and transmitters alike—wishing to check antenna performance and location characteristics. G3AOO's Lazy-H with directors sets a very high standard for performance on the long-path to VK/ZL. Regular listeners to the group must agree that his contacts daily dispel the gloom detailed in the "HF F-layer propagation predictions"! Probability numbers should be nearer "10". One wonders why—would G8KG care to comment, please? Some would perhaps criticise activities on "Don's Net", but coping with breakers, broadcast interference and the many other vagaries of the band is not easy, and Don feels that many would have retired hurt long ago. It would be interesting to know how many listen to the group—G8PO considers it to be perhaps one of the most-monitored dx nets. A mention of ZL activity must include reference to ZL2ANR, who always has an outstanding signal, and who considers that listening for too long on 7,098kHz makes pumpkins grow—he supplied a cutting from a local newspaper showing one 6ft 8in in girth! (Thanks for the above to G3AOO.)

7MHz

A paper produced by NZART for the recent IARU Region 3 Conference, and referring to intruders, contains a section about 7MHz which describes the present sorry state of that band in detail, and after reading its contents readers may better understand the situation:

Alan, G4NXG (centre) with Wylie, VE1YN, (l) and Jim, VE1VG on Prince Edward Is. The two VEs are often on 14,142kHz for anyone working for the PEI Award.

*Knightlow Road, Birmingham B17 8QD.

"A much misunderstood situation exists with regard to the 7MHz band. Prior to WARC 1979 the amateur service had 7·0–7·1MHz as an exclusive band. At WARC we lost the 7·0–7·05MHz part of the band as exclusively amateur. The first 50kHz is now shared with the fixed service in 13 countries. This left only 7·05–7·1MHz as amateur exclusive. It has been noted that the fixed service stations operating in the first 50kHz are seldom those of the 13 countries 'footnoted' into the band (D2, YI, 5Z, 9X, 70, 5V, SU, ET, 7G, 5A, 5R, 7Q and 5H). They appear to be predominantly Russian, and UMS (Russian maritime mobile shore station) and UHF3 (believed to be located at Moscow Airport) are but two of those positively identified as daily users.

"Anyone who has attempted to use this band will know that it has many bc stations operating in it. Of these, Radio Beijing and Radio Tirana are daily using many different frequencies, namely 7,010, 7,025, 7,035, 7,040, 7,045, 7,055, 7,060, 7,065 and 7,095kHz (Beijing) and 7,065, 7,075, 7,080, 7,085 and 7,009kHz (Tirana). All these frequencies are not in use at any one time; however, up to five of these may be in use by Beijing at one time.

"With regard to Radio Tirana. This station is operated by the Albanian administration. They are not members of the ITU and therefore little can be done except to hope that the Albanian government will ultimately see the wisdom of joining the ITU.

"The situation with regard to Radio Beijing is different. The Chinese are members of the ITU and thus have agreed to abide by the provisions of the regulations. Resolution 641 attached to the regulations calls upon all bc stations using 7·0 to 7·1MHz to vacate that band—however, by using the reservations procedure provided for in the ITU Convention, the Chinese administration reserves the right to continue to use the 7MHz band for its bc stations until it receives what it considers to be a fair and reasonable allocation of frequencies on the broadcast bands. These matters are subject to the current WARC for the hf broadcast services. On the face of it the Chinese appear not to have been given an equal share along with other countries in the bc bands. Unfortunately for the amateur service they have chosen to use frequencies that are within the amateur band. The reservations of the Chinese administration regarding the 7MHz band have been 'noted' by the other administrations; this gives their usage a basis of legality. Hopefully, the Chinese administration will obtain sufficient bc band frequencies from the working of the WARC HF BC Conference to enable them to comply with Resolution 641.

"Of even greater concern is the use of bc jammers operated from Russian and E European sources. These wide-band transmitters are, apparently, used whenever Radio Beijing and Radio Tirana broadcast in the Russian language. The question of the use of these machines and the question of the rights of other countries to broadcast in various languages enters into political considerations. As an international amateur organization we must remain above any political discussions. Our strength lies in the fact that the amateur service is non-political.

"Having said that, I will continue my remarks on the effects of the use of these jammers. It has been noted that when Beijing is being jammed, many frequency changes occur, often in mid-sentence of a commentary, presumably this is an attempt to get clear of the jammers. Within a few minutes some of the jammers shift to the new frequency, leaving others to the original frequency. If both Beijing and Tirana are being jammed and indulging in frequency shifts, within a very short time there is very little of this band left clear for amateur operations.

"The problems caused to the amateur service by the above noted bc stations and the jammers are compounded still further by the use of this band by many fixed service stations. Some of these, such as SGJ on 7·06MHz, are permanent, others are short-time users. The end result is that the amateur service has a *de facto* shared band which is so populated with non-amateur stations as to render it virtually useless for amateur usage except during daylight hours for short distance communication."

Overseas news

Philip Weaver, VS6CT, visited China recently on the occasion of the Hong Kong to Beijing Motor Car Rally in September when HARTS was invited to provide some radio operators for the three stations to be established in Hong Kong, Wuhan and Beijing. In Wuhan and Beijing, Philip and Roger Clark, VS6CL, used Motorola 150W equipment with dipoles. At Beijing the operators were VS6CL and Tom Clark, VE3OM, from the Canadian Embassy, and operators from BY1QH. Philip received great help from Yuan B0, the person in charge of the BY1QH station, without him the operation would have been impossible.

There are now over 300 licensed amateurs in Hong Kong. Over 100 have Class A (hf) and 200 have Class B (vhf). The new president of HARTS is Pat Wong Sui, a teacher, VS6TV, in the Hong Kong Telephone Co, which now has a club with 350 members, all interested in amateur radio, and a club station VS6TS.

Yuan Bo, station manager of the University of Beijing station BY1QH

Walt Marshall, W7SE, president of the Dhahran ARC, has kindly provided the latest information concerning HZ1AB. He writes: "Improvements planned for the Dhahran Airport will shortly result in the removal of the building which housed HZ1AB. Lacking other suitable quarters, at least for several months, the Dhahran ARC disassembled the station in mid-August 1985. All equipment, antennas and furnishings have been placed in secure storage near its long-term home as one of Saudi Arabia's most active amateur radio stations. Negotiations for a new operating site are being actively pursued, but a date for regaining operational status has not been projected. Copies of all available station logs are in the hands of HZ1AB's very capable QSL manager, Leo Fry, K8PYD. The DARC will keep Leo informed on the progress of events."

Ted Miller, 9M8EA, confirms the facts given in July 1985 *MOTA* that he keeps a regular schedule with G4RZQ on Fridays in the 14,115–14,220kHz area at about 1500. It is also kept by its originator, David Calderwood, 9M2DC, who shares G4RZQ as QSL manager. 9M8GH, Gordon, has shared the 9M8 activity with Ted since September and is very active from Kuching. Ted is in Lutong, some 500 miles north of Kuching, and uses an FT980 with an inverted-V and mostly operates on 14MHz.

Nick Langmead, G4OOE, will be active as ZC4EE for the next few years using an FT101Z with dipole and HF5V antennas. His QSLs should be sent via the ZC4 QSL Bureau (see "QTH Corner").

SSTV

G3WW reports that activity on this mode continues despite poor band conditions and occasional deliberate QRM. DL1KAD/A gave G3WW his 2,100th two-way sstv QSO, and on 9 November 36s and 12s colour pictures were exchanged with W1JKF and K4KG using the Robot 1200C during the USA Saturday SSTV Net. Richard asks everyone to note that rumours of his giving up amateur radio are not correct! In fact he is moving shortly to a new QTH in southern England and is only temporarily off the air.

Contests

YL-OM Midwinter Contest
0700 to 1900 11 January (CW)
0700 to 1900 12 January (Phone)
Organized by the Dutch YL Club (DYLC) this year—the other participants being BYLARA, Belgian YL Club, and YLRC Elettra-Marconi (Italy). Copies of rules are available from G3FKM (sae, please).

YL-OM Contest
1800 8 February to 1800 9 February (Phone)
1800 22 February to 1800 23 February (CW)
Copies of rules available from G3FKM (sae please).

UBA Trophy
0600 25 January to 1800 26 January (CW)
0600 22 February to 1800 23 February (SSB)
3·5 to 28MHz. (A) Single-operator (3·5 plus 7MHz only 6h operation—0900 to 1100 Sunday plus 4h free choice operation); (B) single-operator 3·5 plus 7MHz with 12h operation; (C) single-operator all bands for 24h only; multi-operator single-transmitter (36h); and listeners in categories as above.

QTH CORNER

AZ1A	PO Box 5, 1636 Olivos, Buenos Aires, Argentina.
CE0ZIG	J Herrera Herrera, Airport, Easter Island, Chile.
CY0SAB	VE1ASJ, G. McLellan, Box 51, St John, NB, E2L 3X1, Canada.
HS0A	RAST, PO Box 2008, Bangkok 10501, Thailand.
J5WAD	(4/84-3/85) W6CNA, 10722 Avenida Roberta, Spring Valley, Cal, 92078, USA.
P44B	H Miller, N2MM, 61 Mill Rd, RR2, Vincentown, NJ, 08088, USA.
P48K	L Pentimalli, Pco Comola Ricci 90, I-80122, Naples, Italy.
P49Z	W8ZF, 6027 Fire Fly Ct, Tucker, Ga, 30084, USA.
TA3B	PO Box 33, Istanbul, Turkey.
V2A	J Young, K8BA, 105 Bramble Bush Drive, Springboro, Ohio, 45066, USA.
V3A	KD0FW, 1528 Broadway, Independence, Mo, 64050, USA.
VP2VEQ	N6ZZ, P Goetz, PO Box 5491, Los Angeles, Cal, 90055, USA.
ZC4EE	ZC4 QSL Bureau, Joint Signals Board, BFPO 58.
ZS3/W6QL	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
4V2C	K4BAI, PO Box 421, Columbus, Ga, 31092, USA.
5T5SL	DL8DF, Graacherweg 10, D-6600 Saarbruecken 2, FR Germany.
9L3MW	J Droge, 7138 Wilkinson Drive, Rockford, Mich, 49341, USA.

Exchange RS/T plus serial QSO number. ON stations will give their province abbreviation. QSOs with ON and Belgian Forces in Germany count 10 points, with other stations in the "French countries" one point. The multiplier is one for each province, BSD or FBA per band (maximum 10). Logs should give date, time, station worked, numbers exchanged, points claimed, and if multiplier. Use separate sheet for each band and enclose summary sheet with usual signed declaration and post before 1 March (cw) or 1 April (ssb) to UBA HF Contest Committee, Galicia Jan, ON6JG, Oude Gendarmeriestraat 62, B-3100 Heist op den Berg, Belgium.

PACC Contest
1200 8 February to 1200 9 February
1·8 to 28MHz, cw and ssb (no cross-mode). Please use the IARU band sections: on 3·5 and 14MHz, "contest-preferred" segments were agreed by member societies and they are: 3·5-3·560MHz and 3·6-3·65MHz for cw, with 3·7 to 3·8MHz for phone. On 14MHz, 14·0-14·06MHz for cw, and 14·125-14·3MHz for phone. Single- and multi-operator and listener sections. Exchange RS/T and serial number. Netherlands stations give RS/T and province (GR, FR, DR, OV, GD, UT, YP, NH, ZH, ZL, NB and LB). Each QSO with PA/PB/PI counts one point, and a station may be worked only once on each band. The multiplier is one per province per band (maximum 12 × 6 = 72). Listeners use same scoring system, and logs should include exchanges given by both stations. Note multipliers each time a new one is worked, and enclose the usual signed declaration concerning observation of rules etc. Logs must be sent before 31 March 1986 to PA0INA, F Th Oosthoek, PO Box 499, 4600 AL Bergen op Zoom, Netherlands.

Hungarian DX Contest
2200 18 January to 2200 19 January
CW only in segments 3·5-3·590, 7-7·035, 14-14·09, 21-21·09 and 28-28·09MHz. Single-operator single- and multiband. Exchange RST and serial QSO number. Hungarian stations also give a two-letter code indicating their county: BA, BE, BP, BN, BO, CS, FE, GY, HA, HE, KO, NO, PE, SA, SO, SZ, TO, VA, VE and ZA. Each QSO with HA counts six points, with stations outside Europe three points—other QSOs with own continent do not count. The multiplier is one for each county on each band. Stations may be worked once on each band. Logs should follow the usual format and be mailed within six weeks of the contest to Radioamateur League of Budapest, PO Box 2, Budapest H-1522, Hungary.

CQ WW 160m DX Contest
2200 24 January-1600 25 January (CW)
2200 21 February-1600 22 February (Phone)
Single- and multi-operator (not more than five). Exchange RS/T; USA and Canadian stations will also indicate their state or province. QSOs with own country count two points, with other countries in same continent five points, and with others 10 points. The multipliers are one for each state, province and DXCC country worked. Note that the countries W and VE do not count. Sample log and summary sheets may be obtained from CQ 160M Contest, 76 N Broadway, Hicksville, NY, 11801, USA, in exchange for a large sae and some ircs. Logs should have 40 QSOs per page and list time, station worked, numbers sent and received, if new multiplier, and points claimed. Include summary sheet showing details of the scoring and the usual signed declaration. Mark the envelope "CW" or "SSB" on the outside and post the former by 28 February and the latter by 31 March to 160m Contest Director, N4IN, 3075 Florida Avenue, Melbourne, Fla, 32901, USA.

In the **1985 CQ WW 160M DX Contest** (CW section) **GW3YDX** came world leader in the single-operator category with 336,255 points. Other UK scores were as follows: **G3XWZ/A** 106,818 points, G4OBK 104,709, GW3JI 37,920, G3BDQ 20,826, G3SJX 16,730, G4ARI 5,360, G4SLE 5,080, G2CIL 3,876, and G8QZ 3,496. In the multi-operator section **G3FVA/P** scored 24,054 points. In the phone section **GW3YDX** again put in an outstanding performance by coming world third with 157,356 points. GW4IOI scored 25,789, **G4OBK** 3,591, and G4XKR 2,223 points. In the multi-operator, **G3XWZ/A** scored 38,120 points. GW3YDX won the Don Busick, K5AAD, European plaque both on cw and phone—congratulations, Ron!

YU DX Contest
2100 1 February to 2100 2 February
CW only, 3·52-3·59 and 7·01-7·04MHz only. Single- and multi-operator and listener sections. Exchange RST and serial QSO number. QSOs with YU on 3·5MHz count 10 points, with other Europeans three, and with others five. On 7MHz, scores are five, two, and four respectively. The multiplier is the total of YU prefixes and DXCC countries worked on each band. Single-operator entrants must stay on a band for at least 30min at a time, multi-operators at least 10. Logs should show date, time, station worked, numbers sent/received, band, if new multiplier, and points claimed, and a separate sheet should be used for each band. Include summary sheet detailing multipliers and scoring plus a signed declaration. Post before 15 March to SRJ, YU DX C, Bos 48, 11001 Beograd, Yugoslavia.

1985 ALL BAND TABLE No 5

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3NAS	39	**103**	114	**168**	**131**	72	627 (all ssb)
G4OBK	88	73	93	155	109	46	564
G3KDB	37	73	113	148	119	56	546 (all cw)
G4OTU	30	51	97	130	86	41	435
GM3YOR	—	76	**121**	75	63	32	367 (all cw)
G3SXW	—	66	76	107	50	24	323
G4XKR	19	19	39	116	63	24	280
G3TXF	29	43	45	83	39	16	255 (all cw)
GW4RHW	—	13	112	71	39	17	252
G4GOF	12	22	25	54	50	46	209

Next deadline (for scores to 31 December 1985) **15 January** (to G3GIQ please).

10MHz TABLE

	All-time	1985
G3IGW	101	73
G4UZN	72	52
G4VDX	34	33
5B4DN	32	23
G4OBK	26	9
G4YWG	7	7
G5LP	59	—
G4UYR	33	—
G4RWP	4	—

28MHz TABLE

1985

G3VOF	— 116	G4OBK	— 46
G3XQU	— 115	G4NXG/M	— 43
G4XAH	— 97	G0AGP	— 39
G4JBR	— 90	GW4TEJ	— 39
G4MUW	— 78 (all ssb)	G4RWP	— 37
G4RAB	— 75 (all ssb)	G4YWG	— 30
5B4DN	— 55	G2FQR	— 27
G4DXW	— 52	G4FVK	— 16
G4VPD	— 49		

Around the bands

No G8KG report this month, so straight to the loggings—and with special thanks to those who contributed, including: G2HKU, G3YY, G5JL, G3s BDQ, GIQ, GVV, KSH, LPS, PJT, YRM, G4s EHQ, FVK, GW4KGR, G4s LRS, MUW, OBK, RFE, GW4TEJ, G4s UOL, UZN, XAH, G0AGP, and RSs 10906 and 84869.

Calls listed in italics were of stations using A1A.

1·8MHz. *0000 OH2BEN/C56, OH0XX/C56, T77C, UA9, UA0, YO4s KCA, KWJ.* **0100** *FM5WD,* HB9H, LX9BV, *TK5VN, UA9AJN.* **0300** *DF4ZL/CT3, CY0SAB, V3A.* **0400** *AS7B, T44C.* **0500** *OA4ZV, W1-4, W8, 4U1ITU.* **0600** *EA6QO, 9Y4VT.* **0700** *CN8ES, D44BC,* HH7PV, *K0CS, PY1RO, VE2FYR, YV3AGT, YV5TK,* ZL2BT, *ZL3GQ.* **1600** *UA0BCV, UG6GAW, UH8EAA.* **1900** *JW0A.* **2000** *EA9CE, OY7ML, 4U1VIC, 4X4XT.* **2100** *VK6HD.* **2200** *T77C.* **2300** *OH2BEN/C56, UA0AKN, UO50JM, ZB2EO.*

3·5MHz. **0000** *8P9AK.* **0100** CY0SAB, *SV1RP/SV7, UI9BWI, 3X0HAB.* **0500** *HK, HP, PJ2LS, VP2VI, DK8ZB/VP9, W6RL, YV5ANE, ZL2AIZ.* **0700** *D44BC, EA8QO,* HH7PV, WB7FRA/V2A, VK, VP2VCW, VP9AD, W6NLZ, *ZL4FT.* **0800** *FY5YE, N5AU, V3A, 4V2C.* **2000** *JW0A.* **2100** JA6s GIJ, LDD, OD5BP, *UZ0SWN,* YB0JH. **2200** JA, JY50s CI, YJ, *VK6HD,* W1, 3, YB0JH, 7X2LS. **2300** *DL1RK/CT3, DJ9ON/S9, UA0WBJ, RW0AM, VS6DO, 7X2AX, DL0MAR/9G.*

7MHz. **0000** *V2A 5L2EQ, 8P9RG.* **0100** *UA9ANI/UI, UM8MFB.* **0500** *V2A.* **0600** *CE0ZIG,* CO, *FM4CY,* KL7U, *ZF2DF.* **0700** *FY5YE,* JA4MN, *VI3XB,* VK9NM, *ZL2UW, ZL2UV.* **0800** *CY0SAB, K8CV/HC, JA, KL7XO,* VI0GC, VP2MW, *W7EJ,* ZM6ARU, *9Y4VT.* **0900** *JH7DNO, JH8JYV, PZ1DV,* UI8IBB. **1200** *JW0A.* **1600** *JAs 2IVY, 2KYA, 5BJC, UA0WW.* **1700** *KL7RA, OH0PA, VU2TTC.* **1900** *D44BC, JA5BJC, 3X0HAB.* **2000** *DL4HALIST2, N7OF/TT8, VK5PF, ZS6QU, 4K1C.* **2100** *FP5HL, OE7RUS/YK, 4K1ZZ.* **2200** *TA1C, UA9s, VK6s RZ, WT.* **2300** *OH2BEN/C56, CY0SAB, HK1AMW, DJ9ON/S9,* VP2VEQ, *VQ9LD, YB2BLI.*

10MHz. **0500** *ZL3AAM.* **0700** *N4VV, ZL3BJ.* **0800** *JA3HZT, N5VV, VK4JH, VK5AWC, W4EJY, ZL1HY, ZM3RK.* **0900** *VK2DWY.* **1000** *N4MCY.* **1100** *W1PXA, VK4NJ.* **1300** *W8EGB.* **1800** *W4, 8, 9.* **2000** *EA8AGF, ZF2IR/MM.* **2100** *SV1DO.* **2200** *K4SV.*

14MHz. **0700** *JA* (to 1200), YJ8PM, ZD7AL, ZL. **0800** FK8FI, NY6M/KH2, *DJ9ON/S9,* TZ6FE, V85GA, VK. **0900** *FK8FE,* FK8FA, FY5FE, HZ1FM, K5OC/KH2, VK9ND, YB6MF, 7J6AAA. **1000** P29JM, 5X5GK. **1100** HV1CN, *VK6WT,* VU2ZAP. **1200** *C56/OH2BEN.* **1300** CY0SAB, V2A, CH1PJ/VG8. **1600** A71AD, VK0DJ. **1700** K7EHI/T32, VK0AK, W6-W7, 3A2EE, 3B8BL. **1800** A22DX, CY0SAB, FR4ZD, S79WHN, *3X0HAB,* 5R8AL. **1900** DP0GVN, J5WAD, P48K, V3FB, VP8ML, *ZS3/W6QL,* ZD7XY, 6Y3M, 9Q5MA. **2000** TZ6FE, VP8VK. **2100** ZD8LIK, 9L1JW. **2200** *J37AE, JA5ANT.* **2300** HC, LU, PY, 5L2AY.

18MHz. **0800** *DL, F, G.* **0900** *5N25BRJ.* **1200** *J28EI.* **1300** *DL, SM.*

21MHz. **0700** *HZ1HZ.* **0800** JA, *DJ9ON/S9, TZ6FE, UM8MO,* VK, VS6CT, *VU2HQ.* **0900** KH0AC, *TA1A, OE3RKI/YK,* ZLs, ZSs, DL0MAR/9G, *3X0HAB.* **1000** BT1BK, *OH2BEN/C56,* HL2AWA, *OD5LX,* TA3B, ON5OS/VS6. **1100** AP2SK, HS0A, KG6DX, *VP2VCW, VU2BK,* 7Q7LW. **1200** D68AM, TR8DR. **1300** *A25/G3HCT,* A4XZG, FG4CH, ZS3/W6QL, 3X0HAB, 5L2EQ. **1400** OD5NT. 5Z4MT, 8P9AG. **1500** HD4BDC, ZD8KM, 6W1NQ, 8R1RPN. **1600** A71BJ, W9GW/EA9, DK9KX/S9, *TZ6FE,* KC2OU/V2A, VI0DJ, VP9JY, ZD7CW, *ZS3CG,* 5T5RG. **1700** *K8CW/HC8,* LU, TR8CP, *OE7RKH/YK,* 5V7RW.

24MHz. **1100** *KP2J, ZS6BMS.* **1200** *J28EI.* **1500** *CT1CBW, KP2J, WA1SKQ.* **1600** *LU6EF.* **1700** *NI4H, W4TG.*

28MHz. 0900 H5FXT. **1000** A4XRS, ZSs, 3B8FP. **1200** VK9XJ, ZS3IL, *6W1CK.* **1300** YC0DPO, ZD7CW, 7P8CM. **1500** CX3CB, TR8IG, TU4BR, 9U5JB. **1600** W6KG/ZS, 3X0HAB. **1700** CE8DXY, CT3VK, EA8OZ, HH2CF, LU, 5N3RTF, 8R1RPN. **1800** CX4HS, FM4CY, FY7AN, YV2BYT, W6REC/VP2M, XQ0ZFZ, 8R1Z. **1900** 8P9AG.

Once again, thanks to the authors of the following for the use of items included in their publications: *Long Skip* (VE3XN), the *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), and the *Ex-G Radio Bulletin* (GI3OEL/W6).

Please send items for **March** issue to reach G3FKM no later than **23 January.** □

HF f-layer propagation predictions for January 1986

Using the table

For each route, the **bands** appear vertically and the **time** horizontally, as indicated in the left-hand KEY blocks of the top two rows.
The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additional 50 and 1·8MHz openings are indicated by a plus (+) sign in the 28 and the 3·5MHz rows respectively.

KEY TO BANDS	MOSCOW	MALTA	GIBRALTAR
28 MHz .	.....	.....	.....
21 MHz .	....1552....	....2544....	.....2321...
14 MHz .	....78882...	....88887...	....58887...
10 MHz .	32.3766671.1	452476668522	132.87667621
7 MHz .	985643346767	998743346888	898664335887
3.5 MHz .	++53....3+++	++++4....3+++	++++3...25++

KEY TO TIMES GMT	ICELAND	OSAKA	HONGKONG
000001111122	......11....	.....	....21.....
024680246802	.....4774...	....3.....	....561.....
.....	....277784..	....63.11...	....3431....
.....	452.65456742	31124222	2...11123244
.....	++++42.245++	.....4+.	.....4+4

BANGKOK	SINGAPORE	NEW DELHI	TEHERAN
.....1.....	.....11.....	.....1.....	....121.....
....361.....	....4652....	....453.....	....5663....
...14651....	...146661...	...24564....	...455661...
1...14333...	2...13345..1	41.113342..3	641322345114
3....1124455	2....1124456	741...114468	8741..114578
.....4++	.....4+4	5.....4++	+5.....4++

COLOMBO	BAHRAIN	CYPRUS	ADEN
....121.....	....121.....	....2321....	....2211....
....4663....	....5663....	....78761...	....5665....
...124662...	1..444662...	22.576787..1	1..332466...
.2...1346114	632311345124	885643457556	7.22..146334
32....114578	973....14678	997411135889	943....14788
4.....4++	+5.....4++	++4.....25++	+5.....4++

SUVA/S	SUVA/L	WELLINGTON/S	WELLINGTON/L
.....	.....	.....	.....
.....	....521.....	.....	....1.....
.....143....	.11.8654141.	.....452....	.11.742..41.
.....4443...	..126333552.	....34441...	..116432442.
....321242..	...231.133..	....421241..	...131.132..
.....	.....	.....	.....

SYDNEY/S	SYDNEY/L	PERTH	HONOLULU
.....	.....	....121.....	.....
....253.....	.....2.....	....5763....	.....
....6765....	....2631.21.	...246672...	.....
...144343...	44333631	2...13346112	.....2123..
....1112421.	....2111351.	1114563	..1.111132..
.....3..	.....2..	.....44.	...4.....

SEYCHELLES	MAURITIUS	NAIROBI	HARARE
.....11....	....1221....	....2221....	.....122....
....2365....	....5566....	....65661...	....35673...
...222466...	1..222466...	1..332367...	2..23225721.
5.11..146334	631...146445	7.12...36555	7622...25766
8.1....14788	84.....14788	953.....3788	973.....2688
+2.....4++	+.....4++	+5.....4++	+5.....4++

CAPETOWN	LAGOS	ASCENSION Is	DAKAR
.....33....	....13331...	.....2112...	.....2322...
....24675...	....57676...	....37556...	....17766...
2..133236321	24..63236421	132.64233521	123.75335521
75221..13676	79233...3687	788141..1477	688252..2576
8731....1489	8874....1489	88951....169	88963....269
+5.....5+	5++.....++	+++3.....3+	+5+5.....4+

LAS PALMAS	Sth SHETLAND	FALKLAND Is	R DE JANEIRO
.....1221...	.....1...	.....22...	.....
....17776...	....12345...	.....3465...	.....4313...
122.8766762.	123.6654331.	.13.5643221.	.13.1632231.
688475445776	3561532111122	4782631...22	6782431..134
989852112589	234321.....1	467531.....1	889741....15
++++2....2++	.....	.343.....	+++5.....2

BUENOS AIRES	LIMA	BOGOTA	BARBADOS
.....1...	......111...	.....1....	.....1....
.....2324...	......5541..	......4541..	.....5541..
.13.2642221.	......6422..	.....16432..	.....56333..
4682642...12	125..131...1	124.3331..11	225.3431.122
689741.....2	5886311....1	6785411....2	8775411...15
3++5.....	2++5.....	4++5.....	++55.....2

JAMAICA	BERMUDA	NEW YORK	MEXICO
.....	.....	.....	.....
......253...	......244...	.....43...	.....43...
......6532..	.....16544..	......4654..	.....652..
.12.22321.1.	..2.13321221	..1..134332.	..1..2242..
5673421....2	6673321...14	55723211..13	25713211....
4++5.....	+++5.....2	+++5.....2	.5+5.....

MONTREAL	DENVER	LOS ANGELES	VANCOUVER
.....	.....	.....	.....
.....33...	.....2...	.....1...	.....
.....4664..	.....363..	.....62..	.....22..
.....134332.	.....4421.	.....1.242..	.....1541.
456122111123	255.21111..1	144.22.12...	243.11.1321.
+++5.....2	2++5.....	.3+5.....	.4+5.....

The provisional mean sunspot number for October 1985 issued by the Sunspot Index Data Centre, Brussels, was 18·5. The maximum daily sunspot number was 72 on 22 October, and the minimum was 0 on 1–12, 30 and 31 October. The predicted smoothed sunspot numbers for 6 January, February, March, and April are respectively: (classical method) 8, 7, 6 and 5; (SIDC adjusted values) 0(0 to −6), 0, 0.

Contest News

September 144MHz Trophy and SWL Contest results

Conditions in this contest were remarkably similar to those in 1984 with good tropospheric conditions favouring southern and western stations. As in 1984 there was a good opening to HB9 for the majority of stations, and to EA for the favoured southern stations, and some very high scores were recorded. Indeed, the description of conditions as "average" by some groups suggest that it is now expected that 10 or more Swiss stations will be worked from the Midlands during this event.

GJ4ICD is again awarded the Thorogood Trophy; for the last time, as he claims this is his last 144MHz contest. The Parallel Lines CG, G4LIP/P is again awarded the Mitchell-Milling Trophy. Parallel Lines CG is particularly congratulated on the accuracy of its log, and owe its retention of the trophy to careless logging by GW4NXO/P, who was the clear leader on the basis of claimed scores. Most of the relatively few comments received were in favour of giving details of the station antenna and the second figure in the antenna column is the height of the antenna above ground in metres.

With a few notable exceptions, which show that accurate logging is possible, logging standards were, if anything, worse than last year. Some stations have lost more than 10 per cent of their claimed scores for errors and duplicates, and many logs had more than 50 errors. Completion of all the details on the 427, especially the "section" box, is being regarded as optional, and if rule 2b were enforced, half the entrants would be disqualified.

There were only two bad signal reports, neither substatiated, and only two views on the new locator system. One group expressed strong dislike of radial ring scoring, another equally strong dislike of pts/km scoring. In answer to the first, the adjudicator doesn't have a computer!

The adjudicator thanks everyone who took part, again making the event a highlight of the contest calendar, and all those in the Manchester area who assisted with the checking, especially G4IRB and G4NTY who, as in 1984, spent many hours wading through the 2ft high pile of logs.

G4JLG

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	Loc	Power (dBW)	Ant	Best dx (km)	Best dx (prefix)
1	GJ4ICD	16,230	1,097	89WF	25	1×10P, 12	956	DL5
2	GJ6TMM*	2,808	200	89WE	20	1×16Y, 6	958	DH3
3	G4AGQ†	2,600	224	91OF	20	1×9Y, 10	1,019	EA1
4	G4PIQ	2,463	220	01MU	19	1×14Y, 9	814	F6
5	G4NBS	2,261	226	02AF	20	1×9Y, 9	882	F6
6	G6HKM	2,074	198	01FT	14	1×17Y, 21	829	F6
7	G6IAT†	1,826	200	91TV	21	1×17Y, 11	826	F6
8	G4DFI	1,406	127	01BL	23	1×9Y, 8	737	HB9
9	G0CLP/P	1,402	198	84IG	10	1×8Y, 5	654	F6
10	G6CSY/P	1,269	149	01CL	15	1×9Y, 12	763	HB9
11	G6KUI/P	1,148	163	92HT	20	1×8Y, 5	891	HB9
12	G8ABI/A	1,128	153	91TN	19	1×8Y, 9	761	DK9
13	G8YGD	1,121	120	91PF	10	1×8Y, 9	980	EA1
14	G8UDV/P†	1,096	67	70UM	10	1×9Y, 3	—	—
15	G6ZWS	1,068	100	91KF	20	1×8Y, 9	793	DK9
16	G1FXG	994	91	02IG	18	1×10Y, 9	865	F6
17	G6HXU	982	111	83RF	13	1×6Q, 10	562	F1
18	G4YFN	976	117	91MK	22	1×17Y, 12	847	F6
19	G8DQK	967	99	83RK	16	1×8Y, 8	568	F6
20	G6MXL	906	78	80XR	13	1×8Y, 7	897	EA1
21	G8ZRE†	894	120	83NE	20	1×8Y, 9	555	F6
22	G3ILO	893	43	81VQ	22	1×9Y, 9	893	F6
23	G1DWQ	886	102	90AT	13	1×16Y, 6	908	EA1
24	G4FVK	830	92	92VN	20	1×9Y, 7	770	F5
25	G6HLL	780	83	83RE	10	1×9Y, 10	595	F1
26	G1HLT	733	83	93JD	14	1×9Y, 10	548	F6
27	G3YDY	710	60	01FQ	16	1×9Y, 9	774	F6
28	G4ZNM	645	50	00BS	22	1×6Q, 10	864	F3
29	G4RYV	508	63	9101	10	1×9Y, 8	776	DL0
30	G8OMI	506	73	92CJ	19	1×4Q, 7	465	F6
31	G8GFF	381	64	91VK	4	λ/4, 8	494	F6
32	G0ASA	263	30	91XO	—	—	—	—
33	G0ATR	258	40	92KP	10	1×6Q, 9	376	GJ4
34	G8NMQ/EA2/P	231	11	83XI	4	5λ8, 12	890	G3
35	G6RJZ	133	35	91SN	10	HB9CV, 24	320	F1
36	G6PFN	71	18	92LO	4	S-JIM, 6	—	—

* Runner-up certificate † Zone leader certificate

LISTENER SECTION

Posn	Station	Points	QSOs	Loc	Ant	Best dx (km)	Best dx (prefix)
1	BRS32525	2,130	210	01AK	1×9Y, 7	939	EA1
2	BRS52543	1,351	160	83LT	1×12ZL, 7	621	F6
3	BRS25429	1,271	132	93FX	1×8Y, 9	655	DL2
4	BRS28198	926	100	00HX	2×8Y, 9	643	HB9

ALL OTHER SECTION

Posn	Callsign	Points	QSOs	Loc	Power (dBW)	Ant	Best dx (km)	Best dx (prefix)
1	G4LIP/P	13,097	969	03CE	26	100el, 13	1,211	EA1
2	GW4NXO/P*†	13,071	942	81LQ	26	58el, 10	1,137	EA1
3	G8LNC/P†	12,043	867	90JO	26	4×19Y, 12	1,084	OE5
4	G3EFX/P	11,847	850	90XV	26	2×16Y, 13	1,010	OE5
5	G8NJA/P	11,260	702	80DQ	24	1×17Y, 6	1,288	OE5
6	G1HHH/P†	11,047	731	00HU	26	4×17Y, 24	1,017	EA1
7	GW8KQW/P	10,973	935	82JJ	26	4×9Y, 10	1,237	EA1
8	G4SSS/P	10,917	691	81CC	26	4×11Y, 10	1,209	FC1
9	G4PUB/P	10,632	837	01QI	26	2×11Y, 9	988	EA2
10	GW3OXD/P	10,277	785	82JG	23	4×19Y, 12	1,090	DL6
11	GW4GFX/P	9,675	709	82KD	26	2×17Y, 8	1,121	HB9
12	G4APA/P	9,599	740	94RJ	26	4×9Y, 15	979	HB9
13	G4CDA/P†	9,571	807	93AD	26	4×19Y, 12	1,103	EA1
14	GW6GW/P	9,004	762	81KS	23	4×9Y, 8	1,143	EA1
15	G4BCH/A	8,513	710	0IIO	26	4×16Y, 9	1,120	I4

Posn	Callsign	Points	QSOs	Loc	Power (dBW)	Ant	Best dx (km)	Best dx (prefix)
16	G4SWX	8,378	665	02PB	26	4×19Y, 24	1,147	EA1
17	G3WOI/P	8,300	632	91GI	26	4×9Y, 12	1,025	EA1
18	GD4IOM†	7,068	571	74QD	26	2×16Y, 9	1,210	EA1
19	G4NUT/P	6,858	643	91NV	26	1×16Y, 6	1,064	IW4
20	G8MBI/P	6,578	739	91TW	25	4×9Y, 10	1,072	EA1
21	G4UHF/P	6,533	660	91LT	23	2×17Y, 12	1,048	F6
22	G1FKN/A	6,345	480	00EW	24	2×17Y, 12	1,007	EA1
23	G4WET/P	6,072	634	92CA	25	4×14Y, 10	1,076	IW2
24	G4SIV	5,866	470	92TR	26	4×16Y, 9	988	F1
25	G1DXY/P	5,559	604	91OO	26	4×17Y, 20	948	F6
26	G3ZMS/P	5,323	439	90WV	23	1×16Y, 9	993	EAI
27	G2XV/P	5,297	521	02EB	22	1×16Y, 13	1,096	EAI
28	G3ULT/P	5,277	519	91IH	20	1×13Y, 9	1,222	EAI
29	G3VEF/P	5,133	415	90KX	20	2×13Y, 12	989	EAI
30	G8ZKE/P	5,117	536	82QL	18	1×13Y, 6	1,230	EAI
31	G4CRA/P	4,738	470	01NW	23	2×17Y, 20	875	F6
32	G3IGO/P	4,689	490	91XG	26	1×14P, 10	798	HB9
33	G4LUA/P	4,302	400	02MN	26	4×9Y, 14	845	HB9
34	G1KMI/P	4,295	469	81WF	26	1×17Y, 9	969	HB0
35	G3PIA	4,194	486	91IN	24	2×16Y,12	926	EAI
36	G4SJK/P	4,191	444	81VS	22	2×16Y, 12	1,092	F8
37	G4WAR/P	3,949	514	92LM	26	2×12ZL, 13	889	HB9
38	GM3BSQ/P	3,726	266	86RW	26	1×19Y, 6	885	DL0
39	G3WRS/P	3,691	367	94MJ	22	4×16Y, 12	897	F
40	G4VAT/P	3,396	413	91TW	21	2×12ZL, 6	830	F6
41	G5LK/P	3,122	398	91VG	20	1×10P, 15	1,018	EAI
42	GM4RAH/P	3,073	287	85RU	20	2×9Y, 11	833	F6
43	G4SNX/P	2,890	373	83PO	23	1×16Y, 12	1,130	EAI
44	G8XBF/P	2,667	308	01EO	19	1×16Y, 10	1,060	EAI
45	G3GJL/P	2,519	340	82VE	23	1×14Y, 15	1,249	HB9
46	G6BSE/P	2,492	294	02HE	25	1×16Y, 13	953	F6
47	G1DWI/P	2,331	240	93FK	20	2×18Y, 8	1,053	F6
48	G4BOX/P	2,253	314	91VH	23	1×13Y, 15	753	HB9
49	G0BRA/P	2,170	317	92GB	18	1×14Y, 5	905	HB9
50	G3TRF/P	2,098	266	01HH	20	1×19Y, 13	737	DK0
51	GM6OFO/P	1,994	204	86IE	24	2×17Y, 6	758	F6
52	G1IBM	1,925	240	91UN	26	1×6Y, 40	940	EA2
53	GM6FPX/P	1,924	191	75PS	25	2×10Y, 3	822	F6
54	G0CRW	1,892	189	01CB	20	1×10Y, 8	854	F6
55	GW3YZD/P	1,882	235	83ID	25	4×11Y, 14	1,110	EA1
56	G3ZQM/P	1,794	210	85XF	24	1×14P, 9	744	DL2
57	GW6JXR/P	1,731	173	81GN	20	2×16Y, 9	1,004	HB9
58	G1MDG/P	1,615	242	91PR	20	1×9Y, 6	826	F6
59	G3CNX/P	628	96	93VK	20	1×6Q, 12	710	F6

*Runner-up certificate. †Zone leader certificate
Stations disqualified (rule 2): GM6MGS, G4NVA/P and GI4VIP/P.
Check logs acknowledged from: G8XTV, G4OTV/P, G3BPM and G1GWS.

ZONAL AWARDS

Zone	S-O Section	A-O Section	Zone	S-O Section	A-O Section
A	G8ZRE	GD4IOM	E	No claim	GW4NXO/P
B	G6IAT	G4CDA/P	F	No claim	No claim
C	G4AGQ	GIHHH/P	G	No claim	No claim
D	G8UDV/P	G8LNC/P			

1st Short Wave Listener Contest 1985 results

There was a good response to this experimental swl contest, with 23 logs being received. Logs were, on the whole, of a good standard and well presented. It was pleasing that two G1 licensees took part. A few unmarked duplicates were found, which meant a sizeable loss of points in some cases. A number of entrants failed to show the "station worked" in a separate column, preferring to put both stations in the station heard column and bracketing them together. It is essential that "stations worked" are shown in a separate column. Several entrants tried to claim multipliers for W1, K1, WA1 etc. The rules were quite clear in this respect—only one station from each call area being acceptable as a multiplier. The Russian prefixes once again caused problems. It is essential to have an up-to-date prefix list to correctly ascertain in which Russian republic stations are located. The biggest problem was caused by R2FAA who was located in UA2, but entrants managed to locate him in UA, UP2, UR2 and UC2!

Many listeners obviously pay great attention to their S-meter when giving reports, judging by the number of 51 and 52 reports shown on the higher frequency bands. In these days of 59 contest exchanges it is a welcoming trend, but certain 41 reports gave the adjudicator much cause for thought as to whether the station in question was actually heard. Several overseas logs provided some interesting analyses, especially one from Stan Porter, ORS45992. Many G stations active on 7MHz working Europeans will be rather annoyed to learn that they were 57 in 7Q7!

In view of the success of this experimental contest, the HF Contests Committee has agreed that the event will continue in the 1986 Contests Calendar. Decisions on rule changes will be considered at a later date. Congratulations to the certificate winners.

BRS32525

BRITISH ISLES PHONE

Posn	Callsign	Stations heard	Points	Multipliers	Score
1	BRS52543*	408	695	142	98,690
2	BRS87156*	337	662	147	97,314
3	G1GQB	268	618	81	50,058
4	BRS87427	222	368	93	34,224
5	BRS86204	187	381	83	31,623
6	RS87212	226	402	73	29,346
7	G1GMZ	174	350	82	28,700
8	BRS25429	146	369	59	21,771
9	BRS86340/87239	177	289	55	15,895
10	BRS87383	109	212	54	11,448
11	BRS20249	94	142	60	8,520
12	BRS32525	55	165	40	6,000
13	BRS28198	45	73	34	2,482
14	BRS87725	22	28	18	504

BRITISH ISLES CW

Posn	Callsign	Stations heard	Points	Multipliers	Score
1	BRS31879*	290	754	88	66,352
2	BRS52868	344	490	110	53,900
3	G-10130	233	475	110	52,250
4	BRS48178	239	546	81	44,226

OVERSEAS PHONE

Posn	Callsign	Stations heard	Points	Multipliers	Score
1	ONL383*	822	1,516	244	369,904
2	ONL620	261	586	93	54,498
3	ORS45992/7Q7	300	408	129	52,632
4	ORS87316/DL	115	255	72	18,360
5	ONL6945	135	171	73	12,483

*Certificate winners

70MHz Cumulative Contest rules

1000-1200gmt 26 January; 9, 23 February; 9, 23 March 1986

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1986, will apply. There will be one section for all classes of station. QTH information must be exchanged in accordance with general rule 13.

All entries and check logs to: VHF Contests Committee, c/o D J Robinson, G4FRE, 15 Ferry Lane, Felixstowe, Suffolk IP11 8UR.

144MHz CW Contest rules

0900-1500gmt 2 February 1986

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1986, will apply. Entrants may transmit only A1A (cw) or, F1A (fsk) and contact only other stations transmitting these modes. There will be one section for all classes of station. QTH information need not be exchanged.

All entries and check logs to: VHF Contests Committee, c/o G M C Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

Contests Calendar

1 Jan-31 Dec	UBA SWL *(Rules in December* SWL News)
6-30 January	CW Cumulatives *(Rules in November issue)*
11, 12 January	YL-OM Midwinter *(Rules in January* HF)
11, 12, 18, 19, 25, 26 January	World SSB *(Rules in December* MOTA)
12 January	Affiliated Societies *(Rules in November issue)*
18, 19 January	Hungarian DX *(Rules in January* HF)
24, 25 January	CQ WW 160m DX (CW) *(Rules in January* HF)
26 January	70MHz Cumulative
1, 2 February	7MHz SSB
1, 2, 22, 23 Feb	7MHz *(Rules in October issue)*
2 February	144MHz CW
8, 9 February	First 1·8MHz
9 February	70MHz Cumulative
16 February	432MHz Fixed
22, 23 February	7MHz CW
23 February	70MHz Cumulative
1, 2 March	144/423MHz and SWL
8, 9 March	Commonwealth *(Rules in September 1985 issue)*
9 March	70MHz Cumulative
15 March	Town & County
23 March	70MHz Cumulative
6 April	432MHz CW
6 April	Ropoco 1
20 April	70MHz and SWL
20 April	Low Power Fixed
May-Sept	Microwave Cumulatives
May-Sept	10GHz Cumulatives
3, 4 May	432MHz-24GHz
17, 18 May	144MHz and SWL
18 May	Region Round-up
31 May	1,296MHz Trophy
1 June	432MHz Trophy and SWL
7, 8 June	HF NFD
28, 29 June	Summer 1·8MHz
5, 6 July	VHF NFD and SWL
12, 13 July	HF SWL
20 July	Low Power FD
26 July	144MHz Low Power and SWL
27 July	432MHz Low Power and SWL
3 August	Hopscotch
24 August	1,296/2,320MHz
31 August	Ropoco 2
6, 7 September	144MHz Trophy and SWL
6, 7 September	IARU Region 1 SSB FD
21 September	70MHz Trophy and SWL
4, 5 October	432MHz-24GHz
7 October	432MHz Cumulative
12 October	21/28MHz SSB
15 October	1,296/2,320MHz Cumulative
19 October	21MHz CW
23 October	432MHz Cumulative
26 October	70MHz Fixed
31 October	1,296/2,320MHz Cumulative
1, 2 November	144MHz CW
8 November	432MHz Cumulative
8, 9 November	Second 1·8MHz
16 November	1,296/2,320MHz Cumulative
24 November	432MHz Cumulative
2 December	1,296/2,320MHz Cumulative
7 December	144MHz Fixed and AFS
10 December	432MHz Cumulative
14 December	70MHz CW
18 December	1,296/2,320MHz Cumulative

RSGB UHF/SHF Contest results

Very few stations had favourable comments to make about this major event in the uhf/shf calendar. Propagation conditions were far from being as good as might have been expected for October, although several stations in the JO squares did manage to work some useful continental dx on the uhf bands. The weather, too, was unkind, especially in northern regions. Many stations reported that they had been flooded out overnight, and most had severe difficulties in preventing their dishes becoming airborne at some time during the contest.

Stations in the southeast accounted for much the greater proportion of the activity in this country, which by any standard was disappointingly low on all bands, 432MHz to 24GHz inclusive. Most stations achieved no more than one or two QSOs on any of the bands above 3·4GHz. This may have been due in some measure to the difficulties of keeping a dish on the correct heading, but more probably was a direct consequence of there being not many stations operating within a normal working distance.

Over two thirds of the stations on 1,296MHz complained bitterly of severe QRM from radar. This appeared to have originated from many sources, most of which continued operating throughout the active hours of the contest. At least two stations abandoned the band before the end of the event, and it is now very evident that if the problem gets much worse, either the band will become unworkable in the most seriously affected areas or that some efficient counter-measures will have to be developed which will allow narrow-band ssb to be compatible with wide-band radar. Some stations also experienced QRM from Syledis in the 432MHz band, and while troublesome, it does not seem to have been quite so widespread as was the radar.

Complaints about the new locator code are beginning to subside. G8OHM hit the nail on the head by saying that the outcry against it would have been a whole lot worse had it been the five letter code replacing the new.

Several stations may be disappointed to find that their callsigns do not appear in the RSGB result tables and may not be included in the IARU overall listings. The VHF Contests Committee acknowledges the receipt of these entries for checking purposes but regrets that in the absence of a crystal ball, or a correctly completed cover sheet (Form 427), it was impossible to glean sufficient data to make the entry comply with the basic requirements of the contest rules.

Certificates will be awarded to the leading stations in each section. The runners up will also receive certificates where there have been more than 10 entries in a section.

G2HIF

432MHz BAND SINGLE-OPERATOR SECTION

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3XDY	22,225	68	JO02	HB9CVC/P	689
2	G6IAT	11,728	84	IO91	DK0VS/P	565
3	G3JXN	11,257	92	IO91	DJ9DL	517
4	G4FOH	7,522	31	IO92	F6CTT/P	832
5	G4LRT	3,798	22	IO92	PA2DRV/A	389
6	G1DOX	3,364	34	IO82	F6CTT/P	388
7	G4VRC/P	2,236	32	IO91	G4APA/P	242

432MHz BAND ALL OTHER, SECTION O

1	G8TFI/P	93,378	353	JO01	DH3NAN	735
2	G4RNL/P	89,682	343	IO93	HB9CVC/P	924
3	G4PUB/P	80,359	312	JO01	F1COW/P	725
4	G4LOJ/P	61,680	197	JO02	DL8NBI/F	795
5	G6YLO/A	47,108	166	JO01	DL5AAK/P	626
6	GW4BVY/P	43,902	196	IO82	DJ9DL	715
7	G8ZHP	40,388	165	IO92	DJ9DL	543
8	G4APA/P	37,332	181	IO93	DL0VL/A	853
9	G1FBH/P	15,480	124	JO00	FC1BNN/P	437
10	G5LK/P	462 (radial)	129	IO91	DK0VS/P	530
11	G3FVA/P	391 (radial)	138	IO93	PA0EZ	489
12	GM4ZUK/A	230	2	IO87	GW4BVY/P	550

1,296MHz BAND SINGLE-OPERATOR SECTION

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3XDY	13,032	55	JO02	HB9CVC/P	689
2	G3JXN	5,832	43	IO91	GI4OPH	483
3	G1DOX	2,868	26	IO82	GM4OGM/P	312
4	G4LRT	1,066	13	IO92	PE0MAR/P	360

1,296MHz BAND ALL OTHER, SECTION O

1	G4NXO/P	15,999	76	JO01	DL0HC/P	525
2	G3CKR/P	15,233	79	IO93	PA0WMX	537
3	G4ANT/P	12,998	60	JO02	DK8VR/A	548
4	G8OHM/P	10,273	73	IO92	PA0EZ	457
5	G4NVA/P	8,766	51	IO93	ON7WR/A	506
6	G0ALE/P	8,447	41	JO01	DL0HC/P	541
7	G3PIA/P	6,464	41	IO91	DC9XO	711
8	G6EKR/A	4,266	19	JO01	PA0GUS/P	356
9	G4SIV	3,557	20	IO92	F1DYD/P	403
10	G8LQO/P	223 (radial)	47	IO93	PA0PLY/A	476

2,320MHz BAND SINGLE-OPERATOR SECTION

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3XDY	2,222	16	JO02	PA3BPC/P	291
2	G3JXN	2,001	15	IO91	PE1GHG	335
3	G4LRT	676	7	IO92	G4CBW	107

2,320MHz BAND ALL OTHER, SECTION O

1	G4FRE/P	5,034	26	JO01	DL0HC/P	523
2	G3ZIG/P	2,710	21	JO02	DJ6JJ	439
3	G3OHM/P	2,679	17	IO92	PA0EZ	457
4	G3NNG/P	1,957	13	IO91	PE0MAR/P	392
5	G4CDA/P	1,656	15	IO93	G4TAW	244
6	G4ALE/P	1,081	10	JO01	PA0EZ	312
7	G8FEZ/A	737	3	JO01	PA0EZ	290
8	G4NVA/P	558	7	IO93	G3OHM/P	139
9	G4SIV	360	4	IO92	G4CDA/P	115

3,456MHz BAND SINGLE OPERATOR SECTION

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3FYX/P	53	1	IO81	GW3PPF/P	53

3,456MHz BAND ALL OTHER, SECTION O

1	G4FRE/P	760	6	JO01	PA0EZ	310
2	G4PZZ/P	482	3	JO02	PA0EZ	286
3	G3OHM/P	0	½	IO92	G4LRT	43

5,760MHz BAND ALL OTHER, SECTION O

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3JOC/P	29	1	JO02	G4BYV	29

10GHz BAND SINGLE-OPERATOR SECTION

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3FYX/P	53	1	IO81	GW3PPF/P	53

10GHz BAND ALL OTHER, SECTION O

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G4FRE/P	76	1	JO01	G0BPU/P	76
2	G3OXL/P	17	1	IO92	G8MWR/P	17

24GHz BAND SINGLE-OPERATOR SECTION

Posn	Callsign	Score	QSOs	Loc	Best dx	Km
1	G3FYX/P	53	1	IO81	GW3PPF/P	53

Check logs: GM1FGO, GM1FML, G1KDF, G4PMK, G4TAW, G4ZTR and G6CSY.

HF Contests Championship 1984–5 results

Posn	Callsign	Score	Contests entered	Posn	Callsign	Score	Contests entered
1	G4OBK	6,391	9	38	GM4ZRR	1,262	2
2	G4BUO	6,149	5	39	G3ESF	1,224	2
3	G3FXB	4,680	3	40	G3RSD	1,188	2
4	G4OTU	4,512	8	41	G2MJ	1,165	2
5	G3CCZ	4,260	8	42	G4UMS	1,089	2
6	G3MXJ	4,220	3	43	G3SWC	1,083	2
7	G3RRS	4,000	2	44	G3NKS	1,080	2
8	G4BWP	3,956	2	45	G3AWR	1,000	5
9	G4CNY	3,738	4	46	G3DOT	985	3
10	G2QT	3,391	5	47	G3FYQ	975	2
11	GW3YDX	3,000	3	48	G4KJD	932	2
12	G3SWH	2,936	5	49	G4XFB	912	3
13	G3SXW	2,919	5	50	G4KGK	870	2
14	G5MY	2,760	5	51	G3WRR	814	2
15	G4UPS	2,730	4	52	G4PDQ	771	2
16	G3SYA	2,560	3	53	G3ILO	768	6
17	G3PDL	2,477	3	54	G3OLB	758	2
18	G3PEK	2,474	3	55	G3VYI	746	2
19	G3FKH	2,348	4	56	G3TXF	729	3
20	GW3JI	2,281	5	57	G3UHU	724	3
21	G3UJE	2,270	2	58	G4RHS	721	2
22	G3YEC	2,247	4	59	G4WYG	710	2
23	G3KSH	2,228	5	60	G4EBK	674	4
24	GM3YOR	2,116	2	61	G3BGM	609	2
25	G3JKS	1,988	2	62	G4MET	462	2
26	G4EOF	1,629	2	63	G4XTM	427	3
27	G3ZRH	1,584	4	64	GW4RHW	426	2
28	GW3MPB	1,522	3	65	G3GMM	413	2
29	GM4SID	1,446	3	66	G4ECI	408	2
30	GW4UZL	1,416	2	67	G3FVW	378	2
31	G3BPM	1,383	3	68	GW4PXQ	371	2
32	G2HLU	1,366	2	69	GM8SQ	330	2
33	G4OGB	1,361	3	70	G2AJB	319	2
34	G3SJX	1,359	4	71	G3GMN	267	2
35	G3ZGC	1,332	2	72	G4OKN	244	2
36	G4KHC	1,299	2	73	G4SMN	132	2
37	G4ELZ	1,274	3	74	GW4HBK	114	2

The G2QT trophy was awarded to P J Catterall, G4OBK, and a runner-up certificate to D J Lawley, G4BUO.

Listener Championship 1986 rules

1. In view of the healthy increase in listener participation in the last year, the number of events counting towards the table have been increased.
2. RSGB hf receiving contest general rules do not apply.
3. No entries for the championship are required.
4. The championship will be decided on the basis of the listener contests listed below and starting on 1 February.
5. Points will be awarded to the leading eight UK receiving stations in the results published in *Radio Communication* as follows:

Contest	Position							
	1	2	3	4	5	6	7	8
7MHz Phone	70	55	50	45	35	25	15	5
7MHz CW	70	55	50	45	35	25	15	5
1·8MHz Town & County	50	35	30	25	20	15	10	5
Region Round-up	50	35	30	25	20	15	10	5
HF SSB (July)	80	65	55	45	35	25	15	5
HF CW (July)	80	65	55	45	35	25	15	5
28MHz Cumulatives Phone	40	35	30	25	20	15	10	5
21/28MHz Phone	80	65	55	45	35	25	15	5
21MHz CW	80	65	55	45	35	25	15	5
28MHz Cumulatives CW	40	35	30	25	20	15	10	5

6. A table will be published in *Radio Communication* showing the points gained by each receiving station, and certificates will be awarded to the leading three stations, provided a total of 20 listeners is shown in the final table.

First 1·8MHz Contest 1986 rules

1. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1986, will apply.
2. Date and time. 2100gmt Saturday 8 February to 0100gmt Sunday 9 February 1986.
3. Sections. Single-operator entries only. British Isles entrants must also be members of RSGB.
(a) British Isles.
(b) Overseas (including EI).
4. Band and mode. 1,820–1,870kHz cw only.
5. Exchange. RST plus serial number starting at 001. British Isles entrants must also give their county code as defined in the "Operating Guide".

6. Scoring
(a) British Isles section. Three points for each completed contact, with a bonus of five points for the first contact with each British Isles county and for the first contact with each country outside the British Isles.
(b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each British Isles county.
7. Documentation. Logs to be headed: date/time gmt; callsign; RST/serial number sent; RST/serial number received; county code received; bonus; points. British Isles entrants should use RSGB hf contest log sheets (form HFC1). Duplicates must be clearly marked with no claim for points. Unmarked duplicates will be penalized at the rate of 10 times the number of points claimed, and logs containing more than five such duplicates will normally be disqualified. Each entry must be accompanied by a cover sheet and the following signed declaration: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".
8. Address for entries. British Isles and overseas entries to: RSGB HF Contests Committee, PO Box 73, Lichfield, Staffs WS13 6UJ.
9. Date for entries. Logs must be postmarked not later than 15 days after the end of the contest.
10. Awards
(a) The Somerset Trophy will be awarded to the winning station in the British Isles section, and certificates of merit to the second and third placed entrants.
(b) 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 1985.
(c) Certificates of merit will be sent to the first three stations in the overseas section, and to the leading entrant from each overseas country.
(d) A certificate of merit will be awarded to the highest placed log from an entrant who has not entered a First 1·8MHz Contest before. Candidates for this award should mark their entry "First-time Award".
(e) A certificate of merit will be awarded to the highest placed UK entrant who has reached pensionable age on or before 9 February 1986. Candidates for this award should mark their entry "Senior Citizen's Award".
11. Receiving section
(1) Transmitting section rules 1, 2, 3, 4, 6, 7, 8, 9 will apply.
(2) A station may appear only once in the column headed "Station heard". The callsigns of the stations being worked may only repeat once in every three contacts logged. Logs to be headed: date/time gmt; callsign of station heard; RST/serial number/county code sent by that station; callsign of station being worked.
(3 Certificates of merit will be awarded to the leading three entrants.
(4) Holders of UK Class B licences may enter the receiving section.

432MHz Fixed Station Contest rules

0900-1500gmt 16 February 1986
The general rules published in the "Operating Guide" supplement, *Rad Com* January 1986, will apply. Only fixed stations as defined in general rule 5 may enter. There will be separate single-operator and multi-operator sections, and entrants should mark the 427 cover sheet S or M accordingly. QTH information need not be exchanged.

All entries and check logs to: VHF Contests Committee, c/o M Pharaoh, G3LCH, 49 Streathbourne Road, London SW17 8QZ.

1985 HF NFD footnote

The graph shown on page 801, *Rad Com* October 1985, as part of the HF NFD write-up, was specifically for 28MHz activity only, not all bands.

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published again in **July 1986.**

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the March issue should reach them by 14 January and for the April issue by 18 February.

Club programmes are given in order of date, subject, time and place of meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3644.

Accrington (NW Repeater Group)—Third Thursday of each month, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec G6IKK.
Ainsdale (AARC/G2OA)—8pm. Scout HQ, Marine Drive, Southport. Sec G4YYV, tel 79825.
Barnoldswick (Rolls-Royce ARC)—First Wednesday of each month, 8pm. Rolls-Royce Sports and Social Club. Sec G4ILG, tel 0282 812288.
Barrow-in-Furness (South Lakeland ARS)—First and third Thursdays of each month, 8pm. Norweb Sports & Social Club, rear of the Ormsgill Hotel. Sec G6LKB, tel 0229 54982.
Blackburn (E Lancs RC)—First Tuesday and last Tuesday of each month, 7.30pm. The Conservative Club, Cliff St, Rishton. PRO G6LXU, tel Gt Harwood 887385.
Bolton (B&DARS, G8WY)—8 January (AGM). 8pm. Horwich Leisure Centre. Chairman P Ingham, tel 791918.
Bury (BRS)—Tuesdays, 8pm. Mosses Youth and Community Centre, Cecil St, Bury. 14 January ("Getting started on rtty", G3VC). Contact Caroline, Publicity Officer, G1PKO, tel 061-764 5018. The Hamfeast will be held on Sunday, 9 February at The Mosses Youth & Community Centre.
Carlisle (C&DARS)—Mondays, 7pm. The Scout Hut, Trinity School, Strand Rd, Carlisle. Sec G4ISS, tel 45182.
Chester (C&DARS)—7 January (AGM), 14 January (Talk by Construction Contest winners), 21 January (What to do with failed projects), 28 January (Video tapes, satellite communications, W0ORE lecture), 4 February (Committee meeting). Morse Classes 7.15pm. Main meetings 8pm. Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Details G6IFA, tel 336639.
Crewe (SCARS)—13 January (Talk by the local Crime Prevention Officer). 8pm. The Victoria Club, Gatefield St, Crewe. Details G1PUV, tel Kidsgrove 73185.
Darwen (DARC)—Second Tuesday of each month, 7.30pm. Albion Hotel, Railway Rd, Darwen. Contact G2AKK, tel 0254 73767.
Eccles (E&DARS)—Informal meetings every Tuesday, 9.30pm. Duke of York Hotel, Church St, Eccles. Sec G8KRG, tel 061-773 7899.
Ellesmore Port (EPDARS)—Meetings 14, 28 January, 7.30pm. The Grosvenor Hotel, Ellesmere Port. Details G4STZ, tel 051-339 7201.
Fylde (FARS)—7 January (AGM), 21 January (Informal and morse class). 7.45pm. The Kite Club, Blackpool Airport. Sec G8GG, tel 725717.
Isle of Man (I of M ARS)—Mondays, 8pm. The Howstrake Hotel, Harbour Rd, Onchan. In addition local amateurs meet on Tuesdays, The Peveril Court Hotel, Ramsey; Thursdays, Tynwald Inn, St Johns; Fridays, Perwick Bay Hotel, Port St Mary. Details GD4GWQ, tel 0624 22295.
Kendal (The Westmorland RS)—8pm. The Strickland Arms, Sizergh, Nr Kendal. Details G1IIE, tel 0539 28491.
Leyland Hundred (LHARG)—Details G1AOG. No information from this group received since November 1982.
Liverpool (L&DARS)—7 January ("Police Radio", G8TRY), 14 January (Talk by G1RAL), 21 January (Junk sale), 28 January ("Amateur radio in Germany", G4IHS), 4 February (VHF natter night). 8pm. The Churchill Conservative Club, Church Rd, Liverpool 15. Sec G1EXJ, tel 051-728 8811.
Liverpool (L Raynet Group, G1KOP)—Details G6DXF, tel 051-427 9350.
Liverpool (Riversdale ARS)—Dept Elect and Rad Engineering, Riversdale College of Technology. No other details available.
Liverpool (Sefton ARC)—Every other Wednesday, 8pm. The Liverpool Prison Officers Club, Hornby Place, Walton. Details G1HDU, tel 051-525 6152.
Liverpool (University of Liverpool ARS, G3OUL and G8JUL)—Thursdays, 12.30pm. The Shack, top of the old Union, 2 Bedford Street North, (Top of Brownlow Hill). Contact G1KNM, tel 051-724 2522/3878.
Macclesfield (M&DRS)—No details since 1983.
Manchester (M&DARS)—No details.
Manchester (Umist ARS)—Most lunchtimes, Wednesday afternoons and Thursdays, 8.30pm in the Union Bar. The Society is active on all bands and operates from the top floor of the main building. Details G6HEH, c/o G3CXX, tel 061-236 9114.
Manchester (Trafford ARC)—Thursdays, 7.30pm. The 9th Urmston Scout Hut, Bradfield Rd, Urmston. Sec tel 061-748 9804.
Manchester (MUARS—G3VUM and G8FUM)—Wednesday lunchtimes. The Shack, 1st floor on the Northside of the Students Union, Oxford Rd. Details G6ZGP, tel during term 051-625 7311.
Manchester (SMRC)—3 January (Mini-lecture contest), 10 January ("Labels and printed circuit DIY", G3WFT), 17 January ("Motor cycle radio", G8TRY), 24 January ("Synthesizers", G8UQC), 31 January (Lecture, tba), 7 February (DF event). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Sec G3WFT, tel 061-973 1837.
Manchester (WMRC)—Wednesdays, 8pm. Astley & Tyldesley Miners Welfare, Meanley Rd, Gin Pit Village, Astley, Tyldesley, Manchester. Details G3BSA.
Maryport (The Solway RC, G4BBX)—No details since August 1983.
Merseyside Raynet—Details from County Controller, G8RXB, tel 051-638 5879.
Morecambe (MBARS)—Mondays, 7.30pm. Canteen of The Luneside Engineering Co, Mill Lane, Halton, Nr Lancaster, Contact G3PER, tel Heysham 52659.
Oldham (OARC)—Thursdays, 8.30pm. The Moorside Conservative Club, Ripponden Rd, Moorside, Oldham. Sec G4SPX, tel 061-652 8862.
Ormskirk (O&DARC)—First Thursday in each month, 8pm. Ormskirk Community Centre. Contact G1KDF, tel 44 74868.
Penrith (Eden Valley RS)—Third Thursdays each month. The Ullswater School, Penrith. 16 January (Table-Top rally). Details G1FBD, tel 0768 88260.
Preston (PARS)—Alternative Thursdays, 8pm. Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Sec G3ZXC, tel 0772 718175.
Rossendale (RVARC)—Thursdays, 8pm. The Bishop Blaize Hotel, A56 in Rawtenstall. Sec G1EIU, tel 0706 214411.
St Helens (SH&DARC)—Thursdays, 7.30pm. The Scout Hut, Parish Church Recreation Ground (Opposite the open-air school), Rainford Rd, St Helens. Details G1GNS, tel 092-572 6821.
Salford (Salford University Communications Society)—No details since 1982.
Skelmersdale (S&DARC)—Thursdays, 8pm. Beacon Park Centre, Dalton Lane, Skelmersdale. 9 January (Activity night), 16 January ("Computer in radio-spectrum", G6IKV), 23 January (Project Night), 30 January ("QSL cards", G4ZAF). Contact G4ZPY, tel 0704 894299.
Stockport (SRS)—8 January (Natter nite), 11 January (Annual party, the Southlands Hotel), 22 January ("RF synthesizers", D Bolton). 8pm. The Magnet Inn, Wellington Rd North (A6), Stockport. Sec G4FFW, tel 061-224 7880.

Tarporley (Mid-Cheshire ARS)—Wednesdays, 7.30pm. The Cotebrook Village Hall. Off the A49, Cotebrook, Nr Tarporley. Sec G4VOH, tel Winsford 4719.
Thornton Cleveleys (TCARS)—6 January (Technical aspects of radar—video), 13 January (Informal, with club on the air), 20 January ("Computers in amateur radio", informal demonstration by G4YVQ and G4APP), 27 January (Club on air/informal night). 7.45pm. 1st Norbreck Scout HQ, Carr Lane, Bispham, Blackpool. Details G4BFH, tel 0253 853554.
Warrington (WARC)—Tuesdays, 7.30pm. Grappenhall Community Centre, Bell House Lane, Warrington. Details G Wood, tel 0925 8420.
Wigan (Douglas Valley ARS)—8pm. Shevington Conservative Club, Shevington, Wigan. Sec G4XMG. Details, G4GWG, tel 211397.
Wirral (WARS)—First and third Wednesdays, 8pm. Heswall Parish Church Hall, Heswall. Sec G4KPY, tel 051-625 7311.
Wirral (W&DARC)—8 January (AGM No 8), 15 January (D&W), 22 January (Junk sale), 29 January (D&W). 8pm. Irby Cricket Club, Mill Hill Rd, Irby. Sec G8TRY, tel 051-630 1393.
Wirral Raynet Group—Details G6FNF, tel 653 4067.
Woodford (RATEC)—6 January (Natter night, if you're not at a 12th night party), 13 January ("Amateur radio on a shoe-string". Rev G Dobbs G3RJV), 27 January (Professional Recording Gear etc," Harold, G1AEO). 8pm. British Legion Club, Moor Lane, Woodford, Nr. Bramhall, Cheshire. Details G4SFU, tel 061-485 3912.

Thanks to all clubs for their invitations and hospitality. Thanks to Stockport and S Cheshire societies for their invitations. My wife and I have great pleasure in accepting. *RR1*

REGION 2—RR P R Sheppard, G4EJP, 9 Elvington Crescent, Leconfield, N Humberside HU17 7LX. Tel 0401 50397.

Area representatives
J Clegg, G3FGH, Huddersfield
G4IWR, Hull
P Gilson, G3WSZ, Leeds North
G4RCH, Leeds South and Morley
G4BVV, Maltby
M J Valentine, Mexborough and district
G4BLT, Wakefield
G3WVO, York

Doncaster (D&D Raynet Group)—14 January (Monthly meeting). 7.30pm. Sypte Club, North Bridge. Details G4NZX, tel 0302 854985.
Halifax (H&DARS, G2UG)—January (Club dinner). The Running Man PH, Pellon Lane. Details G0DLM, tel 202306.
Halifax (Northern Heights ARS, GZSU)—8.15pm. Bradshaw Tavern, Halifax. Details G3UI, tel 60574.
Goole (GR&ES, G8HSG)—Junior Chambers, Boothferry Rd, Goole. Details G6REL.
Hornsea (HARC, G4EKT)—Wednesdays, 7.30pm. The Mill, Atwick Rd. The club reports a successful second ELHOEX at Hornsea in October. Thanks to Hull, Goole, Scunthorpe and Scarborough clubs. Details G4YTV, tel 0401 50397.
Hull (H&DARS, G3AMW)—Fridays, 7.30pm. The Recreational Centre, Walton St. Details G4PEP, tel 0482 77249.
Humberside Repeater Group (GB3GC, HA, HS, HU)—Committee for 1986: chairman G6JF; secretary G4NJP; treasurer G3OJM. Details G4NJP.
Leconfield (RCT ARS, G4GGD)—Thursdays 7.30pm. Normandy Barracks. 9 January (Morse course registrations). Details G4ZJW or G4SMB, tel 0401 51200.
Leeds (L&DARS, G4LAD)—Monday evenings. Yarnbury RUFC, Brownberrie Lane, Horsforth, Leeds. Details G1EBS, tel 0274 665355.
Leeds (White Rose ARS, G3XEP)—1 January (Shack open), 8 January (Test gear night), 15 January (Natter night), 22 January ("Amateur radio in Jordan", JY6WR/G4ATZ), 29 January (Natter night). Moortown RUFC, Moss Valley, Kings Lane, Leeds. Details G6NIZ.
Maltby (MARS, G4SKM)—Fridays. Church Buildings, Church Lane, Maltby. Details G3ZHI, tel 0709 814911.
Pontefract (P&DARS, G3FYQ)—6 January (Annual junk sale), 23 January (Project evening). Carleton Community Centre, Pontefract. Details G0AAD, tel 0977 43101.
Sheffield (SARC)—Wednesdays. Telephone House. Details G8REM, tel 0742 732832.
Sven Valley (SVARS, G3SVC)—16 January (Fast scan link-up with Wakefield ARC). Old Bank Working Men's Club, Mirfield. Details G4PHR, tel Mirfield 499397.
Todmorden (T&DARS)—6 January (Judging of construction project). 8pm. Queen Hotel, Todmorden. Details G6MDB, tel 2494.
Wakefield (W&DARS, G3WRS)—Alternate Thursdays. Ossett Community Centre. Details G8PBE, tel 378727.
Wakefield (North WRC, G4NOK)—2 January (Chairman's welcome and subs), 9 January (Visit to Blood Transfusion Service HQ), 16 January (Visit to Pontefract junk sale), 23 January (Talk on weather by staff from Leeds Weather Centre), 30 January (Monthly meeting). White Horse PH. Details G4RCH, tel Morley 536633.
UK FM Group (Northern, G8KFM)—First Sunday each month. The Royal Hotel, Barnsley. Details G4UNA.
York (YARS, G3HWW)—7.30pm. United Services Club, Micklegate. Details G3WVO.

REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0203 616941.

Area representatives
N Read, G8CXL, Warwick
I Hopwood, G6CWK, Stratford
M Henley, G3OQO, Rugby
B Jones, G8ASO, Worcester
L Craven, G4EQI, S Birmingham
J K Harvey, G4IVJ, S W Birmingham
S H Jesson, G4CNY, Hereford
D Bushell, G4WAD, Evesham

Aerial Radio Group—Club for BBC personnel only. Contact G3DEF or G3PGG.
Atherstone (AARC)—Second and fourth Mondays each month. Sixth Form College, Long St, Atherstone. 13 January (Discussion night), 27 January (Surprise speaker). Sec G6YQU, tel Chapel End 393518.
Birmingham (Aston University RS)—Lunchtime Mondays and Fridays. Sec G1KTH, tel 021-359 3611 ext 5115.
Birmingham (Midland ARS)—Mondays, construction night. First Tuesday in each month, committee meeting. Second Tuesday, computer night. Third Tuesday, Lecture. Fourth Tuesday, Raynet Group meetings. Wednesdays, morse and natter night. Thursdays, night on the air. Fridays RAE class. Weekends, contests. Unit 5, Henstead House, Henstead St (off Bromsgrove St). Sec G8BHE, tel 021-422 9787.
Birmingham (Slade RS)—First Friday each month, 7.45pm. Community Centre, 75 Kingsbury Rd, Erdington, Birmingham. Sec G4FGF, tel 021-770 3473.
Birmingham (B south RS)—7.45pm. Hampstead House, Fairfax Rd, West Heath, Birmingham. Sec T Scrimshaw, tel 021-476 8312.
Birmingham (B University RS)—Every day, 1pm. Fridays, club night. Tuesdays 7.30pm, RAE classes. Club Room, Second Floor, Union Building. Sec GW4YEG.
Bridgnorth (Severn RS)—No details available. Sec E Churchyard, 11 Greenfields Drive, Bridgnorth.
Bromsgrove (BARS)—8pm. Hundred House, Stourbridge Rd, Bromsgrove. Regular morse classes open to all. Sec G4LVK.
Bromsgrove (B&DARC)—Alternative Fridays, 8pm. Avoncroft Arts Centre, Bromsgrove. Thursdays, club net 144·575MHz and morse tuition. Sec G4NYH, tel 73847.
Burton on Trent (BoTARS)—Wednesdays, 8pm. Stapenhill Institute, Main St, Stapenhill. Sec G4HBY, tel 0283 62344.
Cannock Chase (CCARS)—Thursdays, 8pm. Bridgetown War Memorial Club, Union St, Bridgetown, Nr Cannock. Details from sec G8HZP, tel 0922 416419.
Coventry (CARS)—Fridays, 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. 3 January (Computer evening), 10 January (Night on the air/project), 17 January (Quiz), 24 January (Night on the air/project), 31 January (Junk sale). Sec G4JDO, tel 73999.
Coventry (Tech ARS)—Mondays, 7pm. Room E17, Wynfray Bldg, Technical College, Coventry.
Droitwich (DARC)—Second and Fourth Mondays each month, 8pm. Scout HQ, Droitwich. Sec G4HFP, tel 02993 3818.
Dudley (DARC)—Mondays, 7.45pm. Allied Centre, Greenman Alley, Tower St, Dudley. Sec G4NRA, tel 0384 278300.
Evesham (BBB Contest Group)—Private club. Contest working only. Sec G4WAD, tel 0386 6246.
Halesowen (MEB RC)—14 January (Informal), 28 January (Natter night). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.
Hereford (HARS)—3 January (Audio-visual show), 17 January (Informal). 8pm. Civil Defence HQ, Goal St, Hereford. Sec G3WRQ, tel 0432 54064.
Keele (UoKARS)—Mondays, 7.30pm. Room 112, Physics Bldg. Sec G4TQB, tel 0782 621111.
Kidderminster (KARC)—Every other Tuesday, 8pm. Aggborough Community Centre, Hoo Rd, Kidderminster. Sec G8WOX, tel 0562 751584.
Lichfield (Chad RC)—Mondays, 8.30pm. Cricket Club, Birmingham Rd, Lichfield. Sec G4ESK, tel 23919.
Malvern Hills (MHARC)—Second Tuesday each month, 8pm. Red Lion Inn, St Anne's Rd, Malvern. Sec G4TXG, tel 65802.
Much Wenlock (ARES)—Second and fourth Monday, 8pm. Raven Hotel, Much Wenlock. Sec G3ZSL, tel 07462 861332.
North Staffs (NSARC)—8pm. Harold Clowes, Community Centre, Dawlish Rd, Bentilee, Stoke on Trent. Sec G6MLI, tel 0782 332657.
Oswestry (O&DARC)—First Tuesday each month, 8pm. Bell Hotel, Oswestry. Sec GW6YIY.
Redditch (RARC)—8pm. WRVS Centre, Ludlow Rd, Redditch. Sec G3EVT, tel 0789 762041.
Rugby (RATS)—7 January ("The RSGB", G8MWR), 29 January (Visit to Rugby Radio). 7.30pm. Cricket Pavilion, "B" entrance, Rugby Radio Station. Sec G4TWH.
Shropshire (Salop ARS)—Thursdays, 8pm. Old Bucks Head, Frankwell, Shewsbury. 9 January ("Fast scan tv", G8DIR), 23 January (Film night). Sec G6OMJ, tel 0743 67799.
Solihull (SARS)—Third Thursday each month. The Shirley Centre, Stratford Rd, Shirley. Sec G8AYY, tel 021-783 2996.
Solihull Contest Group—Sec G4PYR, tel 021-744 1558 or Prestel 217458337.
Stafford (SARS)—Tuesdays, 8.30pm. The Coach and Horses, Pasturefields, Staffs. Sec G4RWQ, tel 0785 714963.
Stoke on Trent (SoTARS)—Thursdays, 7.30pm. The Cottage, 2A Race Course Rd, Oakhill, Stoke on Trent. Sec G4IMV, tel 0762 613207.
Stourbridge (SARS)—First and third Mondays, 8pm. Robin Woods Centre, School St, off Enville St, Stourbridge. 6 January (Natter night), 20 January (Constructors' Contest). Sec Mr Williamson, tel 392006.
Stratford upon Avon (SuAARC)—Second and fourth Mondays each month, 7.30pm. Baptist Church, Payton St, Stratford upon Avon. 13 January ("Terry gets technical", G3MXH), 27 January ("Contest strategy", G3HCT). Sec G8OVC, tel 750584.
Sutton Coldfield (SCRS)—Second and fourth Mondays each month, 7.30pm. The Public Library, Sainsbury Centre, Sutton Coldfield. Sec G3CNV, tel 021-354 4369.
Tamworth (TARS)—Mondays, 8pm. Rugby Club, Cotton Green, Tamworth. Sec G4SRI, tel 0827 68137.
Telford (TARS)—8 January (Open meeting), 15 January ("Planning for VHF NFD", G6UDX), 22 January ("Slow scan tv", G4IUT), 29 January ("Using test gear", G6UDX). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G0CZD, tel 0952 770568.
Tenbury (TARS)—Thursdays, 7.45pm. The Barn, Pool House, Hanley Childe, Tenbury Wells. Sec G6PQX, tel 08854 274.
Walsall (WARC)—Wednesdays, 8pm. Forest Comprehensive School, Bloxwich. Sec G6HZI, tel 0922 32607.
Mid Warwicks (MWARS)—Second and fourth Tuesday each month, 8pm. St John HQ, 61 Emscote Rd, Warwick. Sec G6VHI.
Warwick (UoWARC)—Wednesdays, 1pm and 7.30pm. The "Cholo". Sec G1NFR, tel Coventry 503702.
Wells (Krautkramer ARC)—Private club.
West Bromwich (WBARC)—Sundays, 8pm. The Hop and Barleycorn, Dartmouth St, West Bromwich. Sec G6ZLW, tel 021-553 0531.
West Midlands (Police ARC)—Sec D Mytton, tel 021-458 3236.
Willenhall (WARS)—Wednesdays, 8.30pm. Cross Keys, Willenhall. Sec G4LWI, tel 0902 782036.
Wolverhampton (WARS)—Tuesdays, 8pm. Electricity Sports Club, St Marks Rd, Chapel Ash, Wolverhampton. 7 January (Night on the air/your problems solved), 14 January (Discussion night), 21 January ("The Radio Regulatory Dept", G4PZA), 28 January (Night on the air and discussion groups). Sec K Jenkinson, tel 0902 24870.
Worcester (WARC)—6 January (Police communications) 15 January (Informal), 17 January (Quiz

versus Cheltenham area). 8pm. Oddfellows Club, New St, Worcester. Sec G4RBD, 14 Oakleigh Heath, Hallow, Worcester.
Worcester Moonbounce Society—Sec P Crosland, tel 0905 620041.
Wordsley (WRC)—8pm. The Vine Inn, Camp Hill, Wordsley. Sec G4VJU.
Wythall (WARC)—Tuesdays, 7.30pm. Community Centre, Silver St, Wythall. Sec G4SMA, tel 021-444 2427.

May I thank all the clubs who have made me welcome at their meetings during the past year. *RR3*

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey DE3 2BJ. Tel Derby (0332) 556875.

Alfreton (A&DARC)—Mondays, 8pm. Swan & Salmon, Alfreton. First Monday in each month, night on air. Sec G1BWE.
Bolsover (BARS)—1 January (No meeting), 8 January (Committee/natter night), 15 January (Duff pressie sale for club funds), 22 January (GDO Construction Contest, a progress report) 29 January (Natter night). 8pm. The Black Bull, Bolsover. Sec G1GNC, tel Chesterfield 824061.
Buxton (BARS)—Second and fourth Tuesday of each month. Haddon Hall Hotel, London Rd, Buxton. 8pm. Sec G6MIF, tel 6174.
Derby (DADARS)—1 January (New Year junk sale), 8 January (Mayorial reception, at Council House, Derby), 15 January (Year in retrospect), 22 January (Night on the air, GB3ERD), 29 January ("My visit to China", G4MHB). 7.30pm. 119 Green Lane, Derby. Sec G4EYM, tel 556875.
Derby (NHARG)—3 January (Shack night), 10 January ("WW2 Radio", BRS85130), 17 January ("Model engineering", G3EMJ), 24 January (Shack reopening), 31 January (Talk by Alan Dunford, G3XOF), 7 February (AGM). 7.45pm. Nunsfield House, Boulton Lane, Derby. Sec G4PZY, tel Derby 767994.
Grantham (GRC)—Third Tuesday in each month, 7.30pm. Shirley Croft Hotel, Harrowby Rd, Grantham. Sec J Kirton, tel 65743.
Grimsby (GARS)—9 January (Co-axial traps and dipoles), 23 January (Sunspots). 7.30pm. Cromwell Social Club, Cromwell Rd, Grimsby. Sec G4EBK, tel Grimsby 887720.
Heanor (SE Derbyshire ARS)—Each Tuesday during term. South East Derbyshire College, Ilkeston Rd, Heanor. Sec G8RZM.
Hinckley (HARES)—Second Wednesday in each month, 7.30pm. John Cleveland College, Butts Lane, Hinckley. Sec G8STX, tel 632778.
Leicester (LRS)—Sundays, 10.30am and Mondays, 7.30pm. Gilroes Cottages, Groby Rd, Leicester. Sec G4PDZ, tel Leicester 871086.
Leicester (Wigston ARC)—Fridays, 7.30pm. Wigston United Reform Church, Long St, Wigston. Sec G6HAJ, tel Leicester 403105.
Lincoln (LSWC)—Wednesdays, 8pm. City Engineers Club, Waterside South, Lincoln. Sec G4STO, tel Gainsborough 788356.
Loughborough (L Falcon ARC)—Fridays, 8pm. Brush Sports and Social Club, Fennal St, Loughborough. Sec G4RVW, tel Quorn 412043.
Mansfield (MARS)—First Friday and Third Tuesday in each month. Victoria Social Club, Princes St, Mansfield. Sec G1DZH.
Market Harborough (Welland Valley ARS)—Mondays, 7.15pm. Welland Park College, Market Harborough. Sec G3LSL, tel 880746.
Marlpool (Notts & Derby Border ARC)—7 January (VHF activity night), 14 January ("Solar power", G4UFC). 7.30pm. United Reform Church, Chapel St, Marlpool. Sec G4UFC, tel Ilkeston 302990.
Melton Mowbray (MMARS)—17 January ("Leicester University Ionospheric Group", G4JCG). 7.30pm. St Johns Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec G3NVK, tel 63369.
Newark (N&DARC)—First Thursday in each month, 7.30pm. Worthington Simpson Sports & Social Club, Hawton Lane, Balderton, Newark. Sec G4SDZ.
Nottingham (ARCON)—2 January (Night on the air), 9 January (Amateur radio's newest frontier —video), 16 January ("My visit to China", G4MHB), 23 January (It nearly worked, club members), 30 January (Forum). 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Rd, Nottingham. Sec G4JAE, tel 232604.
Nottingham (Plessey ARS)—Thursdays, 8pm. Plessey Communications, Beeston, Nottingham. Sec G4VFK, tel 226321.
Scunthorpe (S&DARC)—Tuesdays, 8pm. Grange Farm Hobbies Centre, Franklin Close, Scunthorpe. Sec G4ZGJ, tel Scunthorpe 732268.
Skegness (S&DARS)—First Friday in each month, 7.30pm. White Swan, Burgh le Marsh. Sec G1ONN.
Spalding (S&DARS)—First Friday in each month, 7.30pm. The Ship Albion, Albion St, Spalding. Sec G4ZGT, tel 2781.
Stamford (SADARC)—Wednesdays, twice monthly. Sec G4OSM, tel 54433.
Worksop (WARS)—Tuesdays, 7.30pm. The Maltkins, Gateford Rd, Worksop. Sec G4ZUN, tel Worksop 486614.

REGION 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515 or at work on 0582 21151.

Bedford (B&DARC)—Wednesdays, 7.30pm. The Queen's Engineering Works social Club, Hurst Grove, Bedford. Present secretary's name not known.
Bedford (Bedford Modern School RS)—This club is run for boys at the school, Manton Lane, Bedford. Sec P A J Worden. Contact for correspondence, N E Kinselley, G1BYT.
Cambridge (C&DARC)—Friday evenings. Colleridge Community College, Radegund Rd, Cambridge. Morse classes start at 7.30pm. 3 January (No meeting), 10 January (Facsimile (Fax) reception), 17 January (Informal evening), 24 January (Second talk on Lasers), 31 January (Informal). Sec G4TRO, PRO G1ALF.
Cambridge (University Wireless Society)—No details available.
Daventry (DARC)—First Thursday each month. The Dunn Cow PH, Daventry. Workshop on Wednesday evening at Raynet Control Centre. Sec G1JDZ.
Dunstable (D Downs RC)—3 January (The idiots construction contest) 17 January (Junk sale), 31 January ("The space shuttle", RSGB film). 8pm. Room 3, Chews House, High St South, Dunstable, Beds.
Kent (Process Controls ARC)—This club is "in mothballs". Further information from G3DOT.
Leighton (L Linslade RC)—First and third Monday of each month, except during school holidays, 7.30pm. Room A64, Vandyke Community Centre, Vandyke Rd, Leighton Buzzard. Sec D Jones, 36 Green Way, Longville, Bucks MK17 0AP.
March (M&DARS)—Tuesdays, 7.30pm. Room 7, Neale Wade Adult Education Centre, Station Rd, March, Cambs. Sec G4KPZ.
Milton Keynes (MK&DARS)—Second Monday each month, 8pm. The Community Centre, Hodge Lea Lane, Hodge Lea, Nr Wolverton. Sec G3ZPA.
Nene Valley (NVRC)—8pm. The Prince of Wales PH, Well St, Finedon, Northants. Sec G4XEN.
Northampton (NRC)—Thursday evenings, 8pm. Kingsthorpe Community Centre. Sec G4YJP.
Peterborough (GPARC)—Fourth Thursday each month, 7.30pm. Southfield Junior School, Stanground, Peterborough. Sec G4NRJ.
Peterborough (Radio & Electronics Society)—Chairman G4NUG; secretary G6TAV. No further details.
Shefford (S&DARS)—Thursdays, 8pm. The Church Hall, Shefford, Beds. 9 January (First meeting of 1986). Chairman G6PVS; secretary G4PSO.
Texas (Instrument ARC)—Last Thursday or Friday of each month. Chairman G1JKF; secretary G1IGX.

In addition to the above clubs, the region supports three repeater groups: the Cambridge Repeater Group; the North Cambridge Repeater Group; the Marston Vale Repeater Group. *RR5*

REGION 6—RR F S G Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (A Vale RS)—c/o 9 Conigre, Chinnor, Oxon OX4 JY.
Aylesbury (A Vale Repeater Group)—Hunter Moon, Buckingham Rd, Hardwick, Aylesbury, Bucks.
Banbury (BARS)—64 Mascord Rd, Banbury, Oxon OX16 0NB.
Berkshire (B Downs Repeater Group)—This group provides the services GB3RD and GB3BK. Contributions to running costs will be gratefully received by the sec, G4CCC.
Bracknell (BARC)—81 Quintilis, Roman Hill, Bracknell, Berks RG12 4QQ.
Burnham Beeches (BBRC)—6 January (Natter night), 20 January (Junk sale), 3 February ("Mobile antenna measurements", G0BCQ), 17 February (Talk by Pat Hawker, G3VA), 3 March (AGM—Please attend), 17 March ("Electronic news gathering", G4XMJ). PRO G6EIL.
Caversham (Aerial Radio Group)—57 St Johns Rd, Caversham, Reading RG4 0AL.
Chesham (C&DARS)—Wednesdays, 8pm. The Stable Loft, Bury Farm, Pednor Rd, Chesham. Sec G3SNQ, tel Great Missenden 2516.
Chiltern (CARC)—R Ray, G3NCL, Parish Piece, Holmer Green, High Wycombe, Bucks HP15 6SP.
Didcot (Vale of White Horse ARS)—First and third Tuesday each month, 8pm. Clubroom of the Waterwitch, Cockroft Rd, Didcot, Oxon. Most members collect in the bar from 7.30pm. All welcome. Details G4SYL, tel 0235 816845.
Halton (RAF Halton AR&EC)—c/o 6 Mansion Hill, Halton, Bucks.
Reading (RARC, G3ULT)—Alternate Tuesdays, 8pm. Clubroom of the White Horse PH, Peppard, Rd (B481), Emmer Green, Reading. 7 January (First meeting) New sec after December's agm.
Reading (RARC, G4RSC)—Reading School, Erleigh Rd, Berks RG1 7HH.
Reading (British Telecom Radio Club, G4LNV)—Third Wednesday of each month. The local BT Building. Details G4MUT, tel 693766.
Wallingford (RAFARS)—Details G6ZH, 38 Breaford Close, Cholsey, Wallingford, Oxon OX10 9PZ.

REGION 7—RR R Sykes, G3NFV, 16 The Ridgeway, Leatherhead, Surrey KT22 9AZ.

Addiscombe (AARC)—Tuesdays (Informal). 9pm. Lion Inn, Pawsons Rd, Croydon. Sec G3SJX, tel 01-656 9054.
Ashford (Echelford ARS)—Second Monday and last Thursday of each month. 13 January (Frequency and power measurement), 30 January ("Science Museum—radio section", G3JUL). 8pm. The Hall, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 783823.
Bexleyheath (North Kent RS)—First and third Tuesday each month. 2 January (Quiz against Cray Valley, at Cray Valley), 21 January (Lecture). 8pm. The Pop-in-Parlour, Graham Rd, Bexleyheath. Sec G6CUE, tel 01-309 7214.
Biggin Hill (BHARC)—Third Tuesday each month, 8.30pm. St Marks Church Hall, Church Rd, Biggin Hill. Sec G0AMP, tel 0689 57848.
Coulsdon (CATS)—Second Monday and last Thursday each month, 8pm. St Swithuns Church Hall, Grovelands Rd, Purley, Surrey. Sec G6HC, tel 01-684 0610.
Cray Valley (CVRS)—First and third Thursday each month. 2 January (Club quiz against North Kent RS). 8pm. For new venue details—G3TAA.
Croydon (SRCC)—First and third Monday each month, 8pm. TS Terra Nova, 34 The Waldrons, S Croydon, Surrey. Sec G8IYS, tel 01-657 0454.
Crystal Palace (CP & DRS)— Third Saturday each month. 18 January ("Facsimile", G8BMQ). 8pm. All Saints Parish Room, Upper Norwood SE19. Sec G3FZL, tel 01-699 6940.
Dorking (D & DRS)—Second and fourth Tuesday each month. 14 January (Informal, Star and Garter Hotel), 28 January (AGM). 8pm. Ashcombe School, Dorking. Sec G3AEZ, tel 0306 77236.
Farnham VHF Group—Second and fourth Monday each month, 8pm. Farnham Central Club, Farnham, Surrey. Contact G4EPX, tel 0734 787298.
Guildford (G & DRS)—Second and fourth Friday each month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4KXA.
Guildford (UHF Repeater Group)—First Thursday each month, 8.45pm. Anchor and Horseshoe, Burpham, Guildford. Details G4EML.
Kingston (KDARS)—Third Wednesday each month, 8pm. "Alfriston", 3 Berrylands Rd, Surbiton. Sec G3ODH, tel Epsom 26005.
New Cross (Clifton ARS)—Fridays. 10 January (Computer evening), 24 January (Scanning receiver display). 8pm. Telegraph Hill Community Centre, Kitto Rd, New Cross SE14. Sec R Hinton, 42 Sutcliffe Rd, Welling, Kent.
Redhill (RATS)—Third Tuesday each month, 8pm. Constitutional and Conservative Club, Warwick Rd, Redhill. Sec G8JXV.
Surbiton (308 ARC)—Last Tuesday each month, 8pm. The Coach House, Church Hill Rd, Surbiton. Details G0CFH, tel 01-397 9403.
Sutton and Cheam (S & CRS)—Third Friday each month. 17 January ("Solders and fluxes", G6YAF). 8pm. Downs Lawn Tennis Club, Holland Ave, Cheam, Surrey. Sec G4BOX.
Thames Ditton (TVARTS)—First Tuesday each month, 8pm. Thames Ditton Library, Watts Rd, Giggs Hill, Thames Ditton. Sec G3ENI.
Wimbledon (W & DRS)—Second and last Friday each month, 8pm. St John Ambulance HQ, 124 Kingston Rd, Wimbledon SW19. Sec G3DWW, tel 01-540 2180.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE.

Area representatives
S D Reeks, G4WCP, Hastings
J Brooker, G3JMB, Horsham, Crawley & Mid-Sussex
G D Edy, G4AXD, Maidstone & District
B A Hancock, G4NPM, Swale
B E Pearson, G0CBY, Thanet
F J W Perry, G8ZXC, West Kent
S G Williams, G3LQI, Worthing & District

Brighton (BADRS)—First and third Wednesday each month, 8pm. The Seven Furlong Bar, Brighton Race Course. Details G4IIL, tel 607737., Morse classes every Monday, 7.30pm, at Cromwell Rd, Hove. Details G4HLH or G3YY.
Burgess Hill (Mid-Sussex ARS)—Thursdays (except during school holidays). Marle Place, Burgess Hill. Details G1FRF, tel 07918 2937.
Canterbury (UOKARS)—Tuesdays, 7.30pm. The Radio Shack, beside the Oast House, beside Parkwood residences. Details G4SAY.
Canterbury (East Kent ARS)—First and third Thursday each month, 7.30pm. Radio Cabin, Kings Rd, Herne Bay. 2 January (Junk sale), 16 January (Natter night). Details G4RIS.
Chichester (CARC)—First and third Thursday each month. The Fernleigh Centre, 40 North St, Chichester. Details G4EHG, tel 789587.
Crawley (CARC)—Fourth Wednesday each month. Trinity United Reform Church Hall, Ifield, Crawley. Details G4IQM, tel 882641.
Dartford (DDFC)—7 January (Pre-hunt meeting), 12 January (Club hunt). Pre-hunt meetings held after 9pm, Horse and Groom PH, Leyton Cross, Dartford Heath. Details G8DYF, tel Greenhithe 844467.
Darenth Valley (DVRS)—Wednesdays, twice each month, 8pm. Crockenhill Village Hall, nr Swanley. 29 January (Talk by C Ridley of KW Ten-Tech). Details G1NMX, tel Orpington 26951.
Dover (SEKYMCARC)—Wednesdays, 7.45pm. Dover YMCA, Godwynehurst, Leyburne Rd, Dover. Details G3VSU, tel 0304 822738.
Eastbourne Electronics (EEARS)—Sundays, 7.30pm Archery Youth Centre, Seaside, Eastbourne. Details G1EJB, tel 765701.
Eastbourne (Southdown ARS)—First Monday each month, 7.30pm. Chaseley Home, Bolsover Rd, Eastbourne. Also Tuesdays and Fridays, 7pm, at the Clubrooms, Wealden Council Office, Vicarage Fields, Hailsham. 6 January (AGM). 8pm. Details G1BAB, tel 890234.
Edenbridge (EARS)—Second Wednesday each month. The Scout Hut, High St, Edenbridge. Details G8VCH, tel East Grinstead 24748.
Gillingham (BRATS)—Thursdays, 8pm. Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham. Details G4ZTF, tel Medway 374670.
Gravesend (GRS)—Mondays, 8pm. The Windmill Tavern, Shrubbery Rd. Details G4BNQ.
Hastings (HERC)—Third Wednesday each month. West Hill Community Centre, Croft Rd, Hastings. Also Fridays, 8pm at Ashdown Farm Community Centre, Downey Close. 15 January ("Aerials", West Hill Community Centre). Details G4NVQ, tel 420608.
Horsham (HARC)—First Thursday each month, 8pm. The Guide HQ, Denne Rd, Horsham. Details G4LKW, tel 64580.
Kent (K Repeater Group)—The group supports two vhf and three uhf repeaters by annual subscription: GB3KN, GB3KS, GB3NK, GB3EK and GB3CK. Details G4RVV, tel Orpington 27050 ext 91, office hours.
Lewes (L&DARC)—First and third Tuesdays each month. Bridge View Community Centre, Lewes. Details G4PZU, tel 3239.
Maidstone (MYMCAARS)—Fridays, 8pm. YMCA Sports Centre, Melrose Close, Cripple St, Maidstone. Details G4AXD, tel 0622 29462.
Medway (MARTS)—Fridays, 8pm. St Lukes Church Hall, King William Rd, Chatham. Details Faram, tel 0634 578647.
Margate (RC of Thanet)—Second and fourth Tuesday each month. Grosvenor Club, Grosvenor Place, Margate. Details G4SBD, tel Thanet 32313.
Sussex Repeater Group—This group is responsible for GB3BP, GB3CP, GB3HO, GB3NX, GB3SR and GB3WX. The SRG "roadshow" is available to local clubs for presentations. Details G8TJQ.
Swale (SARC)—Mondays, 7.30 for 8pm. The Ivy Leaf Club, 52 Dover St, Sittingbourne. Details G4NPM, tel Minster 873147.
Tunbridge Wells (West Kent ARS)—Fridays, 8pm. Adult Education Centre Annex, Quarry Rd, Tunbridge Wells. Details G4KIU, tel 33586.
Worthing (W&DARC)—Wednesdays, 7.30pm. Lancing Parish Hall, South St, Lancing. Details R Jones, G4SWH, WADARC, PO Box 599, Worthing BN14 7TT.

REGION 9—RR A H Hammett, G3VWK, Rosehill, Ladock, Truro, Cornwall TR2 4PQ. Tel 0726 882 758

Axminster (Axe Vale ARC)—First Friday in each month, 7.30pm. The Cavalier PH, West St, Axminster, Devon. 3 January (Constructors' evening with members' slides), 7 February ("Aerial circus", with video, G6CJ). Details G3VW.
Barnstable (North Devon RC)—First Wednesday in each month, 7.30pm. Mivrocentre, The Strand, Barnstable. Details G4LST.
Brittania (BRC)—This club is for the use of licensed trainee naval officers and meets irregularly. Details G4LUF.
Caradon Hill (CH Repeater Group)—Club meets when required for maintenance etc. Details G4DGU.
Exeter (EARC)—Second Monday each month, 7.30pm. The Community Centre, St Davids Hill, Exeter. Details G6FGS.
Exeter (Evets Communications Ltd ARS)—A closed society.
Exeter (UOEARS)—Meets fortnightly during termtime. Mathematics department. Details G1GGT.
Exmoor (ERC)—No details.
Exmouth (ERC)—Alternate Wednesdays, 7.30pm. The Scout Hut, Marlpool Hill, Exmouth. 1 January (RSGB film show), 15 January (Open meeting). Details G8SBU.
Kelly (Kelly College ARS)— Thursdays during termtime, 6.15pm. Physics Laboratories. Details G8ONR.
Paignton (ITT Communications RC)—A closed group.
Newquay (N&DARS)—Details, G6GOR.
North Cornwall (NCRC)—First Wednesday in each month, 7.30pm. Meets alternately at the Wharncliffe Hotel, Tintagel and the Kings Arms PH, Bude. Details G4FHL.
Plymouth (P Polytechnic ARC)—Irregular meetings during termtime, Students Union, Plymouth Polytechnic. Details G4VKQ.
Plymouth (PARC)—First and third Wednesdays of each month, 7.30pm. Plymouth Albion RFC Club, Peverall, Plymouth. Details G4SCA.
Plymouth (P & West Devon Raynet)—Sundays, 7pm, on S9 (145·225). Details G3TGR, tel 45478.
Pottair (P School RC)—No details.
Redruth (Cornwall ARC)—First Thursday each month, 7.30pm. Treleigh Church Hall, Redruth. Second Monday monthly, Computer section. Third Monday monthly, constructors' workshop. 2 January ("Beetling around Africa", G3WKP), 13 January ("Understanding machine code", G3OCB), 20 January (Constructors' evening). Details G4RUP.
St Austell (English China Clay RC)—Meets Pentewan Rd Laboratories, 7.30pm. 13 January (AGM), 27 January ("23cm operating and equipment", G3VVB). Details G4OKS.
St Ives (St Comprehensive School)—First Friday of each month during term, 7.30pm. For pupils only. Details G3NPB.
Saltash (S&DARC)—First Friday in each month. The Toc H Club, Saltash. Details G0AKH.
South Devon (SDRC)—Details from G4SSD.
Tiverton (TRC)—Details from PO Box 3, Tiverton.
Torbay (TARS)—Fridays, 7.30pm. Tye ECC Social Club, Highweek, Newton Abbott. 25 January (Construction night). Details G1EAU.

REGION 10—RR E J Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam CF5 7RS. Tel 0222 810368.

Area representatives
Cyril Laws, GW0CUM, Cardiff
A F Dowling, GW3GUE, Carmarthen
Reg Bray, GW4ESV, Port Talbot

Abergavenny (A&NHARC, GW4GFL)—Thursdays, 7.30pm. Pen-y-Fal Hospital, above Male Ward 2, Abergavenny. Sec GW4XQH, tel 0873 4655. The club is a registered examination centre for the May 1986 examination session.
Aberystwyth (A&DARS)—Second Tuesday in each month, 7.30pm. Bay Hotel (on the sea front). Sec GW4JXB, tel 0970 828446.
Barry (RAF St Athen ARC, GW3CKB)—RAF St Athen, Barry, South Glam. Contact D H Rycroft.
Barry (BCoFERS, GW3VKL, GW4BRS, GW6BRC)—Thursdays, 7.45pm. Barry College of Further Education Annexe, Weycock Cross, Barry. New Sec Jorge Bonter, GW0AGA, tel 736260.
Blackwood (BARS, GW6GW)—Fridays, 7pm. Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. This club does not meet during the school holidays. Sec GW8UAM.
Bridgend (B&DARS, GW4LNP)—First and third Fridays in each month, 7.30pm. YMCA, Angel St (near Recreation Centre). New Sec, GW1LWC, tel 0443 226198.
Bristol (Channel Repeater Group, GB3BC)—Sec GW6MBU, tel Barry 711146.
Cardiff (CRSGBG, GW5BI)—Second Monday in each month, 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. 13 January (Film show). Sec GW0CUM, tel Cowbridge 3212.
Cardiff (Highfields ARS, GW4LFO, GW1LFO)—Thursdays, 7pm. Highfields Handicapped Centre, Allensbank Rd, Cardiff. Sec GW6ZHM, tel 0222 750315.
Carmarthen (CARS, GW4YCT)—Second and fourth Fridays in each month, 7pm. West Wales Hospital Social Club, The Quay, Carmarthen. New sec not yet notified.
Chepstow (C&DARS, GW4LWZ)—Tuesdays, 7.30pm. Chepstow Leisure Centre. Club net every Sunday at 8pm. 144/5MHz fm. New sec, GW1FJI, tel Chepstow 2808.
Cwmcynon (CARS, GW3FFE)—Sec GW4AUJ, 7 Daniel Street, Cwmbach, Aberdare.
Fishguard (F&DARS)—Wednesdays. The Radio Shack, FE Centre, Fishguard, Pembs, Dyfed. Further details GW0ALN.
Llanelli (LARS)—First and third Monday of each month (depending on the availability of hall), 7pm. Temporary HQ and meeting place, Disabled Drivers Association Hall, Albert St, Llanelli. Sec D Graham, GW1MGW, 1 Maestir, Felinfoel, Llanelli, Dyfed SA15 3NS.
Lougher (LRA&EC, GW4HVJ)—Thursdays fortnightly, 7.45pm. Lougher Scouts Hall, Lougher, Gorseinon. Sec GW8TYS, tel Gorseinon 893392.
Merthyr (Hoover Merthyr, GW3RDB)—C/O Engineering Dept, MP9, Hoover Ltd, Pentrebach, Merthyr Tydfil.
Newport (NARS, GW4EZW)—Mondays, 7pm. Brynglas House, Brynglas Rd, Newport. Sec GW6ZUQ, tel 02912 6867.
Pembroke (P&DRAC, GW2OP)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock. Also a mid-monthly meeting on Sunday evening. New sec GW6EHC, tel 0646 686532.
Pontypool (PARS)—Tuesdays (excluding Bank Holidays), 7pm. The Settlement Adult Centre, Rockhill Rd, Pontypool. New sec GW4RJA, tel Cwmbran 06333.
Port Talbot (British Steel Corporation ARS, GW3OEP)—Thursdays, 7.30pm. BSC Sports and Social Club, Port Talbot. First Thursday is reserved for general meetings. Visitors and new members are always welcome. Plenty of expertise available for "ham surgery" over a pint of ale. New sec GW4IGR, tel 0639 720416.
Powys (PARC, GW4HVN)—Thursdays, 7.30pm. Cricket Pavilion, Montgomery. Sec GW4DWX, tel Welshpool 2068.
Tredegar (LCRARC, GW4IYD)—Tuesdays, 7.15pm. MIM Factory, North Ave, Tredegar. Portacabin just inside the gates. Club net each Wednesday, 7pm, S21/22. Sec GW1EXF, tel 049525 6560.
Rhonda (RARS, GW2FOF)—Thursdays, 7.30pm. National Union of Mineworkers' Club, Tonypandy. Sec GW4BUZ, tel Tonypandy 432542.
Swansea (SARS, GW4CC)—First and third Thursdays in each month, 7.30pm. Lecture Room N, Applied Sciences Building, Swansea University. 6 February, ("Traffic control in and around Swansea" by a Traffic Engineer of the WGCC). Details R Williams, tel 404422.
Swansea (SRACC)—Sec Mr Morgan, 1 Jersey St, Hafod, Swansea.
Swansea (UCoS RS)—Sec R B Hughes, Electrical Eng Dept, University College, Singleton Park, Swansea.
Wales (West W Repeater Group, GB3WW)—Contact 7 Crofton Drive, Baglan, Port Talbot.

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288

Area representatives
R H Tyson, GW6HUV, Conway Valley
A Evans, GW4HDR, Rhyl and District
P E W Allely, GW3KJW, Pwllheli

Clwyd (C County Raynet Group)—Second Tuesday each month. Green Lawns Hotel, Bay View Rd, Colwyn Bay, Clwyd. Sec GW4UWI, tel 0492 2149.

Bangor (Dragon ARC)—First and third Mondays each month. Bangor Rugby Clubhouse. Sec GW0ANB.
Bangor (University College of N Wales)—Electrical Engineering School, Dean St, Bangor, Gwynedd LL57 1UT. No other information.
Colwyn Bay (Conwy Valley ARC, GW6TM)—Second and fourth Thursday each month, 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. 9 January ("ATUs", GW3HGL). Sec GW4VVW, tel 0492 636376.
Deeside (Alyn & Deeside ARS)—Mondays, 8pm. Shotton Social Club, Shotton Lane, Deeside. Sec E Smith, GW1ILZ, 1 Devonshire Rd, Broughton, Chester.
Dolgellau (Meirion ARS)—First Thursday each month. Dolserau Hall Hotel, Dolgellau. Sec GW4KEV.
Menai Bridge (David Hughes School RC)—David Hughes School, Menai Bridge, Gwynedd LL59 5SS. No other information.
Porthmadog (P&DARC)—Third Thursday in each month, 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. 16 January (Homebrew construction night). Sec GW4WKQ, tel 0758 740445.
Rhyl (R&DARC, GW4ARC)—First and third Monday each month, 7.30pm. Sec GW8OYT.
Sealand (RAF Sealand ARC)—c/o Officer in Charge, Radio Wing, 30MU RAF, Sealand, Deeside, Clwyd CH5 2LS. No other information.
Wrexham (WARC)—First and third Wednesday each month, 7pm. Friends Meeting House, Holt Rd, Wrexham, Clwyd. 8 January ("Is your rig on frequency?") 22 January ("Valve volt meters", GW3RMB). Sec G4HRH, tel 0948 5161.

REGION 12—RR M R Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140.

Aberdeen (AARS)—Fridays, 7.30pm. Club rooms, 35 Thistle Lane, Aberdeen. Details GM4CXD, tel Pitcapple 251.
Caithness (CARS)—Second Wednesday of each month, 7.30pm. Loch Watten Hotel, Watten. Details GM1AHC, tel 0847 63638.
Dundee (Kingsway Tech ARC)—Tuesdays 7.30pm. Kingsway Tech, Grayham St, Dundee. GM4WEQ, tel 0382 552362.
Elgin (Moray Firth ARS)—Wednesdays. Club Room, Moray College of Further Education. Sec GM4IZY, tel Elgin 41549.
Forfar (F&DARC)—46 High Street, Kirrimuir. Sec, GM3ZXE, tel 082-85 312.
Fort William—First Thursday of each month, 7.30pm. The West End Hotel. Details GM4JNB on S20, or PO Box 6, Fort William.
Inverness (IARC)—Thursdays, 7.30pm. The Cameron Youth Club, Planefield Rd, Inverness. Details GM1GFX, tel 0463 242463.
Kirkwall—First Wednesday of each month, Lynnfield Hotel, Kirkwall. Details GM3IBU, tel Kirkwall 3273 business hours.
Perth (P&DARG)—Tuesdays, 7.30pm. Perth City Sports and Social Club, Leonards St, Perth. Details GM6OFO, tel 0738 28621.
Shetland (Lerwick RC)—Thursdays, 7pm. Room 14, Islesburgh Community Centre, King Harold St, Lerwick. Details GM4LBE, tel 0595 4270.
GB3BI, Black Isle Repeater Group. Contact GM4UMA.
GB3AB/GN/PD/NG, Grampian Repeater Group. Contact GM8HGD, tel 0779 2413
GB3LU, Lerwick Repeater Group. Contact GM4LBE, tel 0595 4270
GB3OC, Orkney/Caithness Repeater Group. Contact GM3IBU, tel 0856 3232
GB3PR/PU, Perth Repeater Group. Contact GM8KPH, tel 0796 2140
GB3SS, Speyside Repeater Group. Contact GM4ILS, tel 0343 45842

REGION 13—RR A Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Berwick Upon Tweed (BARS)—3 January (Holiday recess), 17 January ("Topband working", G3YOG and G3KMR). Details GM1IRN.
Glenrothes (G&DARC)—Every Wednesday and third Sunday each month. Provosts Land Centre, Leslie, Fife. Details GM4TNP, tel 755958.

REGION 14—RR T G Wylie, GM4FDM, 3 Kings Crescent, Elderslie, Strathclyde PA5 9AB. Tel Johnstone (0505) 22749.

Ayr (AARG)—Second and fourth Fridays each month, 7.30pm. Community Leisure Centre, 24 Wellington Square, Ayr. 10 January (Natter night), 24 January (Homebrew competition). Details GM3THI, tel Ayr 42313.
Dumfries (D & GREC)—First and third Mondays each month, 8pm. Cargenholm Hotel, New Abbey Rd, Dumfries. Details GM4NNK, tel 0387 64957.
Dumfries (MARK)—Club meets twice monthly, 8pm. The Tam O'Shanter Inn, Queensberry St, Dumfries. 8 January (Committee meeting), 22 January ("First aid and safety in the shack", GM6HWZ). Details GM4NNC.
Dunoon (D & DARC)—Fridays, 7.30pm. Community Centre, Edward St, Dunoon. Details GM0BUL, tel 036984 217.
Falkirk (FARC)—First and third Wednesdays each month. The Grange Centre, Brightons, near Falkirk. RAE and Morse classes every Tuesday 7.30pm. Details GM4XQJ, tel Falkirk 0324 31258.
Glasgow (WOSARS)—Fridays, 8pm. 154 Ingram St, Glasgow. 10 January ("The other man's shack", a video by GM4HCO), 24 January ("A visit to VS6 and JA", a slide show and talk by GM3EDZ). CW Classes available.
Greenock (G&DARC)—Tuesdays and Fridays, 7pm. 22 Inverkip St, Greenock. Details GM3XNJ, tel Greenock 31810.
Helensburgh (HARC)—Thursdays, 7.30pm. Cairndhu House, Rhu Rd, Helensburgh. Details GM6JLQ, tel Dumbarton 841452.
Irvine (Cunninghamme & DARC)—Tuesdays and Thursdays, 7.30pm. The Community House, 1 Bonnyton Row, Girdle Toll, Irvine. Details GM3JOB, tel 0294 215728.
Kilmarnock (K&LARC)—Tuesdays, 7.30pm. The Glenfield Social Club, Queens Drive, Kilmarnock. Details GM4XGW, tel 0563 38652.
Loch Lomond (LLARC)—Meets in Dumbarton. Sec GM4LKJ. tel Dumbarton 64223.
Motherwell (MLARS)—Fridays, 7.30pm. Wrangholm Hall Community Centre, Jerviston St, Motherwell. CW & RAE Classes. Details GM4UXX, tel 0698 350926.
Stirling (S & DARS)—Second and fourth Wednesday each month. CW Classes. For further details and new meeting place contact GM0BFS, tel 0259 217702.
Stranraer (WARC)—Thursdays, 7.30pm. Community Centre, Lewis St, Stranraer. Details GM4BAE, tel 0776 2876.
Lochgilphead (Mid Argyll ARC)—First Monday each month. The Stag Hotel, Lochgilphead. Details, GM4VXA.
Glasgow—The Glasgow Battalion of The Boys Brigade have formed an Amateur Radio Club which operates from BB House, Bath St. Details GM4HYF, tel 041 634 4567.

REGION 15—RR R Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP Tel 0232 612322

Ballyclare (E Antrim ARC GI4KKK)—Second Tuesday in each month. 14 January ("Emergency communications", HM Coastguard). 8pm. Fairview Primary School, Ballyclare. Sec GI4PRH.
Ballymena (BRC GI3FFF)—Every Thursday, 8pm and Sunday, 3pm. 10 Nursery Rd, Grace Hill, Ballymena. RAE class Wednesday evenings—GI4OZT. Sec GI4HCN.
Banbridge (Mid-Ulster ARC GI4BAC)—Second Sunday in each month, 3pm. QTH of GI4BAC. Sec GI1BIW.
Bangor (B & DARC GI3XRQ)—First Friday in each month. 3 January ("Direct broadcast satellites"). 8pm. Royal Hotel, Bangor. Sec GI4OCK.
Belfast (C of B YMCA RC, GI6YM/GI6YMC)—Tuesdays, 7pm and Saturdays, 2.30pm. Club Room, 4th Floor, YMCA, Wellington Place, Belfast.
Belfast (RSGB Group)—Third Wednesday in each month, 8pm. 90 Belmont Rd, Belfast. AR GI6ATZ.
Belfast (QUBRC, GI3LLQ/GI8FQB)—Tuesdays, 7.30pm, (term and vacation). 37 Fitzwilliam Street, Belfast. Operational 3·5-430MHz. Morse and RAE tuition available. Contact GI4WWF, tel 0232 661111 Ext 4006.
Coleraine (North-West ARC GI4DBB)—First Tuesday in month, 8pm. Scout Hall, The Crescent, Coleraine. (Meetings suspended) Sec GI4KIG.
Enniskillen (Lough Erne ARC)—Third Monday in each month, 8pm. Railway Hotel, Enniskillen. Sec GI4CZW.
Larne (L & D ARS, GI4PHA)—First and third Wednesday in each month, 8pm. Club premises, 100 Glenarm Rd, Larne. RAE class each Thursday by GI4UUC. Sec GI4CPP.
Lisburn (Lagan Valley ARS, GI4GTY)—Second Monday in each month, 7.30pm. Rathvarna Teacher's Centre, Pond Park Road, Lisburn. 13 January (Talk—"DF hunts"). Sec GI4TCS.
Londonderry (North West of Ireland ARC, GI3CFH)—First Monday in each month, 7.30pm. Prehen Municipal Boathouse, Victoria Rd, Londonderry. Sec GI4OUN.
Moneymore (Magherafelt ARC, GI4OMA)—Third Tuesday in each month, 8pm. Manor Hotel, Moneymore. Sec GI3SOO.
Moy (Armagh, Dungannon & DARC, GI4FVN)—Second Tuesday in each month, 8pm. Now meets Lonsdale St, Armagh. For membership contact GI8RNX.

REGION 16—RR A Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk IP4 2XA. Tel 0473 51319

Basildon (Marconi ARS)—First Monday each month, 8pm. The Shack, GEC Avionics Social Club, Gardiners Way, Basildon. Sec G8PKM, tel 0245 323323.
Braintree (B&DARS)—First and third Monday each month, 8pm. The Community Centre, Victoria Rd (next to Bus Station), Braintree. Sec G6THE, tel 0376 25587.
Burnham on Crouch (Dengie Hundred ARC)—Second Thursday in each month, 7.30pm. Burnham Sailing Club, The Quay, Burnham on Crouch. Sec GZSJ, tel 0621 784225.
Bury St Edmunds (BSTEARS)—Third Tuesday, 7.30pm. The Guildhall, Guildhall St, Bury St Edmunds. Sec G3GBB, tel 0284 66496.
Canvey Island (SEARS)—Wednesdays, 7.30pm. The Paddocks, Long Rd, Canvey Island. Sec G4FMK, tel 0268 683805.
Chelmsford (CARS)—First Tuesday each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. 7 January (Films and video), 4 February (What's new from BNOS). Sec G4KQE, tel 0376 83094.
Colchester (CRA)—Alternate Thursdays, 7.30pm. Colchester Institute, Sheepen Rd, Colchester CO3 3LL. Sec G3FIJ, tel 0206 851189.
Felixstowe (F&DARS)—Second and fourth Monday each month. The Feathers PH, High Rd West, Felixstowe. Sec G3MJS, tel 272426.
Great Yarmouth (GYRS)—Fortnightly on Thursdays, 7.30pm for 8pm. STC Sports and Social Club, Beevor Rd, South Denes, Gt Yarmouth. 2 January (Informal), 16 January (Visit to Telephone Exchange). Sec G3NHU, tel 0493 721173.
Harlow (H&DRS)—Tuesdays, 7.30pm. Mark Hall Barn, First Ave, Harlow. Sec G4PGB, tel 0279 722612.
Haverhill (H&DRS)—Fridays, 7.30pm. Copse Hall Farm, Bumpstead Rd, Haverhill. Sec G4MVK, tel 0440 61207.
Ipswich (IRC)—Second and last Wednesday each month, 8pm. Rose and Crown PH, Norwich Rd, Ipswich. 8, 29 January (TBA). Sec G4IFF, tel 0473 44047.
Brentwood (International Police Assoc RC)—Sec G4TRE, tel 0277 231077.
Leiston (LARC)—First Tuesday of each month, 7.30 for 8pm. Sizewell Sports and Social Club, King Georges Ave, Leiston. Sec G0CJX.
Loughton (L&DRAS)—Alternate Fridays, 8pm. Loughton Hall, Rectory Lane, Loughton. 3 January (Informal), 17 January (Junk sale), 31 January (Informal). Sec G6LWR, tel 0279 29457.
Lowestoft (LD&PYEARC)—Sec G4KDL, tel 66289.
Martlesham (MRS)—Occasional first Wednesdays of each month, 7.30pm. British Telecoms Research Labs, Martlesham Heath, Ipswich. Sec G4SYG, tel 0473 88663.
Norwich (NARS)—Wednesdays, 8pm. Valley Drive Community Centre, 79 Plumstead Rd, Norwich. 8 January (Technical topics), 15 January ("What's in the box", G4HSL), 22 January (Visit to Radio Broadland). Sec G4WTR, tel 0603 610874.
Rochford (RDRC)—Second Monday, 7.30pm. Civil Defence Bldg, Rochford. Sec G3FGC.
Saffron Walden (SW&DRAS)—Third Wednesday each month, 8pm. Sec G6KDW, tel 0799 22715.
Southend (S&DARS)—Fridays, 7.30pm. Rocheway Centre, Rocheway, Rochford. Sec G3YOA.
Stanford Le Hope (SLH&DARC)—Mondays, 8pm. St Joseph's Parish Rooms, Scratton Rd, Stanford Le Hope. 6 January (The lessons of 1985), 13 January (VHF night), 27 January (RSGB videos). Sec G4OVG, tel 0375 642312.
Stowmarket (S&DARS)—Temporarily suspended.
Thurrock (TARC)—First and third Tuesday of each month, 8pm. Grays Park Hall. Sec G3KMD.
Vange (VARS)—Thursdays, 8pm. Barstable Community Centre, Basildon. Sec D Thompson, tel 0268 552606.

I would like contact with Basildon, Dengie Hundred, Haverhill, Saffron Walden and Thurrock clubs. *RR16.*

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL. Tel 0703 812435

Andover (ARAC)—First Tuesday and third Wednesday each month, 8pm. Wolversdene Club, Andover. 7 January (Subs collection night), 15 January (Slow morse night). Club net, Sundays, 2pm on S18. Sec G0AMO, tel Andover 51593.

Basingstoke (BARC)—First Monday in each month. Forest Ring Community Centre, Sycamore Way, Basingstoke. 6 January ("23cm operation", G3NNG), 3 February (Talk by Wood & Douglas). Sec G4WIZ, tel Tadley 5185.

Binstead (IOW BARS)—Wednesdays, 7.30pm. First Ryde/First Binstead Scout Group HQ. Sec G4RTT, tel Isle of Wight 295951.

Bishops Waltham (Amateur Radio & Computer Club)—10 January (Next meeting). 8pm. The Crown, Bishops Waltham, Hants. Sec G1NIM, tel 0705 38106.

Blackmore Vale (BVARS)—Second Tuesday of each month, 7.45pm. The Bell and Crown PH, Zeals (on the A303). 14 January ("Raynet", a Somerset Raynet member). Sec G1GRS, tel 0963 70969.

Bournemouth (BARS)—First and third Friday in each month, 7.30pm. Kinson Community Centre, Kinson, Bournemouth. 3 January ("65 years of amateur radio", G6MA), 17 January ("The DTI", Mr Lipscombe). Sec G4EKE, tel 0202 877945.

Chippenham (C&DARS)—Tuesday evenings. Chippenham Sea Cadet HQ. Sec G4GFJ, tel 02214 4190.

Devizes (D&DARS)—Fridays, 8pm. Football Club Social Club, Nursteed Rd, Devizes. Sec G3MQD.

Eastleigh (Itchen Valley ARS)—3 January (Natter night), 17 January ("Crystals", The McKnight Crystal Co.), 31 January ("Amtor, rtty and Ascii", G8DOW). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford, Hants. Sec G6DIA, tel 0703 863039.

Fareham (F&DARS)—Wednesdays, 7.30pm. Porchester Community Centre, Portchester, Hants. Sec G4ITG, tel 234904.

Farnborough (F&DARS)—Second and fourth Wednesday of each month. The Railway Enthusiasts Club, Access Rd, off Hawley Lane, Farnborough. 8 January ("Film off the Cuff", G4MBZ), 22 January (G8ATK, the constructional contest winner). Results of agm: Chairman, G8ATK; treasurer, G4IZB; secretary G4UQE. PRO G4SBU.

Gosport (Rowners & DARS)—8 January and every alternate Wednesday, 7.30pm. Scout HQ, off Grange Rd, Rowners. (Morse tuition followed by meeting). Sec G6OTY, tel Locks Heath 2541.

Guernsey (GARS)—Tuesdays and Fridays, 8pm. The Lodge, La Corbinerie, Oberlands, St Martins, Guernsey. Results of recent agm: president, GU3MBS; treasurer GU4YMV; committee, GU4WRP, GU4WTN and GU4XEA. Sec GU1PMY, tel 0481 26392.

Horndean (H&DARC)—First Thursday in each month. Merchiston Hall, London Rd, Horndean. 2 January (Junk sale). Tenth anniversary of club falls in 1986, watch for details of special award. PRO G4BEQ.

Jersey (JARS)—Fridays, 8pm. Sundays, 10am. Le Hocq Tower, St Clement. Sec GJ4TXB, tel 24328.

Jersey (JAEC)—Club HQ, Belmont Rd, St Helier. Details GJ4ICD, tel 0534 77067 (day) 26788 (night).

Liphook (Three Counties ARC)—8 January ("Computer basics", B Jeffries), 22 January ("Bee Keeping", G0BUZ). 8pm. The Railway Hotel, Liphook. Sec G0BTU, tel Petersfield 66489.

New Forest (NF Repeater Group, GB3NF)—For information to join the group and help support the repeater, contact G6DLJ, tel 0703 891975.

Plessey (Christchurch ARS)—Second Thursday of each month. Plessey Social Club, Grange Rd, Christchurch, Dorset. Sec G1PFX.

Poole (PARS)—Last Friday in each month, 7.30pm. Commander's House, Constitution Hill Rd, Poole. 31 January ("The RSGB", G3KWU). NB change of meeting place. Sec G4XYX.

Portsdown Hill (PH Repeater Group, GB3PH)—For information or to join the group and help support the repeater, contact A L G Price, tel 0329 281852.

Portsmouth (Marconi EARS)—Last Tuesday in each month, 8pm. Broad Oaks Canteen, Portsmouth Airport. Please watch for details of a very special event in 1986. Sec G3FWE.

Salisbury (SRES)—Tuesdays, 7.30pm. Grosvenor House, Churchfield Rd, Salisbury. 14 January (AGM). Sec G4LDR, tel 0980 22809.

South Hants (SH International Telegraphy Society)—Thursdays, 7.30pm. The Community Centre, Malins Rd, Portsmouth. Morse classes for aspirants to full membership on Mondays. Sec G3JZV.

Southampton (SARS)—First and third Wednesday of each month, 7.30pm. Millbrook Community School, Green Lane, Southampton. NB change of meeting place. Sec G4VKB.

Southampton (SUARS)—Mondays, 7.30pm. 65 University Rd, Southampton. PRO G4STF via Students Union.

Swindon (S&DARC)—Thursdays, 7.30pm. Oakfield School, Marlowe Ave, Swindon. 2, 16, 30 January (Natter nights), 9 January (Construction projects evening), 23 January (Tour of studios of Great Wiltshire Radio at Wooton Basset). Sec G4YQZ.

Trowbridge (T&DARC)—Fourth Tuesday in each month, 8pm. Southwick Village Hall, Trowbridge. Sec G4SPE, tel 4532.

UK FM Southern Repeater Holding Group (GB3SN)—For information or to join the group and help support the repeater, contact J Steele, tel Fleet 3311.

Waterside (WSWC)—Second and fourth Tuesday in each month, 7.30pm. Fawley and Blackfield Community Centre, Blackfield, Southampton. Sec G1KMY.

Wessex Amateur Wireless Club—alternate Tuesdays, 8pm. The Cricketers, Wimborne. 7, 21 January (First meetings). Chairman G6SDQ, tel 0202 822125.

Wimborne (FRARS)—Sundays, 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8ZLH, tel 0202 570894.

Winchester (WARC)—Third Saturday in each month. The Log Cabin, Stockbridge Rd, Winchester. 18 January (AGM—all members are asked to make a special effort to attend at 8pm). Sec G4FPC, tel 0962 64747.

REGION 18—RR Ian Gibbs, G4GWB, 61 The Gables, Widdington, Morpeth NE61 5QZ. Tel 0670 790090.

Aycliffe & Shildon (A&SARC)—Tuesday evenings. Scout HQ, 4 Cross St, Shildon. Sec G1NNU, tel 0388 774081.

Berwick (Borders ARS, G0BRS)—First and third Fridays in the month. Tweed View Hotel, Tweed St, Berwick. 3 January (No meeting), 17 January ("Introduction to topband," G3YOG), 7 February ("50MHz experiences," GM4CXB). NB new club sec, GM1IRN, tel 0289 82491.

Bishop Auckland (BARAC)—Monday and Thursday evenings. Travellers Rest PH, Evenwood. Sec G0ACY.

Blyth (BARC, G4VKY)—Wednesday evenings. Community Centre, Warwick St, Blyth. Sec G1JFW, tel 0670 353069.

Consett (Derwentside ARS, G4PFQ)—Monday evenings. Consett Assocn FB Club, Belle Vue Park, Consett. Sec G1AAJ, tel 0207 520477.

Durham (DARS)—Friday evenings. Rowing Club, Green Lane, Durham City. Sec G4WJV, tel 0783 853552.

Durham (UoD R&ES, G4DUR)— c/o Mr Puddephat, Grey College, South Rd, Durham City.

Easington (EARS, G4APN/G6APN—Tuesday and Thursday evenings. Easington Workmen's Club, Seaside Lane, Easington. 30 January ("GB3US repeater logic," G4NXH). Sec G4RIK, tel 0783 815331.

Great Lumley (R&ES, G4EUZ)—Wednesday evenings. Community Centre, Great Lumley. Sec G4OCQ, tel 0385 40827.

Hartlepool (HARC)—Monday evenings. Grange Rd, Methodist Church Hall, Tankerville Street entrance. Sec G4SHJ, tel 0429 67419.

Hazelrigg (NER&CC, G4YPT)—Monday evenings, Village Hall, Hazelrigg. Sec G1HDV, tel 091 2742413.

Hetton Le Hole (Houghton Le Spring ARC, G3NMD—Wednesday evenings. Hettondowns Hotel, Hetton. Sec G4ULJ, tel 0783 841897.

Middlesborough (BT ARC, G8GPO)—Thursday evenings. 6 Lytton St, Middlesborough. Details G4ZML, tel 0642 244501.

Morpeth (Northumbria ARC, G4AAX/G6AAX)—Thursday evenings. Old Telephone Exchange, Cresswell Rd, Ellington, Morpeth. Sec G6IIA, tel 0670 513026.

Prudhoe (Tynedale ARC, G4ONQ)—First Monday in each month. Scout & Guide HQ, Station Bank, Prudhoe. Sec G6RRT, tel 0434 602718.

Redcar (East Cleveland ARS, G4CRS)—Friday evenings. RAFA Club, Newcombe Tce, Redcar. Sec G1GMF, tel 0642 474769.

South Shields (South Tyneside ARS, G3DDI)—Monday evenings. Marine & Tech College Club, South Shields. Sec Tony, tel 0632 567305.

Stockton (S&DARG, G4XXG)—Wednesday evenings. Billingham Community Centre. Sec G6NRV, tel 0642 582578.

Sunderland (SARS, G4LPK/G6BXJ)—Monday and Thursday evenings. Sunday mornings, 11.30 to 1pm. Sec G4WMW, tel 0783 343295.

Tees-side (TSRG, GB3TS)—Sec G8MBK. No information on regular meetings.

Washington (W&DARC)—Sunday evenings. Oval Community Centre, District 12, Washington. Sec G6EPS, tel 091 4168648.

Whitley Bay (Tyneside ARS, G3ZQM)—Wednesday evenings. Community Centre, Earsdon. Sec G4KOT, tel 091 2340170.

REGION 19—RR R J C Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Barking (BR&ES)—Details, Roy Woodberry, 162 Brentwood Road, Herongate, Brentwood, Essex.

Boreham Wood (BEARS)—First Monday of each month, 8pm. Full details of venue Tony King, tel 01-207 3809.

Bishops Stortford (BSARS)—Third Monday of each month, 8pm. British Legion Club, Windhill, Bishops Stortford. Sec G6HKK, details G3MVT. This is a new club reporting.

Cheshunt (CDARC)—7.45 for 8pm. Church Rooms, Church Lane, Wormley, Herts. All welcome. Sec G4OAA. Details G3OJI, tel Ware 4316.

Chiswick (ABCARC)—21 January (AGM). 7.30pm. Chiswick Town Hall, High Rd, Chiswick, London W4. Sec G3GEH, tel 01-992 3778.

Ealing (E&DRS)—Tuesdays. Community Centre, Northfield Rd, London W13. Details G4SCR, tel 01-997 1416.

Edgware (E&DRS)—9 January (AGM), 12 January (AFS), 23 January (Informal). 8pm. Rest of month to be announced. Watling Community Centre, 145 Orange Hill Rd, Burnt Oak, Edgware. Details G4SYI, tel 958-9868.

Harrow (RSH)—3 January ("Still at Home"), 10 January (Activity night), 17 January (Film show), 24 January (Activity night), 31 January (Contests for all). The Roxeth Room, Harrow Arts Centre, High Rd, Harrow Weald, Middlesex. Pub. Off. Tel Rickmansworth 779942. Talk-in on GB3HR.

Havering (H&DARC)—1 January (No meeting), 8 January (No meeting), 15 January (AGM), 22 January ("SHF dx", G8DPB). 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Sec G0BOI, tel 04024 41532.

Ilford (IRSGBG)—50 Mortlake Rd, Ilford. Sec G3PCA. No other information received in 12 months.

London (Civil Service ARS)—First and third Mondays in each month, 12.30pm. 6/20 January (G3CSR operational from shack in Recreational Centre, Monck Street, London SW1P 2BL, on 10m 15m, 20m). Nets Tuesdays, 7.30pm, on 144·320MHz, followed at 8pm, on 3·720MHz or 1·960MHz. Chair/station manager Bob Treacher, tel 01-212 8823, or Sec G6IMM, tel 01-698 4437.

London (New Scotland Yard ARS)—Not open to public. G4NSY and G8NSY active from time to time. Sec, Room 99, NSY Broadway SW1.

London (ARGBBC)—This BBC club is restricted to members of the BBC and their families. details of membership, G8LRE. Ariel Radio Club, Bush House, Strand, London WC1.

St Albans (Verulam ARC)—14 January (Informal and workshop), 28 January ("Weather satellites", G8LOK). 7.45 for 8pm. RAFA HQ, New Kent Rd, St Albans. Details G4JKS, tel 59318.

Southgate (SARC)—7.30 for 8pm. St Thomas' Church Hall, Prince Georges Ave, Oakwood, London N14.

SW Herts UHF Group—This group maintains GB3HR (RB14) now located at Stanmore, Middlx and welcomes monetary support. All donations from users and others will be gratefully received by G3WCB, or G3THQ.

Stevenage (SDARS)—First and third Tuesday of each month. SITEC Ltd, Ridgemond Rd, Telford Park, Stevenage. 7 January (Discussion on AFS), 21 January ("RTTY" G4DDX, G3OVT). All Welcome. Sec G3OVT.

Watford (WRS)—First and third Wednesday of each month. The Tuder Arms, Bushey Mill Lane, Bushey. All are welcome to attend. Details G8XXV, tel 01-950 3611.

Welwyn (WDARC)—6 January (Demo of rtty systems), 20 January (3·5MHz activity night). Details G0AII.

East London Group RSGB—It is with regret that your RR has to report the closing down of this long established RSGB group after some 40 years of existence. The committee found it hard to enthuse any of the 300 local RSGB members to

attend the Sunday meetings. An EGM was called to which 47 known past members were individually written to. Seven attended. The meeting decided that under the circumstances the group would be disbanded. Any enquiries about this group to G3AAJ. *RR19*

REGION 20—RR N F O'Brien, G3LP, 26 Southfield Road, Gloucester GL4 9UD Tel 0452 34890

Bath (B&DARC)—Alternate Wednesdays, 8pm. Englishcombe Inn, Englishcombe Lane, Bath. Club station, G4TMH, regularly operating. Details G4UMN, tel Frome 63939.

Bath (Downside School ARS)—Details Physics Department, Downside School, Stratton-on-the-Fosse, Bath, Avon.

Bridgwater (Sedgemoor ARC)—Third Wednesday, 7.30pm. Bridgwater Sea Cadets HQ, The Docks, Bridgwater. Details G4EHU, tel Bridgwater 455923.

Bristol (BARC)—Tuesdays, 7.30pm. YMCA, Park Rd, Kingswood, Bristol. Details, G4YOC, tel Bitton 4116.

Bristol (BRSGBG)—27 January (AGM). 7.30pm. Small Lecture Theatre, Bristol University. Details G4SQQ, tel 0272 508451, or G4ROX, tel 0272 513573.

Bristol (First Crockern Scouts SWG)—Details Pete Knowles, 30 Church Path Rd, Pill, Bristol BS20 0EE, tel 8814248.

Bristol (HTVRC)—Details G3TKF, tel Keynsham 3965.

Bristol (North Bristol ARC)—Fridays, 7pm. SHE, 7 Braemar Crescent, Northville, Bristol. 31 January (AGM). Details G4EUV.

Bristol (South Bristol ARC)—Wednesdays, 7.30pm. Whitchurch Folk House, East Dundry Rd, Whitchurch, Bristol BS14 0LN. Details G4RZY, tel Whitchurch 834282.

Bristol (UoBARS)—Details Mark Posen, G6DYY, c/o Students Union, Bristol University, Queens Rd, Clifton, Bristol BS8 1LN.

Bristol (432MHz Repeater Group, GB3BS)—Details G4MCQ.

Cheltenham (CARA)—3 January ("Amtor"—talk and live demonstration, G3WHO), 17 January (Quiz with Worcester ARS). 7.30pm. Stanton Rooms, Charlton Kings Library, Cheltenham. Details, G4VXE, tel 0242 36723.

Cheltenham (Smiths Industries RS)—Alternate Thursdays, 8pm. Club House, Newlands, Bishops Cleeve. Details G8UJG, tel Bishops Cleeve 2175 or 3333 ext 2511.

Cirencester (C&DARC)—Alternate Thursdays, 7.45pm. Phoenix Centre, Beeches Rd, Cirencester. Details G0AXD, tel 5015.

Gloucester (GARS)—Wednesdays, 7.30pm. St John Ambulance HQ, Heathville Rd, Gloucester. 8 January ("Measurements," G3GIY). RAE and morse classes being arranged. Details G6AWT.

Mendip (M Repeater Group)—GB3WR, 144MHz repeater GB3UB and GB3US, 432MHz repeaters and GB3UT, 1·3GHz tv repeater. Details and applications for membership from G8GMZ, tel Midsomer Norton 413902.

Portishead (Gordano ARG)—Fourth Wednesday of each month, 7.30pm. Ship Hotel, Down Rd, Portishead. Details G3LJD.

Shepton Mallet (Mid Somerset RC)—Alternate Sundays, 7.30pm. The Kings Arms, Shepton Mallet. Details G4WZF, tel Chilton-Polden 722946.

Shirehampton (SARC)—Fridays, 7.30pm. Twyford House, High St, Shirehampton. Bristol. Details G4GTD.

Street (S&DARS)—First Tuesday of each month, 7.30pm. Strode College, Church Rd, Street. Details G4SCD, tel 0458 45145.

Stroud (SARS)—Alternate Wednesdays, 7.30pm. Nelson School, Stratford Lodge, Stroud. Details G1DCT, tel Nailsworth 2773.

Stroud (S&DARS)—Tuesdays, 7.30pm. Scout HQ, Parliament St, Bisley Rd, Stroud. Details G3TEV.

Taunton (T&DRC)—Fridays, 7.30pm. Basement, County Hall, The Crescent, Taunton (opposite the Crescent car park). Details G4ZLF.

Thornbury (T&DARC)—First Wednesday of each month, 7.30pm. White Horse Inn, Groves End (A38). Details G8AZT.

Wells (EMI Sports & Social Club RC)—Cedar House, Chamberlain St, Wells, Somerset BA5 2PJ.

Weston-super-Mare (RAFARS)—Headquarters station of RAFARS. Details Admin Secretary, RAFARS, RAF Locking, Weston-super-Mare, Bristol BS24 7AA.

Weston-super-Mare (WsMARS)—13 January (AGM). 8pm. Rugby Club (off Drove Rd), Weston-super-Mare. Details G1DJW, tel 0934 514429.

Yeovil (Y&DARC)—2 January (Natter night), 9 January ("Tuned circuits," G3MYM), 16 January ("QRP transmitter design," G3MYM), 23 January ("QSLs and the QSL Bureau," G3GC), 30 January (Natter night), 6 February ("Aerials for QRP," G3MYM). 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Club sec G3GC, tel Yeovil 0935 75533.

Yeovil Repeater Group—Details G6AGL.

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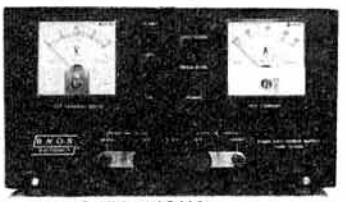

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TRIO	SP40 Mobile speaker	16.40	(0.75)
YAESU	SP55 Mobile speaker	14.95	(0.75)

ANTENNA BITS

7·1MHz RAL-TRAPS—Epoxy—pair		8.95	(1.50)
Self Amalgamating Tape 10m × 25mm		3.95	(0.75)
T-piece polyprop Dipole centre		1.50	(0.30)
Small ceramic Egg Insulators		0.50	(0.10)
Large ceramic Egg Insulators		0.75	(0.10)
75 ohm Twin Feeder-light duty	per metre	0.16	(0.04)
300 ohm Twin Feeder	per metre	0.14	(0.04)
UR67 Low loss coax—50 ohm	per metre	0.65	(0.20)
UR76 50 ohm coax—dia 5mm	per metre	0.25	(0.05)
UR70 70 ohm coax	per metre	0.30	(0.05)
4mm Polyester Guy Rope, strength 400kg	per metre	0.16	(0.04)
50 metres 16 swg hardrawn copper		6.90	(0.75)

COAXIAL SWITCHES

SA450	2 Way Diecast SO239 (500MHz)	14.95	(0.75)
SA450N	2 Way Diecast N plug (500MHz)	19.95	(0.75)
CH20A	2 Way Welz 50239 (900MHz)	22.95	(1.00)
CH20N	2 Way Welz N plugs (1300MHz)	41.90	(1.00)
DRAE	3 way SO239 sockets	15.40	(0.75)
DRAE	3 way N sockets	19.90	(0.75)

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R-7A	0.1 30MHz HF Digital Receiver, SSB/CW/AM	1595.00
SL-300	300Hz CW Filter for R-7 & TR-7	69.00
SL-4000	4000Hz AM Filter for R-7 & TR-7	69.00
SL-1000	1000Hz RTTY Filter as above	69.00
NB-7A	Noise Blanker for R-7 receiver	73.60
RP-700	Receiver Protector from lightning and static	79.35
RR-3	Marine Reserve & General Coverage Receiver	2070.00
R-4245	High Spec 0.1-30MHz Commercial receiver	2852.00
C-7011	Table Top Cabinet for RR-3 & R-4245	184.00
ACCESSORIES FOR R-4C RECEIVER		
FL-250	250Hz CW Filter	59.95
FL-500	500Hz CW Filter	59.95
FL-4000	4000Hz AM Filter	59.95
FL-6000	6000Hz AM Filter	59.95
CRYSTALS	Accessory Crystals for R-4 & T-4X Series	10.35
DRAKE SATELLITE TV RECEIVERS		
ESR-240	Earth Station Receiver with I R Remote Control	1035.00
ESR-324	Earth Station Receiver	695.00
ESR-2220	Commercial Rack Mount Single Conversion RCVR	1127.00
LNA-2573	85 Degree Low Noise Amplifier	695.00
ACCESSORIES FOR TRANSCEIVERS		
RV-7	Remote VFO for TR-7 & 7A	172.50
MMK-7	Mobile Mount for TR-7	69.00
CW-75	Electronic CW Keyer	79.35
P-75	Phone Patch	87.40
FA-7	Fan for TR-7, PS-7, DL-1000	29.90
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RRM-7	Range Receive Modules for AUX-7	10.35
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SP-75	Speech Processor	138.00
NB-5	Plug in Noise Blanker for TR-5	87.40
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GENERAL		
LA-7	600 Ohm Balanced Line Amplifier	46.00
CS-7	5 Way Remote Antenna Switch	149.50
SD-240	240-120V Auto Transformer 500W 2 US Sockets	27.60
AK-75	Multiband Antenna	46.00
8202	Auto Scale Digital Multimeter	69.00
DC-PC	SPR-4 DC Power Cord	3.80
Manuals	Operator Manuals, available for most models	10.00

The above items cannot be replaced when present stocks are sold

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KWM-380	HF Amateur Band Transceiver	3438.50
MM-280	Hand held Microphone	73.50
NMM281	Noise Cancelling Hand Microphone	103.45
AC-3801	Noise Blanker	396.75
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AC-3812	1.7kHz RTTY Filter	205.25
AC3813	6.0kHz AM Filter	191.75
AC-2801	Rack Mount	295.00
AC-2808	Blower Kit	449.65
AC-2821	DC Power Cable	95.00
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CS-7	Communications Quality Headphones	99.95
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SM-770	Service Manual	51.75

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D75	Manual RF speech clipper	56.35 (1.50)
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MK	Keyboard morse sender	137.40 (1.50)
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SRB2	Auto Woodpecker blanker	86.25 (1.50)
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HUSTLER		
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5-BTV	10-80m 5 Band Trap Vertical	189.95
3-TBA	3 Element 10/15 & 20m Beam Antenna, 14' 8" boom,	379.50
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AVANTI		
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JAYBEAM		
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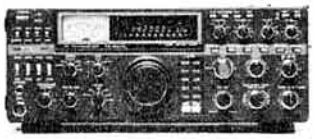

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TS830S	£832.75	PS430	£145.00	AT930	£165.13	TR2600E	£295.69
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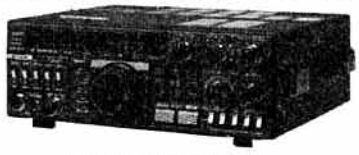

TS430S HF Transceiver

ANTENNAS

12AVQ 10-20m Vertical	£78.95
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Both models operated by 13.8V dc or 240 AC. Size 270mm wide 96mm high 260mm deep. Receiver section double conversion Superhetrodyne. Noise blanker; All mode squelch circuit; Voice synthesizer unit (optional).

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"MICROCOM 16" CW/RTTY (Tx. and Rx.) with Morse Tutor for the Commodore 16. Also available "Microcom +4", "Microcom 64", and "Microcom 128". S.a.e. to Moray Micro Computing, Enzie Slackhead, Buckie, Moray. AB5 2BR for full details.

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G3LLL's SALE. Black Star 600MHz counters (£147) now £135 p.p. 6146B General Electric matched pair £27.50, matched three £40 p.p. Both with free 12BY7A. FT101Mk1-E inc. WARC KIT & double balanced mixer £27 p.p. Free listen on input and auto tone burst FT290R this month. Shure 444D £69.99 p.p. Yaesu sales, service, bargains! Amateur Electronics/Holdings, 45 Johnston Street, Blackburn BB2 1EF. (0254) 59595.

1920 ONWARDS. Popular Wireless magazines and T & R bulletins and set Harmsworth's Wireless Encyclopaedias. Phone 01-654 3378 evening.

DISCOUNT MULTIMETERS. Auto range digital, £29.95; folding analogue, £19.95; miniature, £6.95. Add £1.00 p&p. Many other bargains. SAE for catalogue. 11 Applerigg, Kendal, Cumbria. Phone 25728.

PAG TERMINAL UNIT KITS. PLL, AFSK, auto start/stop, £60.00 inc p&p. Creed Teleprinters 444 (TP15) overhauled, working. Raynet and BARTG members, £42.00 each. Details Mike Watson G8CPH, Ipswich (0473) 831448.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET" front and rear similar to Police and Ambulance, etc. Also "RAYNET CONTROLLER". 2 sizes. Medium, £7.60; Large, £8.10 inc p&p. Details Mike Watson G8CPH. Ipswich (0473) 831448.

G3OCQ TRANSCEIVER—PRINTED CIRCUIT boards. Main board incorporating synthesised VFO, RIT, counter and digital mixer, CW oscillator and break in, receiver and transmit exciter, audio filter and all band pass filters—£12.00.
Synthesiser—£7.20. Diode switching—£3.10. Voltage control—£3.40. Display—£1.30. Predriver—£2.10. Driver—£1.40. PA—£4.20. ALC—£2.00. Wattmeter—£1.70. Complete set £35.00. Photostat of both articles—£1.80. All prices post paid. CWO to 1 Old Hall Close, Walton, Warrington.

AMATEUR RADIO EQUIPMENT BOUGHT, sold and exchanged. Contact Dave G3RCQ evenings 6-9pm on Hornchurch (040 24) 55733, Prestel Mbx 402455733 or SAE to 65 Cecil Avenue, Hornchurch, Essex RM11 2NA.

AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

SITUATIONS VACANT

SUMMER JOBS IN AMERICA. American children's summer camps are seeking bright, enthusiastic young people (aged 19½-35) to live with and teach Amateur Radio skills to children from mid-June to mid/end August. Return flight, special work visa, food and accommodation arranged plus $250-$300 pocket money for the season. A challenging and rewarding job for those who don't mind hard work and who have a genuine regard for children. If you have the relevant experience, and would like further details of this fantastic opportunity to work and travel in the USA (for up to 6 weeks after camp), please contact: Rod Carol, Bunacamp, 232 Vauxhall Bridge Road, London SW1V 1AU. Tel: 01-630 0344.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc) write or phone—THE RAPID RESULTS COLLEGE, Dept JT10, Tuition House, London SW19 4DS. Tel: 01-947 7272 (9am-5pm) or use our 24hr Recordacall service 01-946 1102 quoting JT10.

HEATHKIT. UK spares and service centre. Cedar Electronics, Unit 12, Station Drive, Bredon, Tewkesbury, Glos. Telephone (0684) 73127.

RSGB MAIL-ORDER PRICE LIST

RSGB books

	Non-members' price	Members' price
A Guide to Amateur Radio (19th edn)	£4.14	£3.52
Amateur Radio Operating Manual (3rd edn)	£6.51	£5.54
Amateur Radio Software	£8.69	£7.39
HF Antennas for All Locations	£7.79	£6.62
How to Pass the Radio Amateurs' Examination	£3.62	£3.08
Microwave Newsletter Technical Collection	£7.23	£6.15
**Morse Code for Radio Amateurs*	£1.75	£1.49
RSGB Amateur Radio Call Book (1985 edn)	£7.33	£6.23
Radio Amateurs' Examination Manual (11th edn)	£4.07	£3.46
Radio Communication Handbook (5th edn) Vol 2	£8.96	£7.62
Radio Data Reference Book (5th edn)	£9.13	£7.76
Raynet Manual (1984 edn)	£2.95	£2.51
Teleprinter Handbook (2nd edn)	£13.47	£11.45
Television Interference Manual (2nd edn)	£2.45	£2.08
Test Equipment for the Radio Amateur	£6.79	£5.77
VHF/UHF Manual (4th edn)	£11.20	£9.52
World at Their Fingertips (paperback)	£8.21	£6.98

RSGB logbooks

Amateur Radio Logbook	£2.93	£2.49
Mobile Logbook	£1.30	£1.11
Receiving Station Logbook	£3.04	£2.58

RSGB maps, charts and lists

HF Awards List and Countries List	51p	43p
Great Circle DX Map (wall)	£2.57	£2.18
IARU Region 1 Beacon List	42p	36p
Locator Map of Europe (wall)	£2.07	£1.76
Locator Map of Europe (card for desk)	75p	64p
UK Beacon List	42p	36p
UK Repeater List and maps	53p	45p
Western Europe (new) Locator Map (wall)	£3.24	£2.75
World Prefix Map in full colour (wall)	£2.68	£2.28
Meteor Scatter Data	£3.72	£3.16

RSGB members' sundries (members only)

Radio Communication Easibinder	—	£6.72
RSGB badge car sticker	—	49p
RSGB belt (real leather)	—	£7.57
RSGB coffee mug (plastic)	—	£1.84
RSGB hf contest log sheets (100)	—	£3.14
RSGB vhf contest log sheets (100)	—	£3.14
RSGB tie (coffee, maroon, green or blue)	—	£3.20
RSGB callsign cap	—	£4.98
RSGB logo rubber stamp	—	£3.16
RSGB station callsign plaque (Delivery five weeks)	—	£9.50
RSGB teeshirts (med, large, exl)	—	£4.90
Standard callsign lapel badge (Delivery five weeks)	—	£1.96
De-luxe callsign lapel badge (Delivery five weeks)	—	£2.81
Lapel badge (RSGB emblem, pin fitting)	—	60p
Mini lapel badge (RSGB emblem, pin fitting)	—	68p
Members' headed notepaper (50 sheets) quarto	—	£1.20
Members' headed notepaper (50 sheets) octavo	—	76p

Miscellaneous

"Amateur radio" (two colours) car sticker	78p	66p
"I'm on the air with amateur radio" (four colours) car sticker	89p	76p
"I'm monitoring ·5 are you?" (two colours) car sticker	78p	66p
Radio Communication back issues *(As available)*	£1.40	£1.19
Radio Communication bound volume, 1982	£16.87	£14.34
Radio Communication bound volume, 1983	£17.90	£15.22
Radio Communication bound volume, 1984	£17.90	£15.22
Smith charts, pad of 25 (Chartwell D7510)	£2.35	£2.00

Other publications

	Non-members' price	Members' price
**All About Cubical Quad Antennas* (RPI)	£6.17	£5.24
Amateur Single Sideband (Ham Radio)	£5.78	£4.91
Amateur Television Handbook (revised) (BATC)	£3.12	£2.65
**Antenna Anthology* (ARRL)	£6.36	£5.41
ARRL Antenna Book (ARRL)	£9.30	£7.91
**ARRL Electronics Data Book* (ARRL)	£4.73	£4.02
AX25 Amateur Pocket Radio Link-layer Protocol (ARRL)	£4.70	£4.00
Basic Radio Electronics (Willey)	£16.95	£14.41
Beam Antenna Handbook (RPI)	£7.24	£6.15
Better Short Wave Reception (RPI)	£7.24	£6.15
**Care and Feeding of Power Grid Tubes* (Varian)	£7.40	£6.29
CMOS Cookbook (Sams)	£13.84	£11.76
Complete DX'er (W9KNI)	£8.23	£7.00
Complete Shortwave Listener's Handbook (Tab)	£12.93	£10.99
Design of VMOS Circuits with experiments (Sams)	£9.00	£7.65
FM and Repeaters for the Radio Amateur (ARRL)	£4.56	£3.88
Fourth ARRL Amateur Radio Computer Networking Conference	£10.66	£9.06
G-QRP Club Circuit Book	£4.79	£4.07
Guide to Oscar Operation (AMSAT)	£1.89	£1.61
Hints and Kinks for the Radio Amateur (ARRL)	£4.73	£4.02
How to Troubleshoot and Repair AR Equipment	£11.09	£9.43
Power Supply Handbook (Tab)	£11.64	£9.89
Radio Amateurs Antenna Handbook (RPI)	£8.34	£7.09
Radio Amateurs Callbook (1986) (DX listings) (ARC1)	£19.43	£16.52
Radio Amateur Callbook (1986 USA listings) (ARCI)	£19.98	£16.98
Radio Amateurs Handbook (1985) (Softback) (ARRL)	£11.75	£9.99
Radio Amateurs Handbook (1985) (Hardback) (ARRL)	£23.19	£19.71
Radio Communication Receivers	£16.63	£14.14
Radio Frequency Interference (ARRL)	£4.43	£3.77
Satellite Experimenters Handbook (ARRL)	£10.71	£9.10
Secrets of Ham Radio DXing	£8.39	£7.13
Semiconductor Data Book (Newnes)	£8.44	£7.17
Shortwave Listeners' Antenna Handbook	£16.73	£14.22
**Shortwave Propagation Handbook* (Cowan)	£8.25	£7.01
Simple Low-cost Wire Antennas (RPI)	£7.23	£6.15
Solid State Design for the Radio Amateur (ARRL)	£8.33	£7.08
Towards the Radio Amateurs' Examination	£4.57	£3.88
Towers International Transistor Selector	£14.77	£12.55
**Towers Op-Amp Selector*	£10.06	£8.55
TV for Amateurs	£2.36	£2.01
**UHF-Compendium Parts 1 and 2*	£15.81	£13.44
Understanding Amateur Radio (ARRL)	£5.01	£4.26
Weekend Projects for the Radio Amateur (ARRL)	£5.24	£4.45
World Atlas (RACI)	£3.56	£3.03
World Radio TV Handbook 1985	£20.98	£17.83

RSGB kits

Morseman (*Rad Com* December 1984)		
Kit 1	£13.52	£11.49
Kit 2	£20.67	£17.57
*Kit 3	£38.24	£32.50
CMOS Z80 ic	£8.65	£7.35
Ferrite ring 28-041-31 (Pack of two)	£2.71	£2.30

MORSE INSTRUCTION AID

RSGB morse course Stage 1 (to 5wpm)	£4.80	£4.08

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership). One year	£33.39	£28.38
Two years	£63.53	£54.00
Three years	£95.02	£80.77
By air via KLM (to W Europe only) one year	£47.45	£40.33
Ham Radio Magazine (per annum) (incl air delivery)	£26.84	£22.81

NEWSLETTER SUBSCRIPTIONS

Microwave Newsletter, VHF Newsletter, DX Newsletter. For details contact the membership services department at RSGB headquarters.

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

***Items marked with an asterisk may not be available immediately; please telephone before ordering to confirm availability.**

ORDER FROM: RSGB Publications (Sales), Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

RADIO COMMUNICATION

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RAD COM OPERATING GUIDE 1986

(Supplement to *Radio Communication* January 1986)

General rules for RSGB vhf/uhf/shf contests 1986

The rules governing all RSGB VHF/UHF/SHF Contests to be held in 1986 will include the following general rules, supplemented by individual rules for each contest. Please read the rules carefully before the event.

Cover and summary sheets and up to 10 log sheets are available from the contest adjudicator. If you are entering a contest for the first time write to the contest adjudicator enclosing a large sae and a recent *Radio Communication* address label as proof of membership. For subsequent supplies it is only necessary to tick the bottom of the cover sheet (Form 427) and enclose a large sae. All stationery is A4 size (30 by 21cm); envelopes which hold flat sheets will carry far more than those which require sheets to be folded. Larger quantities of log sheets may be obtained from RSGB Publications (Sales) quoting reference LSVHF. Queries on vhf contests may be made to John Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED; tel Ipswich 717830 (before 9pm).

Please note that the general rules have been changed considerably this year, and as a result the individual contest rules will contain most of the detailed information on the sections, scoring systems and methods of tabulation. Unless otherwise stated in the individual contest rules, all of the general rules apply in every contest.

Logging standards are giving rise to concern, so this year the adjudication standards are being tightened considerably. All points claimed for a contact will be lost if either station logs callsigns incorrectly, including any suffix. The receiving station will also lose all claimed points for a contact where other information is logged incorrectly. Note that 10 times the claimed score will be lost for unmarked duplicate contacts.

1. Entries
All entries must be sent to the contest adjudicator at the address shown in the individual contest rules. All entries become the property of the RSGB and cannot be returned.

2. Last posting date
All entries must be postmarked not later than 15 days after the end of the contest or last cumulative activity period.

3. Cover sheets
All entries must be accompanied by a correctly completed current RSGB vhf/uhf contest cover sheet (form 427) for each band used. In multiband events entrants must also complete a multiband summary sheet (form 4422).

4. Operators
All operators must be RSGB members.

5. Fixed stations
In fixed station sections, the station must be located at the main address as shown on the licence.

6. Single-operator stations
Single-operator stations are those operated by one operator who received no assistance with operating or log keeping during the contest.

7. Locations
In multiband events all stations forming one entry must operate from one site, defined as a circle of 1km radius.

All equipment for portable stations must be installed on site during the 24h preceding the contest or during the contest itself. Entrants may not change the location of their stations during the contest.

8. Valid contacts
No points will be lost if a non-competing station being contacted by an entrant is unable to supply a QTH, locator, or serial number, but the receiving operator must obtain and record enough information to be able to calculate the claimed distance score. Contacts with stations whose callsigns appear on the cover sheet will not count for points.

Only one scoring contact may be made with a given station on each band in use during the contest, ie any callsign regardless of suffix or prefix may only be worked for points once. Any non-scoring contacts must be clearly marked in the log. Unmarked duplicate contacts will be penalized at the rate of 10 times the claimed score for that contact.

In cumulative contests one contact may be made with a given station (as defined above) during each activity period. Only the three highest scoring activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purpose of checking.

9. Radial ring scoring
Contacts made between stations separated by the distances shown in the table will score as indicated.

Km	Points	Km	Points
0-50	1	151-200	7
51-100	3	201-250	9
101-150	5	251-300	11

and pro rata

10. Final tabulation of multiband contests
The final tabulation showing the overall results will be formed by taking the sum of the points gained on each band, which will first be calculated by dividing each station's score by that of the band leader and multiplying by 1,000.

$$ie \quad \text{Points for each band} = \frac{\text{Score achieved}}{\text{Band leaders score}} \times 1{,}000$$

11. Awards
There will be an award to the highest scoring station in each section. An award will also be made to the runner-up in each section in which there are 10 or more entries. In events tabulated under rule 10, a certificate will be awarded to the highest scoring station on each band that has not qualified for either the overall winner or runner-up award.

12. Crossband contacts
Crossband contacts do not count for points.

13. Log keeping
The logs for contest entries must be made out on current RSGB vhf/uhf log sheets or if computer listings are to be submitted, these must be cut to A4 size, RSGB log format, and be line spaced to contain 25 contacts per sheet. Each sheet must be headed with the entrant's callsign, IARU locator, contest title, and sheet number. Logs must be tabulated as follows:

(*i*) Date/time (gmt)
(*ii*) Callsign of station worked
(*iii*) My report on his/her signal and serial number
(*iv*) His/her report on my signal and serial number
(*v*) IARU Locator received
(*vi*) QTH received (when specifically required) or comments
(*vii*) Points claimed

The contest exchange must consist of both callsigns, RS or RST report followed by serial number, and IARU locator. Where QTH information must be exchanged it must be given as a point identifiable on an Ordnance Survey route planning map (scale 1:625,000) or as a distance and direction not greater than 25km from such a point. Any complaints received or made about signals should be recorded in the comments column.

14. Serial numbers start from 001 on each band and advance by one for each contact. In cumulative contests serial numbers increment from 001 for each activity period.

15. A station must operate within the terms of his/her normal licence. (This excludes high power permits.) Special event callsigns may not be used.

16. The equipment comprising the station may be used under one callsign only for contest purposes on each band. This does not apply to the use of shared equipment for talkback.

17. The same antenna system must be used on transmit and receive.

18. Stations using telephony in the recognized cw sub-bands 70·025-70·150MHz, 144·000-144·150MHz, 432·000-432·150MHz and 1,296·000-1,296·150MHz, or transmitting on beacon frequencies, are liable to disqualification. Entrants should observe the provisions of the IARU/RSGB band plans.

19. Stations which persistently radiate poor-quality signals, or otherwise contravene the code of practice for vhf/uhf contest operation (see below), are liable to disqualification or loss of points. Gross errors in logging will result in disqualification.

20. Contacts made via a repeater, man-made satellite, or moonbounce will not count for points.

21. Proof of contact may be required.

22. Entrants must permit inspection of their station by members of the VHF Contests Committee, or its representatives, and give site access information if requested to do so.

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

General rules for RSGB listeners vhf/uhf contests 1986

1. The general rules for vhf/uhf contests published in this issue of *Radio Communication* will apply.

2. Listeners contests are open to all non-licensed members of the RSGB. Only the entrant may operate the receiving station.

3. Logs must show in columns: (*a*) date/time (gmt), (*b*) callsign of station heard, (*c*) my report on his/her signals, (*d*) report and serial number sent by station heard, (*e*) callsign of station being worked, (*f*) IARU locator given by station heard, (*g*) QTH given by station heard (if appropriate), (*h*) points claimed.

On 144MHz the callsign in column (*e*) may only occur once in every 10 contacts logged. CQ and test calls do not count for points and should not be logged. If both sides of a QSO can be heard, both can be claimed for points.

The Hansen Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 1 March and 21 September 1986. The aggregate score will be calculated in accordance with general rule 8.

Code of practice of vhf/uhf contest operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.

2. Take all possible steps to ensure that a site is not going to be used by some other group or club. Check with the local club and last year's results table to see if any group used the site last year. If it is going to be used by another group, come to an amicable agreement before the event. Groups are advised to select possible alternative sites.

UK 144MHz band plan

144.000		
CW only	144.000 to 144.025	*Moonbounce*
	144.050	*CW calling frequency*
	144.100	*MS cw reference frequency*
144.150		
SSB and cw only	144.250	*Used for GB2RS (ssb) and slow morse transmissions*
	144.260 ± 144.300	*Used by Raynet* *SSB calling frequency*
	144.400	*MS ssb reference frequency*
144.500		
All modes non-channelized	144.500	*SSTV calling frequency*
	144.600	*RTTY calling frequency*
	144.600 ±	*RTTY working (fsk)*
	144.675	*Data and packet radio calling frequency*
	144.700	*FAX calling frequency*
	144.750	*ATV calling and talkback*
	144.775	*Raynet*
	144.800	*Raynet*
	144.825	*Raynet*
144.845		
Beacons	(144.850	*Raynet)*
144.990		
FM repeater inputs	145.000 R0	
	145.025 R1	
	145.050 R2	
	145.075 R3	
	145.100 R4	
	145.125 R5	
	145.150 R6	
	145.175 R7	
145.200		
FM simplex channels	145.200 S8	*Raynet*
	145.225 S9	*Used by Raynet*
	145.250 S10	*Used for slow morse tone modulated transmissions*
	145.275 S11	
	145.300 S12	*RTTY-afsk*
	145.325 S13	
	145.350 S14	
	145.375 S15	
	145.400 S16	
	145.425 S17	
	145.450 S18	
	145.475 S19	
	145.500 S20	*FM calling channel*
	145.525 S21	*Used for GB2RS (fm) broadcast*
	145.550 S22	*Used for rally/ exhibition talk-in*
	145.575 S23	
145.600		
FM repeater outputs	145.600 R0	
	145.625 R1	
	145.650 R2	
	145.675 R3	
	145.700 R4	
	145.725 R5	
	145.750 R6	
	145.775 R7	
145.800		
Satellite service		
146.000		

UK 430-440MHz band plan

430.000		
	NB: 431-432MHz not available within 100km of Charing Cross, London.	
432.000		
CW only	432.000 to 432.025	*Moonbounce*
	432.050	*CW centre of activity*
432.150		
SSB and cw only	432.200	*SSB centre of activity*
	432.350	*Microwave talk-back*
432.500		
All modes non-channelized	432.600	*RTTY calling frequency*
	432.600 ±	*RTTY working (fsk)*
	432.675	*Data transmission calling frequency*
	432.700	*FAX calling frequency*
432.800		
Beacons		
433.000		
FM repeater outputs in UK only	433.000 RB0	
	433.025 RB1	
	433.050 RB2	
	433.075 RB3	
	433.100 RB4	
	433.125 RB5	
	433.150 RB6	
	433.175 RB7	
	433.200 RB8	
	433.225 RB9	
	433.250 RB10	
	433.275 RB11	
	433.300 RB12/SU12	*RTTY repeater and rtty afsk working*
	433.325 RB13	
	433.350 RB14	
	433.375 RB15	
433.400		
FM simplex channels	433.400 SU16	
	433.425 SU17	
	433.450 SU18	
	433.475 SU19	
	433.500 SU20	*FM calling channel*
	433.600 SU24	*RTTY-afsk*
	433.700	*Raynet*
	433.725	*Raynet*
	433.750	*Raynet*
	433.775	*Raynet*
434.600		
FM repeater inputs in UK only	434.600 RB0	
	434.625 RB1	
	434.650 RB2	
	434.675 RB3	
	434.700 RB4	
	434.725 RB5	
	434.750 RB6	
	434.775 RB7	
	434.800 RB8	
	434.825 RB9	
	434.850 RB10	
	434.875 RB11	
	434.900 RB12	*RTTY repeater-afsk*
	434.925 RB13	
	434.950 RB14	
	434.975 RB15	
435.000		
	434 – 440	*ATV – frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service*
	435 – 438	*Amateur satellite service*
440.000		

Notes on UK 144MHz and 430MHz band plans

MS operation can take place up to 26kHz higher than the reference frequency (see RSGB *Amateur Radio Operating Manual* p80).

The beacon and satellite service must be kept free of normal communication transmissions to prevent interference with these services. († – 144.850MHz in use by Raynet until further notice, subject to 25W erp max and vertical polarization).

The use of the fm mode within the ssb/cw section and cw and ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for dx communication. FM stations wishing to work dx should use the all-mode section, taking care to avoid frequencies allocated for specific purposes.

From January 1987, 433.200MHz will cease to be a simplex channel and will become a permanently designated repeater channel, RB8.

UK 50MHz band plan (Effective 1 February 1986)

50.000		
CW only	50.020 to 50.08	*Beacons*
50.100		
Narrowband modes	50.110	*Worldwide dx calling*
	50.200	*SSB activity centre*
	50.300 ±	*CW ms*
	50.350 ±	*SSB ms*
50.400		
All modes		
50.500		

UK 70MHz band plan

70.025		
Beacons only		
70.075		
CW only		
70.150		
SSB and cw only	70.200	*SSB calling frequency*
70.260		
All modes	70.260	*National mobile and calling frequency*
	70.300	*RTTY calling frequency*
	70.350 to 70.400	*Raynet*
70.400		
FM simplex only	70.450	*FM calling frequency*
70.500		

IARU Region 1 HF Band Plan

Band (MHz)		Type of emission
3.50—3.60	± 20kHz	cw (2)
3.60		rtty (1)
3.60—3.80		cw and phone (2, 3)
7.00—7.04	± 5kHz	cw
7.04		rtty (1)
7.04—7.10		cw and phone
10.100—10.150	± 5kHz	cw
10.145		rtty (1)
14.00—14.10	± 10kHz	cw
14.09		rtty (1)
14.10—14.35		cw and phone
18.068—18.110	± 5kHz	cw
18.105		rtty (1)
18.110—18.168		cw and phone
21.00—21.15	± 20kHz	cw
21.10		rtty (1)
21.15—21.45		cw and phone
24.890—24.930	± 5kHz	cw
24.925		rtty (1)
24.930—24.990		cw and phone
28.00—28.20	± 50kHz	cw
28.10		rtty (1)
28.20—29.70		cw and phone

Notes

(1) For rtty, recommended section of operation shared with cw.
(2) 3,500-3,510 and 3,775-3,800kHz reserved for intercontinental working.
(3) 3,635-3,650kHz is used by USSR stations for intercontinental working.
(4) For sstv recommended operation frequencies are: 3,735, 7,040, 14,230, 21,340, 28,680kHz, all ± 5kHz.
(5) For beacons, 28.2-28.3MHz is recommended.
(6) For the downlink of amateur satellites, 29.3-29.55MHz is recommended.
(7) The transmitter power on the 10MHz band should not exceed 250W mean output power, (NB: UK max carrier power is 20dBW).
(8) No contests should be organized on the 10MHz band.
(9) Credit for awards or diplomas should be accepted for contacts made on the 10MHz band.
(10) SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic.
(11) Contest preferred segments for major contests: 3.5-3.56, 3.6-3.65, 3.7-3.8, 14-14.06, 14.125-14.3MHz.

UK 144MHz band plan

144.000		
CW only	144.000 to 144.025	*Moonbounce*
	144.050	*CW calling frequency*
	144.100	*MS cw reference frequency*
144.150		
SSB and cw only	144.250	*Used for GB2RS (ssb) and slow morse transmissions*
	144.260 ± 144.300	*Used by Raynet* *SSB calling frequency*
	144.400	*MS ssb reference frequency*
144.500		
All modes non-channelized	144.500	*SSTV calling frequency*
	144.600	*RTTY calling frequency*
	144.600 ±	*RTTY working (fsk)*
	144.675	*Data and packet radio calling frequency*
	144.700	*FAX calling frequency*
	144.750	*ATV calling and talkback*
	144.775	*Raynet*
	144.800	*Raynet*
	144.825	*Raynet*
144.845		
Beacons	(144.850	*Raynet)*
144.990		
FM repeater inputs	145.000 R0	
	145.025 R1	
	145.050 R2	
	145.075 R3	
	145.100 R4	
	145.125 R5	
	145.150 R6	
	145.175 R7	
145.200		
FM simplex channels	145.200 S8	*Raynet*
	145.225 S9	*Used by Raynet*
	145.250 S10	*Used for slow morse tone modulated transmissions*
	145.275 S11	
	145.300 S12	*RTTY-afsk*
	145.325 S13	
	145.350 S14	
	145.375 S15	
	145.400 S16	
	145.425 S17	
	145.450 S18	
	145.475 S19	
	145.500 S20	*FM calling channel*
	145.525 S21	*Used for GB2RS (fm) broadcast*
	145.550 S22	*Used for rally/ exhibition talk-in*
	145.575 S23	
145.600		
FM repeater outputs	145.600 R0	
	145.625 R1	
	145.650 R2	
	145.675 R3	
	145.700 R4	
	145.725 R5	
	145.750 R6	
	145.775 R7	
145.800		
Satellite service		
146.000		

UK 430-440MHz band plan

430.000		
	NB: 431-432MHz not available within 100km of Charing Cross, London.	
432.000		
CW only	432.000 to 432.025	*Moonbounce*
	432.050	*CW centre of activity*
432.150		
SSB and cw only	432.200	*SSB centre of activity*
	432.350	*Microwave talk-back*
432.500		
All modes non-channelized	432.600	*RTTY calling frequency*
	432.600 ±	*RTTY working (fsk)*
	432.675	*Data transmission calling frequency*
	432.700	*FAX calling frequency*
432.800		
Beacons		
433.000		
FM repeater outputs in UK only	433.000 RB0	
	433.025 RB1	
	433.050 RB2	
	433.075 RB3	
	433.100 RB4	
	433.125 RB5	
	433.150 RB6	
	433.175 RB7	
	433.200 RB8	
	433.225 RB9	
	433.250 RB10	
	433.275 RB11	
	433.300 RB12/SU12	*RTTY repeater and rtty afsk working*
	433.325 RB13	
	433.350 RB14	
	433.375 RB15	
433.400		
FM simplex channels	433.400 SU16	
	433.425 SU17	
	433.450 SU18	
	433.475 SU19	
	433.500 SU20	*FM calling channel*
	433.600 SU24	*RTTY-afsk*
	433.700	*Raynet*
	433.725	*Raynet*
	433.750	*Raynet*
	433.775	*Raynet*
434.600		
FM repeater inputs in UK only	434.600 RB0	
	434.625 RB1	
	434.650 RB2	
	434.675 RB3	
	434.700 RB4	
	434.725 RB5	
	434.750 RB6	
	434.775 RB7	
	434.800 RB8	
	434.825 RB9	
	434.850 RB10	
	434.875 RB11	
	434.900 RB12	*RTTY repeater-afsk*
	434.925 RB13	
	434.950 RB14	
	434.975 RB15	
435.000		
	434 – 440	*ATV – frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service*
	435 – 438	*Amateur satellite service*
440.000		

Notes on UK 144MHz and 430MHz band plans

MS operation can take place up to 26kHz higher than the reference frequency (see RSGB *Amateur Radio Operating Manual* p80).

The beacon and satellite service must be kept free of normal communication transmissions to prevent interference with these services. († – 144.850MHz in use by Raynet until further notice, subject to 25W erp max and vertical polarization).

The use of the fm mode within the ssb/cw section and cw and ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for dx communication. FM stations wishing to work dx should use the all-mode section, taking care to avoid frequencies allocated for specific purposes.

From January 1987, 433.200MHz will cease to be a simplex channel and will become a permanently designated repeater channel, RB8.

UK 50MHz band plan (Effective 1 February 1986)

50.000		
CW only	50.020 to 50.08	*Beacons*
50.100		
Narrowband modes	50.110	*Worldwide dx calling*
	50.200	*SSB activity centre*
	50.300 ±	*CW ms*
	50.350 ±	*SSB ms*
50.400		
All modes		
50.500		

UK 70MHz band plan

70.025		
Beacons only		
70.075		
CW only		
70.150		
SSB and cw only	70.200	*SSB calling frequency*
70.260		
All modes	70.260	*National mobile and calling frequency*
	70.300	*RTTY calling frequency*
	70.350 to 70.400	*Raynet*
70.400		
FM simplex only	70.450	*FM calling frequency*
70.500		

IARU Region 1 HF Band Plan

Band (MHz)		Type of emission
3.50—3.60	± 20kHz	cw (2)
3.60		rtty (1)
3.60—3.80		cw and phone (2, 3)
7.00—7.04	± 5kHz	cw
7.04		rtty (1)
7.04—7.10		cw and phone
10.100—10.150	± 5kHz	cw
10.145		rtty (1)
14.00—14.10	± 10kHz	cw
14.09		rtty (1)
14.10—14.35		cw and phone
18.068—18.110	± 5kHz	cw
18.105		rtty (1)
18.110—18.168		cw and phone
21.00—21.15	± 20kHz	cw
21.10		rtty (1)
21.15—21.45		cw and phone
24.890—24.930	± 5kHz	cw
24.925		rtty (1)
24.930—24.990		cw and phone
28.00—28.20	± 50kHz	cw
28.10		rtty (1)
28.20—29.70		cw and phone

Notes

(1) For rtty, recommended section of operation shared with cw.
(2) 3,500-3,510 and 3,775-3,800kHz reserved for intercontinental working.
(3) 3,635-3,650kHz is used by USSR stations for intercontinental working.
(4) For sstv recommended operation frequencies are: 3,735, 7,040, 14,230, 21,340, 28,680kHz, all ± 5kHz.
(5) For beacons, 28.2-28.3MHz is recommended.
(6) For the downlink of amateur satellites, 29.3-29.55MHz is recommended.
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(8) No contests should be organized on the 10MHz band.
(9) Credit for awards or diplomas should be accepted for contacts made on the 10MHz band.
(10) SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic.
(11) Contest preferred segments for major contests: 3.5-3.56, 3.6-3.65, 3.7-3.8, 14-14.06, 14.125-14.3MHz.

3. All transmitters generate unwanted signals; it is the level of these signals that matters. In operation from a good site, levels of spurious radiation which may be acceptable from a home station may well be found to be excessive by nearby stations (25 miles or more away).

4. Similarly, all receivers are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.

5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur band spurious radiations, including noise modulation, to a level of −90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.

6. Above all, be gentlemanly at all times. Be helpful and inform stations apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! Try the effect of turning the antenna or inserting attenuators in the feedline; if the level of the spurious signal changes relative to the wanted signal then non-linear effects are occurring in the receiver. Some recent synthesized equipment has excessive local oscillator phase noise, which will manifest itself as apparent splatter on strong signals, even if there is no overloading of the receiver front end. Preamplifiers should always be switched out to avoid overload problems when checking transmissions. If you receive a complaint, perform tests to check for receiver overload, and try reducing drive levels and switching out linear amplifiers to determine a cure. Monitor your own signal "off air" if possible. Remember that many "linears" may not be linear at high power levels under field conditions with poorly regulated power supplies. The effects of overdriving will be more severe if speech processing is used, so pay particular attention to drive level adjustment.

If asked to close down by a Government official or the site owner, do so at once without objectionable behaviour.

General rules for RSGB hf contests 1986

The general rules for RSGB hf contests are given below and are to be read in conjunction with the specific rules for each particular contest. International contest rules will contain the relevant sections of the general rules for the benefit of overseas entrants.

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

2. Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Each contact to be scored as per the rules of the particular contest. Points are deducted for errors in the logs. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Unmarked duplicates will be penalised at the rate of 10 times the number of points claimed and logs containing more than five such duplicates will normally be disqualified. Proof of contact may be required.

3. Unless otherwise stated, only single-operator entries will be accepted. A single operator station is one manned by an individual operator who receives no assistance whatsoever during the contest period.

4. When multi-operator entries are specifically allowed, such entries will be accepted only if:
   (a) The declaration is signed by one operator, who will be regarded as the entrant, and
   (b) The operator's callsign is given for each contact.

5. Operators of stations located within the British Isles, ie within the call areas G, GD, GI, GJ, GM, GU and GW, must be fully paid-up members of the RSGB.

6. A contact consists of an exchange and an acknowledgement of an RS report on telephony or of an RST report on telegraphy, and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest period, irrespective of the band or mode in use. In an accumulative type of contest, each session will recommence with 001. Serial numbers, when sent, must be recorded from non-competing stations. In order to preserve contest-free segments, contestants are recommended to operate only within the segments designated in the rules of each event.

7. Entries must be clearly written or typed on one side only of RSGB hf contest log sheets (Form HFC1) or international A4 size paper using blue or black ink. *Separate log sheets must be used for each band.* Logs must be kept and entries submitted in gmt. Computer derived logs will be accepted provided that they follow the same format as standard hf log sheets, with 40 entries on an A4 size page split into groups of 10 and having the same column spacings and headings as HFC1.

8. Each entry must include a cover/summary sheet (eg Form HFC2) incorporating a signed declaration.

9. Entries must be addressed to the adjudicator, whose address will appear in the specific rules for each contest, with the name of the contest marked in the top left hand corner. 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.

10. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

11. For scoring purposes, aeronautical mobile and maritime mobile stations will count only as the minimum score of the particular contest and not for any bonus or multiplier. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.

12. Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates.

13. Certificates of merit are normally sent to the three leading stations in each section of a contest.

14. Entrants may be disqualified for failure to observe the general rules or the specific rules.

15. The practice of pre-arranging contest contacts with specific stations before the start of the event is considered not to be in the spirit of the contest. Proof of this taking place may result in disqualification.

16. Small quantities of RSGB hf contest log sheets (Form HFC1) and cover/summary sheets (Form HFC2) may be obtained from RSGB HQ on receipt of a large stamped addressed envelope. Larger quantities may be purchased.

General rules for RSGB hf receiving contests 1986

1. To claim points, a station may be logged once only on each band whether fixed, portable, mobile, or alternative address.

2. A receiving station log must show in columns: date/time (gmt), callsign of station heard, report and serial number sent by station heard, callsign of station being worked, bonus points, total points. The band in use must be shown at the top of each log sheet.

3. A cover/summary sheet (eg Form HFC2) must be submitted with the logs. The signed declaration must include the words "I certify that I do not hold a Class A transmitting licence".

4. The following rules from the transmitting general rules also apply to receiving contests: 3, 5, 7, 9, 10, 11, 12, 13, 14 and 16.

Code letters for use in RSGB contests

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

*Please note change of name and code letters from Salop.

THE RSGB News Bulletin PAGES

50 MHz We have lift-off.....

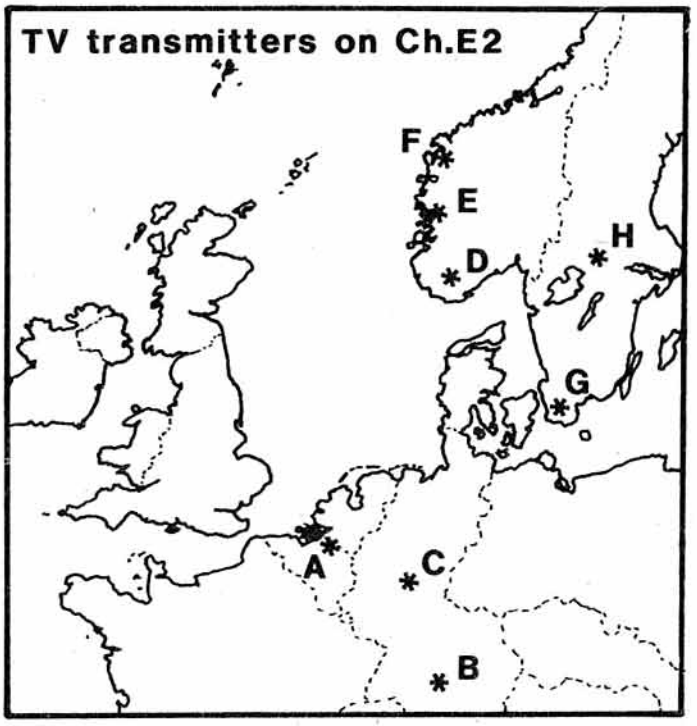
The Society is delighted to announce a further step in the progress of the 50 MHz experiment - the band is to be generally released at 0001 on 1 February 1986. Elsewhere in this edition of RadCom you'll find a 6-page section featuring an article specially prepared at our request by the Radio Regulatory Division on the background to the negotiations leading up to the new allocation: there's also an exclusive preview of the text of their Information Sheet, which answers questions we're all likely to have about the new band. You can also see a copy of the letter sent to the Society from the DTI setting out the terms of the release of the band.

There are some initial restrictions - it's a primary allocation but the power limits are 14 dBW carrier and 20 dBW PEP. The transmitting antenna must not be more than 20 metres above ground and it must be horizontally polarised. There's no mobile, portable or "temporary premises" operation permitted and no repeaters will be allowed in the band. Existing permits will be withdrawn. Finally, despite our very best efforts (and our declared policy), the band is initially only available to Class A licensees. However, all these restrictions will be reviewed after one year - as you'll see from the DTI's Information Sheet, they'll be reconsidering the matter of Class B access to 50 MHz, as well as all the other points, in the light of any problems arising in the first year of operation. The good news is that there are no restrictions on times or modes of operation.

Main reason behind all the restrictions is the need not to cause interference to the services of other administrations. RRD Information Sheet spells it all out, but it is VITAL that amateur operations don't cause problems for broadcasters or land mobile users in Europe. Bottom line is that if there are interference problems we'll lose the band - it's as simple as that - so forget the beefy power amplifier and the monster arrays, at least for a year.

Hopefully the band will become available later to all and at least some of the restrictions will be lifted.

Propagation at 50 MHz looks likely to be interesting, to say the least. Expect some or all of the following: E and F layer reflections as per 28 MHz,



Key to TV transmitter map

Location	Key	ERP	Polarisation
Antwerp (ON)	A	0.1/0.01kW	Vertical
Grünten (DL)	B	100kW	Horizontal
Biedenkopf (DL)	C	100kW	Horizontal
Greipstad (LA)	D	60kW	Vertical
Gulen (LA)	E	30kW	Vertical
Melhus (LA)	F	100kW	Vertical
Hörby (SM)	G	100kW	Horizontal
Örebrö (SM)	H	60kW	Horizontal

FREQUENCY	CALLSIGN	LOCATION	LAT/LONG	ERPW	AERIAL	MASL	BEAM DIRECTION	MODE
50.005	H44HIR	SOLOMON ISLANDS		-		-		
50.005	ZS2SIX	CAPE PROVINCE		10	TURNSTILE	174	OMNI	CW
50.005	ZS5VHF	CAPE PROVINCE		10	TURNSTILE HORIZ	174	OMNI	CW
50.006	GB3RMK	INVERNESS		30	DIPOLE	201	NORTH/SOUTH	F1A
50.010	ZS1STB	STILL BAY	34°23'S, 21°24'E	50	2 X DELTA LOOP	15	NORTH	F1
50.010	ZS6STB	VEREENIGING		-		-		
50.015	SZ2DH	ATHENS		-		-		
50.020	GB3SIX	IO73IT		100	3 ELE YAGI	58	WEST	F1A
50.025	ZS6SIX	KEMPTON PARK		-		-		
50.025	6Y5RC	JAMAICA		40	3 ELE YAGI	80	NW	F1
50.030	ZS6PW			-		-	N OR NNW	A1A
50.035	ZB2VHF	IM76HE		100	5 ELE YAGI	-	WNW OR S	A1
50.039	FY7THF	FR. GUIANA		-		-		
50.041	WA8KGG	NE OHIO		-		-		
50.045	OX3VHF	IQ06PS	76°46'N, 18°42'E	20	GROUND PLANE	20	OMNI	A1A
50.050	GB3NHQ	IO91VQ	51°43'N, 00°12'W	15	CROSSED DIPOLES	35	OMNI	F1A
50.055	ZS6DN			-		-		
50.060	ZS6DN/B	PRETORIA	25°44'S, 28°12'E	100	4 ELE YAGI	1280	NORTH	
50.062	PY2AA	SAN PAULO		25	GROUND PLANE	-	OMNI	A1
50.062	W3VD	LAUREL, MD		-		-		
50.075	VS6HK	HONGKONG		30	GROUND PLANE	-	OMNI	
50.080	TI2NA	SAN JOSE		-		-		
50.080	ZS5VHF	DURBAN	29°44'S, 30°50'E	10	HALO	670	OMNI	A1
50.088	VE1SIX	NEW BRUNSWICK		-		-		
50.098	ZS6LN	TRANSVAAL		100	5 ELE YAGI	1240	VARIABLE	CW
50.099	KH6EQI	PEARL HARBOR		-		-		
50.110	ZS6LN			100	7 ELE YAGI	1200	VARIABLE	CW
50.110	ZS6SS			100	7 ELE YAGI	1200	VARIABLE	CW
50.499	5B4CY	ZYGHI KM54PS	34°45'N, 33°19'E	15	GROUND PLANE	30	OMNI	F1A
50.945	ZS1SIX	CAPE PROVINCE		8	3DB VERTICAL COLIN	-	OMNI	FSK
52.200	VK8VF	DARWIN, AUS		15	GROUND PLANE	-	OMNI	
52.300	VK6RTV	PERTH, AUS		-		-		
52.320	VK6RTT	CARNARVON		-		-		
52.330	VK3RGG	GEELONG, AUS		4	CROSSED DIPOLES	400	OMNI	F1
52.350	VK6RTU	KALGOORLIE, AUS		-		-		
52.500	ZL2VHM	PALMERSTON NTH		-		-		
52.510	ZL2MHF	MT CLIMIE		5		890		F1

very good meteor scatter characteristics, tropo, aurora and probably a few others no-one's thought of yet. DTI has asked RSGB to gather information on operational experience at 50 MHz and we'll be looking into how best to do that later this year.

HQ station GB3RS will be operational as of 0001 on 1 February and we hope to work lots of stations on voice and CW. Should be a grand band! Final thought - WATCH THAT ERP. Remember the limits are 20 dBW erp (i.e. 100 watts) for SSB and 14 dBW (i.e. 25 watts) for all other modes and that these are effective radiated powers, not transmitter output powers - i.e. you need to take antenna gain and feeder loss into account. Firstly, subtract the loss of your feeder from the gain of your antenna - for UR67 you can reckon on about 1.3 dB attenuation per 100 feet of cable - and then increase the transmitter output power figure by the dB factor you've arrived at. Convert that back into dBW and see whether it's less than 14 or 20 dBW. For example, suppose you have an antenna with a gain over a dipole (dBd) of 6 dB and 60' of UR67 feeder: your transmitter has 10W r.f.output on FM and CW and 15W PEP on SSB. Your feeder loss will be around 1 dB so the "antenna system gain" will be about 5 dB overall. The next step is easy if you have a calculator with an antilog function available: simply divide 5 by 10 (giving 0.5), take the antilog (giving 3.1622776) and multiply the transmitter output by that figure. You will end up with just over 31.6 watts on FM and CW and just over 47 watts on SSB. To get that figure back to dBW, just take the log and multiply by 10 - you should then see 15 dBW and 16.76 dBW. Obviously the first figure is slightly in excess of the legal limit, so you'll have to reduce the power when using FM and CW. The second figure is within the legal limit, so no problems. Former holders of 50 MHz experimental permits - which lapse with the general release of 50 MHz - will need to take a look at the parameters of their stations: in many cases they'll have to reduce their power levels by quite a long way to fall within the new limits.

Incidentally, RSGB did ask for different power levels outside TV broadcasting hours but DTI weren't able to accede to this request.

Do use the minimum power necessary to maintain contact AT ALL TIMES, especially when beaming towards Europe and Scandinavia - it'll be interesting to see just how little power you need if the path is open and the frequency is clear. Also, you'll be helping everyone's chances of staying on the band and getting your Class B friend on in a years' time.... see you on 6!

Morse tests

- RSGB takes over

The Society is also delighted to announce that it has been appointed by the DTI to take over the running of the amateur radio Morse test on its behalf as of 1 April 1986. At present the Morse test is run by BT International, but DTI decided to invite new proposals for the running of the test. RSGB, City & Guilds and BTI were invited to submit proposals and RSGB was chosen. Basically, the Society will establish at least 70 testing centres, one in each county, region or designated island, and tests will be held every two months in each centre - this means that if you're in a hurry and you're prepared to travel into the next county you can get a test even more quickly. The fee will be £7 - as opposed to the current £15 - and that figure will be held for at least two years.

The Society is preparing a booklet intended for those who want to become volunteer Morse examiners. If you're interested in giving your time and skill to this activity, please write to Ms Heather Norman, Assistant to the General Manager, at RSGB HQ. The booklet should be available during the last week of this month (i.e. January 1986).

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We hope you like the new look of the news and Member's Ads pages - at present we reckon on getting your advertisment in if we receive it by about the 10th of the month preceding a particular edition of RadCom. Apologies for the lack of Members' Mailbag and Amateur Radio News pages this month - the special 50 MHz feature takes 6 pages and something had to give....

*

A news release from the American Radio Relay League dated 6 December says that acting on the recommendation of the DX Advisory Committee, the ARRL Awards Committee has unanimously accepted a modification of the wording of Countries List Criterion 5(b). The new wording is as follows: "5(b). The following will not be eligible for consideration as a separate entity from the host country: Embassies, consulates and extra-territorial legal entities of all nature, including, but not limited to, monuments, offices of the United Nations agencies or related organisations, other inter-governmental organisations or diplomatic missions".

The Secretary-General of the International Telecommunications Union, Mr Richard Butler, attended the recent Region III Amateur Radio Conference in New Zealand: he gave the opening speech and spoke very highly of the achievements of the amateur service. Full text in next month's RadCom.

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As of 1 January 1986 the period which must elapse between special-event callsigns being issued to different applicants has been extended from 18 months to 2 years: the main reason for this is related to QSLing. This means that once a special-event callsign has been issued, it won't be reissued to a different applicant for that time. Also, we've recently received a number of applications for "one-off" special prefixes for special event callsigns. Unless they are of genuine national or global importance we can't approach the DTI regarding their issue - so please don't ask for an exotic prefix for your DXpedition or the 20th anniversary of your radio club, for example!

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Get the New Year off to a Good Start with a book from RSGB! Just to remind you, here's a little guide to some of our most popular books.

GUIDE TO AMATEUR RADIO - designed to help the newcomer to the hobby of amateur radio. Contains technical information and operating data of interest to all radio amateurs and listeners. Licence conditions and syllabus for RAE are included together with set of specimen questions - there's also a large chapter on the availability of factory-built equipment, from the 1950s to the present day. Guide to Amateur Radio costs £3.52 to members by post.

VHF/UHF MANUAL - the standard textbook on the theory and practice of amateur radio reception and transmission on frequencies between 30MHz and 24GHz. Contains full constructional details of many items of equipment, many using the latest semiconductor devices. "No serious VHFer should be without this book". - QST. £9.52 to members by post.

RADIO DATA REFERENCE BOOK - a familiar sight on the bookshelves of both amateur and professional radio designers. Presents a wide range of essential reference data in a convenient & compact form without needless repetiton of basic theory and without the requirement to search through many volumes. £7.76 to members by post.

MICROWAVE NEWSLETTER TECHNICAL COLLECTION - if you are interested in microwaves this has to be part of your library. The book consists of over sixty technical items previously included in the RSGB's Microwave Newsletter. Edited by Julian Gannaway, G3YGF & Steve Davies, G4KNZ the Collection is a must for anyone active at these frequencies. Costs £6.15 to members by post.

Not published by RSGB but none the worse for that - 99 Test Equipment Projects is now back in stock, at £9.14 to members by post. Care and Feeding of Power Grid Tubes, published by Varian, is also back in stock at £9.14 - just the thing for existing or aspiring QRO operators. UHF Compendium vols 1/2 combined also available again at £13.44. Finally, don't forget that RSGB Morseman kit 3 is available at £32.50 - brush up your CW for the 50 MHz band with this device and get some homebrewing practice at the same time.

The 1986 DX and North American Callbooks are now available. Format this year has changed slightly - the "North American" callbook now contains entries for the whole North American Continent, including Canada, rather than just the USA and its dependencies. Prices are UNCHANGED from those of the 1985 editions: the DX Callbook costs £16.52 to members by post (£14.88 over the counter) and the North American Callbook costs £16.98 to members by post and is £15.34 over the counter. They're both weighty tomes, so they're expensive to send by post....

Super special offer available on the 1985 Callbooks while stocks last - ring for details.

Late flash - Morse Code for Radio Amateurs available again at £1.49. All prices are those to members by post.

Final-final reminder that the installation of Mr W J McClintock, G3VPK, as the Society's 52nd President takes place on 18 January, at the Furze Hill Restaurant, Margaretting, near Chelmsford at 7.30pm. Admission is by ticket only, costs £4.00 - apply to Ms Heather Norman at RSGB HQ. Be quick though - applications must be received by 8 January. Please make your cheque payable to RSGB.

Super-final - late-breaking news on the 50 MHz allocation (or on anything else come to that) is available via the RSGB Databox on Potters Bar (0707) 52242. Members in London please note - the old "77" dialling code for Potters Bar from London has been phased out and the national STD code 0707 now has to be used.

THE Members' Ads PAGES

FOR SALE••••••

ICOM IC211E with Mutek front-end, £330. Creed 444, £45. G4HQX, Nailsworth, Glos, tel: 0453 83-3411.

HEATHKIT HW7, £30. RA1, £25. DX40 + VF1U, £30. Codar AT5, MS250S, T28, £25 each or £60 the three. All items vgc & c/w manuals. Prefer buyer collects G3IWT, QTHR, tel: Potters Bar (0707) 56241.

GOING QRT. Trio 9130, boxed, as new, £300. TET Quagi antenna, £25. Rotator, £20. Drae Morse tutor £35. Wave meter, £5. Misc aerial brackets, £5. G6DXR, QTHR, tel: 021-354 4125.

TRIO TR2500 2m FM handheld, ST2 base unit/charger, MS1 mobile bracket/adapter, spare PB25 battery pack. All vgc c/w original boxes, £200. Dave, G3TJP, QTHR, tel: 0782-618855.

ICOM 271E c/w Mutek board, £575. KW2000A c/w psu, mic, £165 ono. KW108 Monitorscope, £60. All plus carriage or prefer buyer collects. G4ZXM, QTHR, (Essex) tel: 0375-675453.

EUMIG SUPER 8 PROJECTOR & Prinz cine camera, hardly used, both zoom, offers over £75 or exch for FC102 atu with cash adjustment. G4VNZ, QTHR, tel: 0934-733050.

FDK MULTI 750EX, 25W FM, base/mobile TCVR, 4 years old, £150. C4ZZS, QTHR, tel: Stafford 664667.

ICOM 260E, mic, mobile mount, £240. GM4HPF, tel: 0463-241211.

FR101S RX with CW filter, WARC bands & 70MHz CVTR, vgc, £150. MET 2m 6-ele crossed Yagi antenna, unused, £25. G3BKF, QTHR, tel: 0509-412395.

CUSHCRAFT R3 halfwave vertical antenna 10/15/20m c/w remote control unit, £75. G4MUW, QTHR, tel: Winchcombe (0242) 603682.

RACAL RA117 gen/cov RX c/w manual, £200 ono. Lafayette swr/pwr meter, new, £14. Property of the late G1CHD, Buyer collect. G0CZN, tel: Lutterworth 2781.

YAESU FT290R, boxed, c/w mic, nicads, charger, carrying case, handbook, 1 year old. Mick, G4ODD, QTHR, Mansfield, tel: 0623-811681.

IC251E TCVR with Mutek board, £450. SM5 desk-mic, £25. Datong PC1 HF-2 HF-2m CVTR, £110. Tono 2M-90C linear amp, £115. MM432/28MHz down CVTR, £25. Heathkit HW202, 2m FM, 6-ch, xtal rig, no xtals, £45. G1CZA, QTHR, tel: Thornbury 412185.

SHACK CLEAR-OUT: J-Beam 10XY, boxed, new, £40. AR70 rotator, control box, new, £65. Rotator control cable, 10-20 metres approx, £10. Coax cable, 10-20 metres approx, £10. Buyer must collect. G1NOL, tel: 0297-506996, after 6pm.

IC730, dual vfo, memories, vox, pre-amp, new bands processor, mic, instruction book, boxed, MFJ-944 atu, £425. Trio TM-201A, 5/25W, boxed, book, £200. Both mint, will consider part-exch for late 2m handheld. Jeff, G6XRL, QTHR, tel: 0625-876192 home or 061-489 3770 work.

FDK MULTI 750XX & EXPANDER 430X, complete 2m/70cm multimode system in mint condx, dual vfo, rptr shifts, mic, mobile mount & all connectors, original packing, bargain, £415. Carriage by arrangement. G4MCU, NOT QTHR, tel: 0206-263122, after 7pm.

YAESU FRG7700 RX, FRT7700 atu, FRV7700 CVTR, discone receive antenna, vgc, buyer collects, £270 D J Howes, 149 Warren Wood Road, Rochester, Kent, tel: 0634-404096.

BOOKS: Radio Frequency Interference - ARRL, £2.75; A Newcommers' Guide to FM, Simplex & Repeater Operation on Two Metres, £0.75. J S Wood, tel: Clochan 378.

CODAR PR40 preselector, £7. LAR Omni-match, swl, £32.50. Lowe mobile antenna, 10/15/20m, needs base £30. J S Wood, tel: Clochan 378.

FDK MULTI 750XX, ex condx, little used, original packing, £300 ono. Hazeltine 2000 vdu terminal, 2k internal memory, gwo; ASR33 teletype c/w stand, gwo, offers or exch WHY? Buyer to inspect/collect. G6VAD, QTHR, tel: 0508-70432.

SILENT KEY SALE: Collins KWM2A, £350. 30L1, £400. Racal RA17, £150. RA98A, SSB adaptor, £40. Datong RF processor, £30. DA1 keyer, £25. Philips LTH0084 dictaphones, £10 each. Avo valve-tester, type 160, £40. Open to offers, buyer collects. G3XIX, QTHR, Felixstowe 275676.

TRIO TS711E & TS811E, as new, never used on full power, purchased from Lowe listed dealer. Genuine reason for sale, superb TCVRs. TS711E, £720; TS811E, £830 or £1500 both. David, G1EUG, QTHR, tel: Wellingborough 226009.

BELCOM LS102L 10m multimode & broadband 200w pep linear, £260 ono. Alphacom-32 printer for ZX81 or Spectrum, £25 ono. Power splitter, 70cm, 2-way, unused, £17 ono. PLL expander, this plus 1 xtal will give 28-30MHz in 5kHz steps, £35 ono. WANTED: SW mags containing "G4FRX High Performance PSU and Control System for 4CX350/4CX250 Valve Amplifiers" parts 1-5 or will pay for photocopies. Also Eimac SK620A bases required. Martin, G1GYC, tel: 061-483 2330, 5pm-8pm.

YAESU FT227R, 2m 10W FM mobile, £125. 7/8 SMC mobile whip, boxed, £12.50. 2x5/8 colinear base antenna 2m, £10. 8-ele Yagi, £10. J-Beam MBM48, 70cm, boxed, £30. 70cm 3x5/8 mobile whip, £12.50. G1GQL, QTHR, tel: 0425-54946.

FT757, ex condx, YM35 mic, handbook, manual, boxed prefer buyer inspects, £575 or exch 2 basic TCVRs, one mobile (TS120S, FT707 etc) plus one for shack with 160m & CW filter if poss. All considered, no hurry. G4YSS, QTHR, tel: Scarborough 863137.

MOSLEY V3J 3-band trap vertical, £25. MCR103 miniture RX, 500kHz-18MHz, c/w phones, aerial, handbook & HT inverter, offers. Ex-Army 27' telescopic aerial c/w guy-wires & base kit, £25. Shaw, G4GAS, QTHR, tel: Swindon 750130.

TS530S, £450. 4-400 linear, desk-top, £150. KW LPF £10. E-zee Match, £20. KW2000 DC-PU, £10. BXI 4-section tower, TA33, rotator, cables, £150. Lots of other gear. All buyer collects. SAE for lists. Disposing for widow of silent-key. G3FRB, QTHR.

FRG7700 HF RX c/w FRT7700 atu & FRV7700 CVTR giving 140-150MHz, 50-59MHz and 118-130MHz, boxed, gc, £275. Robert, G0DDN, tel: Daventry 76034.

SOMMERKAMP FLDX500, HF TX, gc, 80-10m, 500W i/p, £90. Andy McKechnie, G4XFV, tel: 01-370 4855.

AMT-2 terminal unit, AMTOR/RTTY/CW/ASCII, £190. Beardow, tel: 01-941 6519.

SCIENTIFIC RADIO MARINE TCVR, 13.5V dc, AM/USB, 10 xtal ch only, solid-state plus 3 6146Bs in pa, workshop manual & mic, suitable conversion project £65. G3WEX, QTHR, tel: 021-354 4265.

RACAL RA1217 RX, solid-state, 1-30MHz, SSB/CW/AM, all filters, digital read-out, manual, £300. Adams, tel: 01-876 2070.

ICOM IC451E, 70cm multimode base stn, mint condx, c/w matching IC-SP2 speaker, Buyer inspects and collects, £400. G4IMB, QTHR, tel: 021-747 6753.

LINEAR AMP, MML144/100S, still under warranty, £110. Rotator, KR400RC, round controller, top & bottom clamps, £89. Antennas: MET 19-ele Yagi, vgc 5/8 & 1/4 wave folding whips, new, plus gutter mount & lead, £10. G6PBG, QTHR, tel: Crawley (0293) 510491, evenings.

ACCOMODATION, Bed & Breakfast situated near beach, central for touring beauty spots. Par, South Cornwall. GOAEW, tel: 072681-2562.

FRG7700 RX, FRT7700 atu, FRV7700 VHF CVTR, £310 ono. Standard C8800 2m FM, £150. Both boxed in mint condx. WANTED: 2m multimode & 7A or above psu. GW1MGI, tel: 0633-62351.

KOKUSAI MF455-10CK & -15CK filters, & SEI 5.2MHz. Full set new conversion xtals for G2DAF RX. Boxed 898 dial. HRO(M) for renovation, unmodded. HRO 4-gang cap, mint. G3ESB, QTHR, tel: 0332-671536.

EXECUTOR SALE FOR LATE G3IAH: Icom 745, c/w mic, psu, £800 ono. Yaesu 902 atu. Vibroplex bug-key, £30. Yaesu 757 HD psu, plus atu, all brand new, complete, £750 ono. Mrs Barnes, tel: 0747-3412

LARGE STOCK OF SURPLUS COMPONENTS: Capacitors, pots, resistors, HV connectors, plugs & sockets. Large SAE for lists. G6HUN, 'Canal Lodge', Bath Road, Padworth, Berks, RG7 5HR.

SONY 2001, state-of-the-art RX, with psu, as new, £75. HF5V, 10-80m with radial kit, 3 months in open, £50. WANTED: 70cm mobile. 2m base. GOADR, tel: 01-764 6767, evenings.

TRIO 7500, 10W mobile TCVR, mobile mount, large non-standard mic etc, gwo, £125 or exch 2m handheld, cash difference either way. Icom EX242 FM unit, suit 740 etc, unused, still sealed, £30 ono. GW2FDW, tel: 0222-623974.

KENWOOD TS430S, £600. AT250 atu, £200. G2DYM dipole & poles, £80. Drae 24A psu, £80. Icom 240, £100. 3-ele 2m colinear, £30. Taylor, G6KPI, tel: Salisbury 780396.

KW VICEROY, KW77 plus many spare valves, RX needs slight tuning, £100. Hirchmann rotator with cable, £25. G0DCZ, QTHR as G6VCZ, tel: 0203-470145.

ANTENNAS: 6-ele Quad, J-Beam, £30. 8-ele Yagi, £10. 2-ele gamma match beam, £25. Turner power mic wired for FT290R, ideal for SSB, £20. Nigel, G0CBK, tel: Dursley 843428.

EDDYSTONE EC10 Mk11 RX, £50. DX40U, CW/AM TX, £30. Scrap AR88D for spares, £12. Teleprinter stand, 444, £20. 11MHz scope, d/b, needs new diodes & transformer, spares eg tube, £8. Scrap scope, £5. 2 x 0-300V regulated HT psu, £10. Adrian, G4ZHZ, QTHR Bedfordshire, tel: 0525-374894.

EDDYSTONE 730/4, HF RX, ex performance & condx, £85. G3WLH, Surrey, tel: 042873-5368.

YAESU FRG7700 gen/cov RX, ex condx, not used enough since being licensed hence reason for sale, also need cash towards HF TCVR, interested?, £220 ono. Dave, G1HVP, tel: Crewe 257578, after 6pm.

COMPLETE VHF/UHF STN, OSCAR 10 etc. Standard C5800 25W 2m multimode mobile. FT790R, 1W 70cm portable. BNOS 144-10-180, 180W 2m linear. FL7010, 10W 70cm

Turn your junk box into cash with an RSGB Member's Ad!

linear. MML432/50, 50W 70cm linear. 2 off BNOS 12/25A psu's. KR5400 az/el rotator. SEM 2m Tranz-match. Wood & Douglas 500mW TV TX. 4 off 420-470MHz 11 turn helix (RH) heavy-duty antennas. Plus lots of bits thrown in. Value is over £2,000 but will accept offers around £1,200. All items have manuals & original packing. Will split as last resort. Also, CBM 64 computer, MPS803 printer 2 off 1541 disk-drives, COM-IN 64 comms interface, RTTY/CW/Slow-scan TV/ASCII, plus lots of software, offers? Carriage extra. GM6UNJ, QTHR,
tel: 0870-2503

1296MHz TVTR MMT1296, vgc, all connecting leads, 2m IF cct, instructions, 1.5W o/p, £140. UHF DXTV wide-band anrenna, Fuba XC391 plus Labgear CM7066 lo-noise masthead pre-amp & mains unit, excellent German antenna, buyer collects, £27. G3ZDM, QTHR, tel: 061-973 1572.

TR10 130S TCVR, all bands 80-10m, 100W, SP120 matchimg speaker, PS30 psu, noise-canceling mic, all immac, £475. Also Transtec 12" green-screen monitor, new condx, £25. G4HSY, QTHR,
tel: Shoreham (07917) 4631, evenings.

KENWOOD TS120S c/w CW filter, swr bridge, £300. HP scope tube, OK for 100MHz, 5" flat PDA, £20. 70cm ATV TX, 10W, £20. G6CSX, QTHR,
tel: Chichester (0243) 788515.

FT101 MkII TCVR, 160-10m plus 10MHz, fan, 600kHz filter, G3LLL RF clipper, dbl balanced mixer, agc mod, FV101B ext vfo, SP101B spkr incl AF notch filter. Prefer no split, £300 ono. G4LDS, NOT QTHR tel: Billericay (02774) 22459.

ICOM IC25E, 25W 2m FM mobile. 2 vfo's, 5 memories, scanning etc, mint condx, boxed, £185. David, G4JLU, QTHR, tel: 01-954 9180.

ICOM 701, psu, mic & ICF1 fan (for RTTY), 2 vfo's, solid-state, 100W o/p, ideal HF rig in mint condx, £450. David, G4JLU, QTHR, tel: 01-954 9180.

FREE... switched mode psu, FP757, worth £160 when you buy my FT757GX TCVR & FC757AT atu at no haggle price, £845, incl mic & mobile mount. Flexi Ten mobile 10-bands mobile antenna, £30. G4UEN, QTHR, tel: Southampton (0703) 433837.

IC2E c/w case, spkr/mic, manual, gc, £115. Alinco ELH230D mobile 10W pa with pre-amp, boxed, as new, £45. John, G6IBC, QTHR, tel: 01-790 8163, after 5pm or weekends.

RIBBON CABLE IDC, top quality; 50-way, £1; 26-way, £0.50; 16-way, £0.35; all prices per metre, post free. Andre Saunders, Kelso ARS, c/o Abbey Centre, Kelso, Roxburghshire.

ICOM R70 RX with FM and 2m Microwave Modules CVTR, workshop manual, £475. Trio R600, manual, £215. Both in mint condx, original packing. G1AGD, QTHR, tel: 01-337 2384.

AMT2, mint condx, £175. Also IMC's program for Commodore 64, £25 or exch for HF linear. Alvin, GW4ODN, tel: 06462-3991.

PF2FMB, two lo-band units c/w H/S, two batteries, flexible antenna & cct. R209 c/w power lead, needs attn. Two new 813s with heater transformer. Any reasonable offers. G3WBL, tel: Bewdley 400563.

TENTEC 228 atu, £65. Tonna 13-ele, 2m, 20113, unused, £25. Eddystone 940, £110. Datong active antenna AD270, £35. G2CKI, NOT QTHR, tel: Broadway 853150.

KW103 HF swr/pwr meter, 0-100/1000W, £30. 100W HF broadband solid-state pa, £25. Farnell ac volt meter, mains operated, 300uV-100V fsd, £60. M80 CW/RTTY system for TRS80 micro, £16. G3WKZ, QTHR, tel: 0273-473377.

WOOD & DOUGLAS ATV TCVR, 10W, built from kit, £100 ono or swap for Icom IC2E. G8XVV, QTHR, tel: Preston (0772) 313886.

MARCONI CR100 c/w manual, £20. Buyer collects. BRS2910, tel: Southampton 432933.

FT101Z HF TCVR, little use, vgc, mic, fan, £350. Trio 7800, 2m FM, £150, G4FCR, tel: 021-378 2198.

PSUs: 240V i/p; Lambda 5V 24A, £6; 12-15V 6.2A, £6; APT 12V 5A, £3: 120V i/p; 2 Gould 12V 16A, £6; Lambda 5V 24A, £6; 2 5V 15A, £4; all ono, buyer collect or local delivery. G4NNA, Southall Middx, tel: 01-571 0625.

KX TEN-TEC CORSAIR, KW Ten-Tec 229 atu, KW Ten-Tec Hercules 444 linear amp, Shure 444D mic, complete solid-state stn, mint condx, try it out before you buy! £2,000 no offers. GW4MTY, QTHR Nr Swansea, tel: 0269-844061.

MONITOR SCOPE, Trio (CO1303G) incl 10MHz scope & monitor scope & RTTY scope all in one. Swap with cash adjustment for modern 20MHz dual-beam scope, no rubbish please! Tony, G4KDZ, QTHR,
tel: 0375-78783.

FT221 & SP120 matching spkr, manual, all boxes etc £330 ono. DX302 RX, £140 ono. Admiralty brass cased Morse key, £30. WANTED: Cheap atu, eg FC901, FC102, KW EZE-Match, WHY? Haggle prices. Bosworth, G4XNG, c/o Wray Castle, Ambleside, Cumbria.

SOMMERKAMP FR100B, FL200B, TX/RX 80/40/20/15/10, AM/CW/SSB, mint, £255. Wood & Douglas 70cm TCVR, 6ch, RB0/RB4/RB10/RB14/SU8/SU18, 10W, pre-amp, scanner, mobile case, S-meter, £85. Standard C812L hi-band VHF, 4ch TCVR, brand new, £45. G4MTG, QTHR tel: 021-430 6764.

COMPLETE STATION, KW77, KW Viceroy MkIII, TA33 Jnr AR40 Rotator, 25' Dexion Tower, £110. Ex-equipment switched mode psu's, +5V @ 15A, +12V @ 1A, -12V @ 1A, 240V i/p, open frame, £10 each. CP/M word processor 'Wordstar', Qume printer, assembler basic/c, £350 ono. G3WXG, tel: Brighton 552824.

IC271E with Mutek front-end, £460. Tono MR150W, £90. Kempro KR400, £80. Daiwa DK210 plus Bencher paddle, £46. Dressler D200C, £180. Mutek GFBA144B plus controller, £96. All ono, p&p extra, vgc. G6IM, tel: 07375-55024.

YAESU FT980 gen/cov HF TCVR, 1 year old, c/w Curtis keyer, 300Hz CW filter, manual, service manual, full break-in, suitable for AMTOR, recently realigned by importer, boxed, as new, £999 ono. G4WVX, QTHR, tel: 06286-64415.

FT707 ex condx, mic, manual, original packing, £325. Shimizu SS10SS, as new, little used, £180. WANTED: TVTR for 2m from 28MHz, MM or similar. Mike, G3XEF, NOT QTHR, tel: Telford (0952) 607586.

AR88 RX in working condx, c/w service manual, and R107 RX in working condx. First reasonable offer secures. G4IOD, QTHR, tel: Cleckheaton 874419, evenings & weekends.

THE FOLLOWING ITEMS NEW & BOXED, all plugs etc: MM432/28S TVTR, £140. MM432/28S CVTR, £25. BNOS 6A psu, £45. 35 metres H100 coax, new, half price. HB35C tri-band, new condx,no traps, coils or switches, perfect order, £150. Antenna to be collected, other items postage extra. G3JZN, QTHR.

ALINCO 70cm LINEAR, 1W i/p, 30W o/p, £65. Four coaxial relays, 12V dc, coil good to 450MHz, RS type 349-686, new unused, £10 each. G4NTY, QTHR tel: 061-790 7673, after 6pm.

ICOM 751 c/w psu, extra CW filter, keypad, SM6 mic £1,160. G4SBR, NOT QTHR, tel: 0526-42918, evenings

FT101ZD MkIII, FM, mic, FV101DM spkr, FL2100Z linear, new, used few times, value £1,744, sell £1,200, need house deposit. FL2000B, as new, little used, £275. Raleigh Sun, 10-speed bicycle, little used, £80. 12V 10A power-pack, £17.50. G3IPM, QTHR.

MULTIMODE, full 28-29.700MHz coverage, EPROM converted, every extra, £125. Transformers, several, 2,000V, 10,000V o/p. Wave analyser type 853, 30kHz-30MHz, perfect condx, probe leads. Frequency bridge B601, 15kHz-5MHz, offers. WANTED: Magnum 2, 28/144 TVTR. G4XOX, tel: 0245-324555.

DRAKE R4B RX, in ex condx, c/w manual, £170. G3CPM, QTHR, tel: 0386-852753.

2m 250B LINEAR plus psu, £95. Liner 2, front-end mod, £65. MMT 2m-23cm TVTR, £145. 2C39 23cm pa, 18W, plus psu, £55. 23cm Tonna, £16. MM tripler, 2m-70cm, £12. SB301 RX, £95. 2m & 10m multimode RX, £45. 2m 10-ele Yagi, £8. 20 metres of UR74 high power, 50 ohm cable, £16. G4MAP,
tel: Bromsgrove (0527) 73988.

TR10 R600 gen/cov RX, as brand new, used few days only, still in box, excellent performance, £225. Jenkins, Surrey, tel: Elstead 703550.

PYE OLYMPIC, VHF/LB/AM, £59. Scopes: Tektronix 533 £55; 545, £70; 547, £120; 555, £95. Avo 7, £19. Avo 8, £39. Sig/gens: 15Hz-480MHz, £19-£55. Airmec 210 mod/deviation meter, £25. Marconi 791D deviation meter, £50. CT212 sig/gen, CW/AM/FM, 65kHz-32MHz, £45. FM mod meter, 25-500MHz, £12. Teletype ASR33, on stand, with tape unit, £20. Advance twin-metered psu, 0-30V @ 2A, £25. Tektronix plug-in's: TV2, £18; D, £9; G, £10; L, £12; O op-amp, £20; Z, £18; CA, £25; 1A1, £45; 1S1, £55; 1A4, £55; K, £11. QQV06-20, £15. QQV03-10, £4. 4CX150, £5. Weir dvm, £25. Avo 47A, £35. Racal frequency counter, HF, £25. Many other items, test gear, components, meters etc. SAE for lists. G4YVJ, QTHR, tel: Brighton 416963.

DX33 at 38', 2m 4/4 slot at 43' on 32' tower & 2' tube extn in lubricated roller bearings, cowl gill rotator, enclosed 5/8" x 3/8" chain/sprockets, desynn transmitter/indicator, £110. G2DAF type RX, 6-band, s/contained psu, AR88 type cabinet, hammer grey. G2DAF type TX, 6-band, single 6146B linear o/p stage, 2 spare 6146B, AR88 type cabinet, black crackle. Xtal desk mic, separate psu,
Woden/Parmeko 7" rack panel. Single 813 AB2 linear S-band, 7" rack panel, spare 813, anode, screen, bias supplies, 10.5" rack panel. 28V dc relay supply & pwr switches, 3.5" rack panel. Unused 3.5" rack panel. 813 linear & above three psus, open back rack cabinet, £80. Datong UC1 up-cvtr, psu, £25. Marconi TF1330 scope c/w manual, £15. Cossor 1049 Mk3 scope, Mk4 manual, trolley, £15. 7A Variac, £12. Rebuilt CR100, 7" rack panel, no cabinet or psu. RA34 psu, metered, handbook, 4 other HT/LT supplies. 3 x 7" rack panel, one (RX) 3.5" rack panel, offers. Bulletin/RadCom 1948 to date; SWM 1948-1972 (most copies). Other junk, many valves, some spares for above equipment, all free. All collected only, Bristol. GW3IFY, NOT QTHR, tel: 0239-614487.

TOKYO 2m LINEAR AMPLIFIER c/w pre-amp, 10W i/p 85W o/p, mint condx but cash needed for HF gear hence only £65. 14-ele Parabeam, 6 months use only £25. Mick, G1IPA, tel: Bury St Edmunds 705123.

50MHz J-Beam commercial quality folded dipole, unused, coax feeder terminated with N plug, £15. WANTED: Pye FM ex-PMR equipment. Tony, G4KZX, QTHR tel: Newhaven 516033.

BASE STATION CLEARANCE: All 2m; Two 8-ele Yagi c/w phasing harness, £30; GP144 colinear, £23. AR40 rotator, just recondx, incl 25m control cable, £45 Telescopic telomast, 30' with 40' gauge tube, £30. Two 24" wall brackets, £8 pair. Guy rope, chain turnbuckles, shackles, grips & stakes, £40. GRP tube 2", 1.5m length, £10, 3m length, £20. 90m RG8/HT100 coax, £25. 40A psu, 0-50V adjustable 19" rack type, £40. Coax switch, SMC S2U, £8. All except rotator & psu less than 6 months old, hardly used, cost £450, accept £250 the lot. Chris, G1LJF, tel: Ringwood 474492, 6pm-8pm.

JAYBEAM VR3, HF tri-band trap vertical, ex condx, £36. Kenwood MC55 mobile mic c/w control box, new, £30. WANTED: loan or buy handbook for Telequipment S51B scope. G3ADZ, QTHR, Rugby 815222.

FT757GX, £600. Amtor AMT-1, £150. Both mint. Steve, G3YDV, tel: Windsor (0753) 851056, daytime.

MICROWAVE MODULES LINEAR AMPLIFIERS: MML144/200, 3/10/25W i/p, 200W o/p, £200. MML432/100, special 25W max i/p, 100W o/p, £200. G3WHK, QTHR,
tel: 01-330 5795, after 6pm.

ERSKINE d/beam scope, 13A, graticule, leads etc. Numerous transformers, some large. ARR3 moded for 90MHz FM. Marconi valve voltmeter. UHF power osc. 3cm microwave bits, 723AB klystrons, waveguide. Collectors 'Wirek' wire recorder. Another new RAF. Other components. SAE for list. Make offer? G3JIX.

ANSWER CALL, executive model ASX2209 telephone answering machine, twin cassette, unused, cost £149, to clear at £50 ono.
Sephton, 16 Bloemfontein Ave, Shepherds Bush, London W12 7BL, tel: 01-749 1454.

COLLINS S-LINE LINEARS: 30L1, as new, virtually unused; 30S1, ex condx. Further details from G4DFU, tel: Nottingham (0602) 626626.

2m COLINEAR, £15. Yaesu FC700 atu, as new, £95. WANTED: Bencher paddle key, also Yaesu FT101ZD or Yaesu FT7B. Must be mint. GM4PGL, tel: Irvine 217611.

HW-7, well documented mods incl new front-end, RIT, audio filter etc, £50. FL200B TX, new Toshiba pa's, £75. WANTED: cabinet for Racal RA117E. Steve, G4EDG, QTHR, tel: Exeter (0392) 216579.

YAESU FT7B, ex condx, £250. YC7B digital readout, £50. Datong Morse tutor, £35. G0DOE, NOT QTHR, tel: 01-391 0514.

No.5 psu hand generator, offers. AR88, for spares. WS52 TX, workable, offers. Class D No.2 wavemeter, brand new, £15. WANTED: R109 WS19 front grills, ex-WD pocket watch, Jones plugs/sockets, Larkspur type plugs/sockets. Jim, G4XWD, tel: Kidderminster 3674.

YAESU FT102, hand mic, fitted FM board, vgc, £500. G3XVN, QTHR, tel: 0767-318882.

FT200 TCVR & FP200, 10-80m, perfect first HF rig, excellent condx, £180 ovno. G4MYB, QTHR,
tel: 061-973 1507.

ICOM ICR70, 1.5-30MHz RX, immac condx, FM, boxed, manual, £365 ono plus carriage. Clements, RS85940, tel: Flitwick (Beds) 714933, after 6pm.

DRAGON COMPUTER 64k plus Dragon 5.25" disc-drive, software, word-processor, RTTY, CW on individual discs, £250. Possibly consider splitting. Also complete hardware, ie interface for RTTY/CW PNP design, £40. G4LTM, QTHR, tel: 061-351 1152.

TR10 TS780, 2m/70cm multimode, as new, c/w manual, original box, £650. G1HBR, QTHR, tel: 01-856 6917.

SOMMERKAMP FL1000 LINEAR, 80m-10m, 900W i/p, going

QRT, last item left, any trial, £250. G4WDZ, NOT QTHR, 37 New Street, St Neots, Cambridgshire, tel: 0480-217026, after 6pm.

FT209R c/w Mutek, psu, base antenna, never used. Yes I did pass! £240 ono. Bragg, Altrincham, tel: 061-928 1954.

COPPER CLAD fibreglass double-sided boards, 1.6mm in large pieces. By weight, 2 pounds for £6.50 carriage paid. M. Skelding, 2 Church Ave, Clent, Stourbridge, DY9 9QT.

FLDX500, HF TX, AM/CW/SSB, 80m-10m incl 10MHz mod, 240W pep, 180W CW i/p, spare finals, fitted fans, can deliver Humberside area, £115. G4NJB, QTHR, 09644-6365, after 1pm.

60' HEAVY DUTY TELESCOPIC LATTICE TOWER, tilt-over capability but requires winch, crank-up winch OK, buyer collects, already dismantled, £300. G4IAR, QTHR, tel: Loughborough (0509) 217655.

ANTICIPATED ACQUISITION of HF TX brings about sale of Yaesu FRG7700 incl memory option, original packing & documentation, ex condx, £250 or sensible offer. Chris, GOBZN, Watford area, tel: 09277-69684.

MARCONI TF1064B sig/gen, 68-470MHz, o/p level 0.5uV-10mV, £40. Windsor 66A sig/gen, 100kHz-80MHz 6 ranges, £10. Advance J2 sig/gen, 15Hz-50kHz, £10. Ultra Lion UHF mobile, 6 ch TCVR, cct diagram £10. G3RHR, QTHR, tel: 0423-504292.

SHURE 444 MIC, £25. New 28' telescopic aluminium mast, £25. KLM 27-ele 432MHz Yagi, £20. Collins F455Y-21, 2.1kHz bandwidth mechanical filter, new, £25. 2000pF vacuum variable, £10. Trio 9R-59DS gen/cov RX, £35. Atlas filter, £15. Dave, G3UUR, tel: Cambridge 843604.

ELECTRONIC ORGAN, Jen Allegro A361 with two 44 key manuals, memory, automatic section, Leslie etc, as new, cost £800+, accept £450. Vic20 computer plus extra 16k RAM, cassette, £35. Middleton, 49 Wolseley Road, Stafford, ST16 3XW.

TS130V, PS20, AT130, all mint condx, £500 the lot, no offers. Possibly p/exch FT290 and/or Century 22 WANTED: Audio transformer type 210, used in B2 RX, also 10X type xtals. Good prices paid. G4TMO, NOT QTHR, tel: 093287-3892.

FT480R 2m all modes, 10W, memories, scanning etc, immac, £275. Also FT707, 9-band, 100W HF, boxed, as new, £325 ono. HF5 vertical 5-band antenna, £50 ono. All items delivered free. G4WXC, tel: 0476-77708 or 63596, anytime.

ASR33 teletype, working, c/w cover & stand, £75. Roband type P1078, 2-50V, 15A, stabilised psu, £30 Panda Cub, 50W, AM/CW TX, £15. Open to offers, buyer collects. G4ASH, QTHR, tel: 0525-378580.

YAESU FT107M TCVR, immac, CW filter, £450. Icom IC502A, 50MHz SSB/CW TCVR, immac, £150. Heathkit HA202A, 2m, 40W amp, £25. New Vic20, NTSC, 110V ac £20. CI-110, HF amp, 10W i/p, 100W o/p, 160-10m, £75. Dave, G3UUR, tel: Cambridge 843604.

SHACK SORT OUT. Test leads, 19" cabinets, data books, heliax connectors & clamps. Valves, 6080, £3 each. TMC US Navy HF RX, ultimate unit synthesised or free running, part assembled c/w 6 volume manual, £250. Allan, G6EII, tel: 0925-57233

VALVES: 6C80, 12AT7, 12AU7, many more connectors for heliax 1/2" and 3/8" cable, stainless steel cable clamps for LDF550. N & BNC connectors. Most items new. Info & costs, Allan, tel: 0925-572332.

OOOOOOOOOOOOOOOOOOOOO

WANTED.....

PANK TCVR model 1005, handbook urgently required. Beg, buy, borrow, user/service manual. All expenses refunded. G4SNL, QTHR, tel: 07555-4188.

YAESU FLDX400 in good clean condx. Roger, G4CCU, QTHR, tel: 021-422 8477.

TRIO 120 VFO. For Sale: Eddystone 750 RX, gc, £65, buyer collects. Wide spaced variable capacitors, 2 split-stator, 3 single, £15 the lot. Icom IC-3PE 13.8V 3A psu, vgc, £35. G3BFR, 04536-3994.

ATTENTION!! Radio operators interested in motorsport. If you live in Scotland & would like to assist with radio communications in motorsport, I would like to hear from you. Please contact Colin Goode, GM4HHY, QTHR, tel: 0968-73783.

MANUAL for Trio 2200G, 2m portable, willing to photocopy & return. A J Anderson, GOBFM, 44 The Spring, Mkt Lavington, Devises, Wilts, SN10 4EB.

KW CENTURY or Argosy TCVR, willing to come & see working rig. Please write, A J Anderson, GOBFM, 44 The Spring, Mkt Lavington, Devises, Wilts, SN10 4EB.

SM-220 STATION MONITOR with pan display if poss. Also cheap 2m mobile rig. FOR SALE: Trio TL120 HF linear amp, 10W in - 100W out, £125. Phone or write. Graham, G4VOE, QTHR, tel: 061-740 4126.

URGENTLY: cct diagram etc or photocopy for Hallicrafters HT37 TCVR & Ten-Tec XPM1 QRP TCVR. Photocopies reimbursed. G4VPD, 37 Forest Way, Hollywood, Birmingham, B47 5JS.

VIBROPLEX semi-automatic key for dedicated telegraphist. G4SCD, QTHR Street Somerset, tel: 0458-42730, day or 0458-45145, evenings.

HF LINEAR, FL2000B, 2100B, 2100Z, TL922 etc. G2YV, QTHR, tel: 0789-68503.

"INSTRUMENTS OF DARKNESS" a history of electronic warfare by Alfred Price, published by MacDonald & James, c1977. For me to read and return to you. Cliff, GI4CZW, 9 Tarmon Brae, Enniskillen, N.I., tel: 0365-24500.

KWM380, KWM2 and Sommerkamp FL100B TX. Sommerkamp must be working but need not be in first class condx as spares available. G2AVI, The Well House, The Downs, Herne Bay, CT6 6JP, tel: 0227-74774.

AR88 PERSPEX ESCUTHEON, RCA badge, 2 small knobs, S-meter, front panel c/w embossed control legends, trimming tools. Ian Haggart, G3JQL, QTHR.

FT101ZD Mk3, incl FM. Also FTV901 TVTR. Must be mint or vgc. G1NFW, NOT QTHR, tel: Bognor Regis 821131, evenings & weekends.

MANUAL FOR AIRMECH RF GENERATOR type 701, buy, borrow or copy. Also xtals for Trio 2200G, especially pairs for R1 & R4, WHY?. All letters answered & expenses covered. G8URI, QTHR, tel: 02774-57235.

FT690R or similar 6m rig & 6m antenna. Also 70cm suitable mobile/portable. Rotator, med/heavy-duty type. All must be in gc & gwo. G4CMT, QTHR, tel: 0482-812115, evenings.

DESPERATELY WANTED: Instruction manual for recently acquired DX302 digital RX. John, G6PFD, tel: 0709-374747.

VHF CVTR for my lonely HF RX (ICR-70). Possibly FRV7700, must cover air-band & 2m. Details to John G6PFD, tel: Rotherham 374747.

RACAL TRA931 (Syncal 30) Manpack, cash waiting for good specimen, will collect anywhare in UK, may be prepared to swap for my beautiful PRM4021 Manpack with cash adjustment. Also require TA944 linear. G4JMF, QTHR or tel: 051-339 4181 extn 211, office.

TOWER 60'-80', crank-up or tilt-over, for Farnborough Radio Society club stn. FOR SALE: Switch-mode psu, +5V @ 5A, +12V @ 1A, -12V 24V @ 1A, two @ 240V one @ 115V (remove link for 240V), £25 each. Paul, G4XHA, tel: 0252-878436.

HEATHKIT SB101 TCVR, for research & experiment. GW4KVJ, QTHR Mid Glamorgan, tel: 0443-813100.

MANUALS FOR TEKTRONIX SCOPES: 531, 533, 545 A&B, 546, 551, 555, 581, 585; Plug-in's: D, G, K, N, O, P, Q, R, TV2, IL5, calibrator. Pye Westminster, Cambridge, Olympic, Motophone, Europa, Reporter. Also for any test gear or amateur gear. Also required, Textronix probes, leads, accessories etc Details to G4YVJ, QTHR, tel: Brighton 816963.

IFT's for AR88D, plus BFO can & ceramic insulated selectivity switch. Also HQ1 minibeam. G3GZQ, QTHR tel: 0364-43608.

DISH for antennas, any size or condx considered. Also waveguides and equipment suitable for 10GHz and above. G6BOL, tel: Worksop (0909) 564289.

MARCONI TM9954 log amp. AR88 RX cabinet. AR88 S-meter. Marconi TF2172 HF amp. Marconi 2 piece trimming tool for CR100/B28 RX. Jackson, RS5858, tel: Winchester (0962) 56064.

70241 Plessey type EHT capacitors, 8uF 4kV rating for linear amp psu use. John, G8HHI, 43 Bartons Drive, Yateley, Camberley, Surrey, GU17 7DW, tel: 0252-871555.

HF LINEAR AMP, 80-10m, 400W+ o/p, 240V, partially built kit or parts considered if metalwork complete, maybe damaged commercial but must be cheap. Will inspect & collect. G3XZV, tel: 0937-65411, daytime, or 0423-862147, evening.

ALTRON TELESCOPIC TILT-OVER TOWER, about 35-45', box section, wall mounted. Also 3-ele beam, and lattice type 60-70'. FOR SALE: Yaesu desk mic, model YD844A, dual impedance. Brian, GOADL, NOT QTHR, tel: 061-724 4218, anytime.

WODEN PLATE TRANSFORMER, 425 or 500V, also pair 2A3 or 45 valves. G4IMT, tel: Bath 891254.

VALVE LINEAR, suitable for 70cm ATV. Good price paid. G4ZEK, tel: Colchester 851343.

FC902, SP901P, FV101Z, FV901DM, incl leads. Good price paid for mint equipment. FOR SALE: SEM Trans Match. G1PIU, NOT QTHR, tel: 0726-823098.

EIMAC SK406 CHIMNEYS & SK410 bases. 5V @ 15A+ transformers with single phase 240V mains primary. Large turns counting dials. Large ceramic coil formers. No rubbish please! Nick, G3VNC, Somerset, tel: 0749-830210, after 6pm.

PROFESSIONAL COMMUNICATIONS RX, must be gen/cov & c/w filters suitable for RTTY. GW4EVJ, QTHR, tel: 0792-843948.

HEATHKIT OR SIMILAR AM/CW TX. ie DX100 or lower power models. Good prices paid for good examples. Nick, G4JHM, QTHR, tel: Lincoln 791114, evenings.

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For rates and conditions of acceptance see last month's RadCom

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other GMs Mr Les Hamilton GM3ITN, Hall's Land, Hardgate, CLYDEBANK, Dunbartonshire G81 6NR
GU series Mr S T Henry GU4GNS, "The Hermitage" L'Ancresse, Vale, GUERNSEY, Channel Islands
GW0,2,3,4,5 Mr J Reid GW3ANU, 28 Waterston Rd, Gabalfa, CARDIFF CF4 2SS
GW1,6 & 8 Mr J Lewis GW8UZL, 14 Garreg Y Gad, LLANFAIR PG, Anglesey LL61 5QF
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ALINCO ALM-203E
2 metre handheld transceiver

Price: £239 P&P: £2.50

This push button, keypad operated transceiver is housed in a robust high impact plastic/cast aluminium case, and provides all the most wanted features needed for pleasurable 2 metre operation—but at a price similar to that of comparable thumb wheel operated units. Quality and reliability levels are up to the highest Japanese standards.

INCLUDED IN THE PRICE
- 400mAH NI-CAD Battery Pack. EBP-5N (Giving 3 Watts output).
- AC Battery Charger. EDC-5.
- Belt Clip.
- Antenna and Hand Strap.

FEATURES
- Up to 5 Watts Tx output (with DC/DC converter).
- Battery Save Rx Mode. (Only 5mA current drain on standby.)
- 10 Memory Channels.
- Programmable Scan Features.
- Built in 'S' Meter.
- Programmable Repeater Offset.
- Repeater Tone Burst.
- Multifunction LCD Display.
- Programmable Call Channel.
- 12.5KHz Channel Spacing.
- 144–146MHz Transceive.
- 150–160MHz Receive.

OPTIONS
- Leatherette Case.
- DC/DC converter giving 5 Watts output.
- DC Lead.
- Speaker/microphone.
- Mobile Charger Stand (mounts inside car window).
- Spare NI-CAD Battery Pack.

AVAILABLE SOON:
ALR-206E 25 Watts mobile transceiver

NEW! PK-64 AMTOR/RTTY/CW/ASCII AX.25 PACKET SYSTEM FOR COMMODORE 64/128

New, world beating hardware/software module for Commodore 64 & 128 computers.

A.E.A. CP-100 RTTY
Terminal Unit

ATU-1000
Top of the line! 32 Poles of input filtering. Tx, Rx tones tuneable to 1Hz with digital readout. Bargraph tuning indicator. Simply, the best there is!
Price: **£1,346.00** plus £2.50 p&p

CP-100
Switched and tuneable tones. Bargraph tuning indicator. Input AGC. CW detect. Everything needed for top quality amateur data communication.
Price: **£335.00** plus £2.50 p&p

CP-1
As CP-100, but slightly reduced features content. The USA's top selling terminal unit!
Price: **£215.50** plus £2.50 p&p

MP-1
The "Micropatch". A good quality, budget priced terminal unit with dual channel filtering, automatic threshold correction and tuning indicator.
Price: **£141.50** plus £2.50 p&p

RM-1
A low cost phase lock loop "Radio Modem". Includes RS232, TTL interfaces and high speed wide band ASCII mode, together with RTTY, CE, Tx/Rx. Surprisingly good performance for the price.
Price: **£69.00** plus £2.50 p&p, (UK made)

AEA's PKT-1
Packet Radio Terminal Unit, which is also designed to be used with any computer equipped as above.
Price: **£629.00** plus £2.50 p&p

Access

Callers by appointment. Large SAE for details.

12 months parts and labour warranty
ICS Electronics Ltd
PO Box 2, Arundel, West Sussex
BN18 0NX.
Telephone (024 365) 590

All prices include VAT @ 15%. Prices may vary according to prevailing exchange rates.

VISA

YAESU

ALL MODE VHF/UHF RECEIVER

AUTHORISED YAESU

FRG9600

WIDE COVERAGE
Continuous coverage from 60 to 905 MHz. Tuning is via a; seven speed (100Hz-100kHz) spin tuned VFO, keyboard, scan (up/down manual or memory) plus external computer control.

ALL MODE
Demodulates: CW-SSB (USB & LSB), FM (narrow and broadcast including stereo MPX output), AM also TV possibilities. This is complemented by an all mode squelch plus a wideband F.M. adjustable mute.

SELECTIVITY
Four IF bandwidths provide the optimum selectivity for the telephonic modes usually encountered.

SYNTHESISER STEPS
Seven step sizes offer world wide compatibility whilst the inclusion of auto selected bandwidths coupled with mode and steps allows for simple, rapid, search and scanning.

CLOCK/TIMER
24 hour clock shares readout with display. Programmable as on/off timer with contacts to control a tape recorder etc for which a line output is provided.

SCANNING
Manual scan, using convenient up/down keys (momentarily press for 1 step change —500mS depression for scan), memory scan plus limited band scan (defined by two adjacent memory channels). Scan halts on a carrier or on modulated signal only, with auto resume of scan and time to scan start indication.

DISPLAY
Bright pleasant green fluorescent display providing; 7 digit frequency readout (or time), two colour graphic signal strength, indicator mode, step size, memory channel number, control status (dial-priority etc) at a glance.

MEMORIES
100 channel (10 × 10 groups) containing frequency and mode with '5 year' Lithium back up. Priority channel, checkable every 3 seconds, is available during both scanning (normal or limited) and dial modes.

COMPUTER CONTROL
Optional interface (FIF series—RS232C or specific models) provides frequency and mode selection for 'infinite' memory capability with most home machines. Intercept role using interactive control from AGC output and scan stop information provided.

SPECIFICATIONS

Frequency Coverage
60-905 MHz
(60-460 MHz for SSB)

Frequency Resolution
100 Hz (Digital Readout)

Modes of Reception
AM, CW/SSB (LSB/USB), NBFM, WBFM, TV*, A3E, A1A, G3E, J3E, C3F*. (*NTSC Demodulator Option)

Selectivity (@-3dB)
AM (A3E H3E),
2.4 KHz (N), 6.0 KHz (W).
CW/SSB (A1A J3E);
2.4 KHz
NBFM (G3E) Narrow;
15 KHz
WBFM (G3E) Wideband;
180 KHz.

Tuning Steps
AM-N; 100 Hz/1KHz.
SSB; 100 Hz/1 KHz.
NBFM; 5/10/12.5/25 KHz.
WBFM; 5/10/12.5/25 KHz.

Image Rejection (Typical)
−50 dB (60-460 MHz).
−40 dB (460-905 MHz).

IF Frequencies
45.754, 10.7, 0.455 MHz.

Conversions
Triple: AM, SSB/CW, NBFM.
Double: WBFM.
Single: T.V.

Audio Output
1W into 8 ohms @ 10% T.H.D.

Power Requirements
Operating: 550mA (Max Volume).
Standby: 100mA (Clock etc).
Off: 3μA (Memories).

Sizes (Ex/Inc Projections)
218/245 D, 79/91 H, 18W mm.
Weight 2.19Kg (W/O NTSC Unit).

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