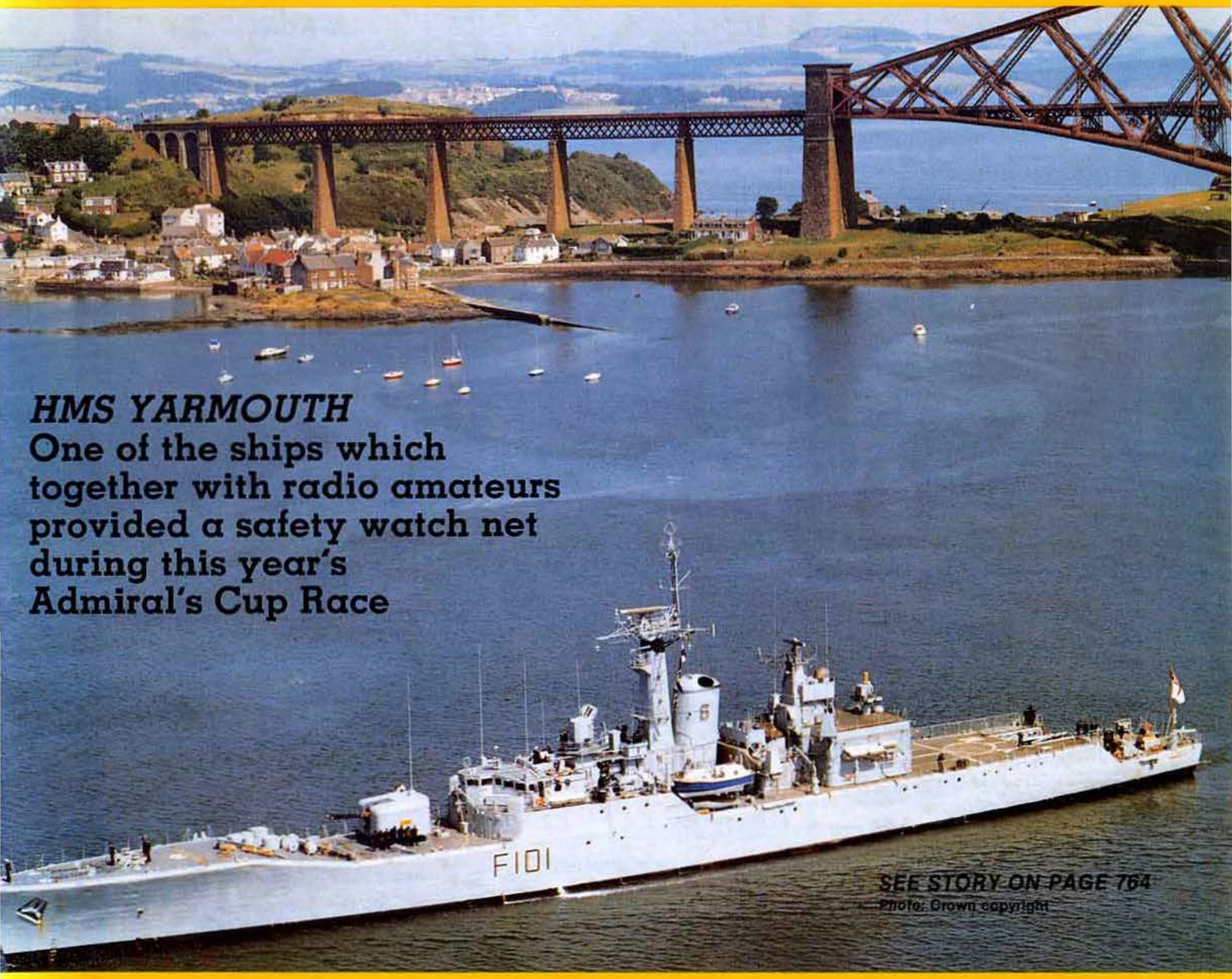
RADio COMmunication

October 1985



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SEE STORY ON PAGE 764

Journal of the Radio Society of Great Britain

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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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We here at TRIO-KENWOOD have over the years developed a range of equipment designed by our professional engineers for you the active radio amateur. Our products range from the top notch TS930S HF amateur band transceiver to the smallest accessory. Each piece of equipment is specifically designed with the requirements of you, the radio amateur in mind. It has always been our policy at TRIO-KENWOOD to improve the specification and reliability of equipment by listening to the valuable comments of radio amateurs all over the world. The important relationship between yourself, the radio amateur and TRIO-KENWOOD is through our authorised distributor for the UK, LOWE ELECTRONICS LTD.
We give below a list of approved dealers in the UK. Any dealer not on this list has no connection with the UK distributor network and has no direct factory backing. Great care should be taken when purchasing your amateur radio equipment, to ensure that the dealer is factory approved. In any case, first contact our sole distributor for the UK: Lowe Electronics Ltd., who will be pleased to advise you of your nearest dealer.

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£1695.00 inc VAT

. . . designed for SSB, CW, AM, FM and FSK operation on all amateur bands from 160 to 10 metres. The transceiver incorporates a 150kHz to 30MHz general coverage receiver having an excellent dynamic range (typically 102dB on 20 metres, 50kHz spacing, 500Hz CW bandwidth). Designed to cope with today's band conditions and with the serious DX'er/contest operator in mind, the TS940S has a comprehensive range of front panel receiver controls;

SSB IF slope tuning; operating in both LSB and USB modes, front panel controls allow the independent adjustment of either the high or low frequency slopes of the IF passband.

CW VBT (variable bandwidth tuning); allows the passband width to be varied without affecting the centre frequency.

IF notch filter; provides in the order of 40dB attenuation to the interfering signal.

AF tune; active filtering reduces interfering signals and white noise in the CW mode.

Narrow/wide filter selection; a selection of filters, both 8.83 and 455kHz are available for the operator who requires maximum selectivity control. The TS940S comes with both 2.7kHz SSB filters (8.83 and 455kHz) and the 6kHz AM filter (455kHz) built-in.

CW variable pitch; dual mode noise blanker and separate RIT/XIT controls complete the facilities.

To aid serious operating on both amateur and broadcast frequencies, the TS940S has;

A large, heavy diecast knob with a moulded rubber cover which when rotated at normal tuning speeds results in frequency steps of 10Hz. Rotation of the tuning knob in excess of 2 to 3 revolutions per second results in the step size and tuning rate being increased.

In addition to instant access to each amateur band using the band select keypad, the same keys can be used to directly enter any frequency within the operating range of the transceiver. Once entered, the VFO can be used to tune away from the selected frequency. Truly flexible operating in the TRIO tradition.

The TS940S has two VFOs, front panel switches enable split frequency operation, both VFOs to be quickly put on the same frequency and the reversal of the transmit and receive frequencies during split frequency operation.

40 memory channels, each of which remembers both frequency and mode are available. Frequencies can be easily transferred from memory to either VFO. Memory is backed up by a lithium battery. The transceiver operating system is held permanently in ROM and is not dependent upon the back-up supply.

The transceiver will scan all memory channels and between user programmed frequency limits as set in memories 9 and 0.

Accurate and quick frequency readout is ensured by the use of a large fluorescent tube digital display combined with an analogue sub-scale. The analogue display can be switched to read a 1MHz or 100kHz span, tuning in either 20kHz or 2kHz steps.

A feature new to HF transceivers is a green, back-lit dot matrix LCD which shows graphically VBT and IF slope tuning positions, can be used to review the frequencies stored in the 40 memory channels and other VFO, will provide information on the automatic sequence of operations when using the internal (optional) tuning unit, and when selected, displays both the time and owner programmed on/off switching times.

In addition, break-in keying on CW, a 28 volt solid state final amplifier stage, an RF speech processor coupled to the rig's ability to monitor its own transmitted audio and all mode squelch add up to give the TRIO TS940S even greater versatility of operation.

For those with failing sight or a blind operator the TS940S is a dream come true; not only is the operating mode identified by the appropriate CW letter sent in tone (F for FM, U for upper side band, etc) but, when fitted with the VSI board (optional), a digitally encoded girl's voice will announce the operating frequency.

TRIO-KENWOOD CORPORATION

Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

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TR9130 TWO METRE ALL MODE TRANSCEIVER

This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones. They're even a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.

TR9130 . . . **£499.00** inc VAT.

TS780 DUAL BAND BASE STATION TRANSCEIVER

The TS780 is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide open spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFOs, up/down frequency shift microphone. IF shift, two priority channels, memory and band scan etc. A superb rig, I have one myself, write for a full enthuse!

TS780 . . . **£948.00** inc VAT.

TR7930 TWO METRE FM MOBILE TRANSCEIVER

Those who have used or owned a Trio TR7800 will know what I mean when I say that Trio, with the introduction of the TR7930 have improved on the unimprovable. The Trio TR7930 improves on the TR7800 by giving a green floodlit liquid crystal display, extra memory channels, both timed and carrier scan hold, selectable priority frequency and correct mode selection (simplex or repeater). The most significant change is the liquid crystal display, but closely following this must be the ability to omit specific memory channels when scanning and the programmable scan between user designated frequencies.

TR7930 . . . **£329.00** inc VAT.

R2000 GENERAL COVERAGE RECEIVER

The amateur bands are only a very small part of the radio spectrum, many other transmissions are available for the short wave listener. Broadcast stations provide an alternative source of current information both political and regarding the life style of the country. Fitted with the internal VHF converter the R2000 covers continuously frequencies from 118 to 174MHz giving access to amateur two metre transmissions (am, fm, ssb and cw) plus a lot more. Having 10 memories, memory scan and programmable scan the R2000 provides in one rig the perfect receiver.

R2000 . . . **£479.47** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE

Much has been said about the TS930S transceiver and it now has a place high in the affection of those amateurs fortunate enough to own one, indeed it has become the "flagship" of the TRIO range. Providing full amateur bands plus a general coverage receiver (150kHz to 30MHz), the TS930S has every conceivable operating feature for today's crowded frequencies.

TS930S . . . **£1295.00** inc VAT.

TR2500/TR3500 HANDHELD TRANSCEIVERS

Two first class hand held transceivers, one for two metres and the other for seventy centimetres. Ten memory channels, band and memory scan, repeater shift, reverse repeater and a low power position make the rigs extremely useful for the radio amateur who wishes to keep in touch with his local scene. A comprehensive range of accessories, base station charger, speaker microphone, mobile mount etc, can be added to enhance operation, accessories used with one rig being compatible with the other.

TR2500 . . . **£258.00** inc VAT.
TR3500 . . . **£270.00** inc VAT.

TS530SP HF AMATEUR BAND TRANSCEIVER

A logical progression from the reliable TS520 series the TS530S was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today's amateur with all necessary facilities for reliable worldwide communication, the TRIO TS530SP now with notch filter.

TS530SP . . . **£698.00** inc VAT.

just a part of the range

The following TRIO models although not shown are still current and available.

TS430S	HF T'ceiver	**£720.00**	TM201A	2M Mobile	**£296.00**
TS830S	HF T'ceiver	**£832.75**	TM401A	70cm Mobile	**£316.00**
TS130S	Mobile HF T'ceiver	**£633.06**	TM211E	2M Mobile with DCS	**£365.00**
TR9300	6M Multi-mode	**£569.97**	TM411E	70cm Mobile with DCS	**£399.00**
TH21E	2M Micro h'held	**£170.00**	TW4000A	2M/70cm Mobile	**£522.00**
TH41E	70cm Micro H'held	**£199.00**	TS711E	2M Base Station	**£768.00**
TR2600E	2M H'held with DCS	**£275.00**	TS811E	70cm Base Station	**£895.00**
TR3600E	70cm H'held with DCS	**£292.00**	R600	Gen. Cov. Receiver	£299.52

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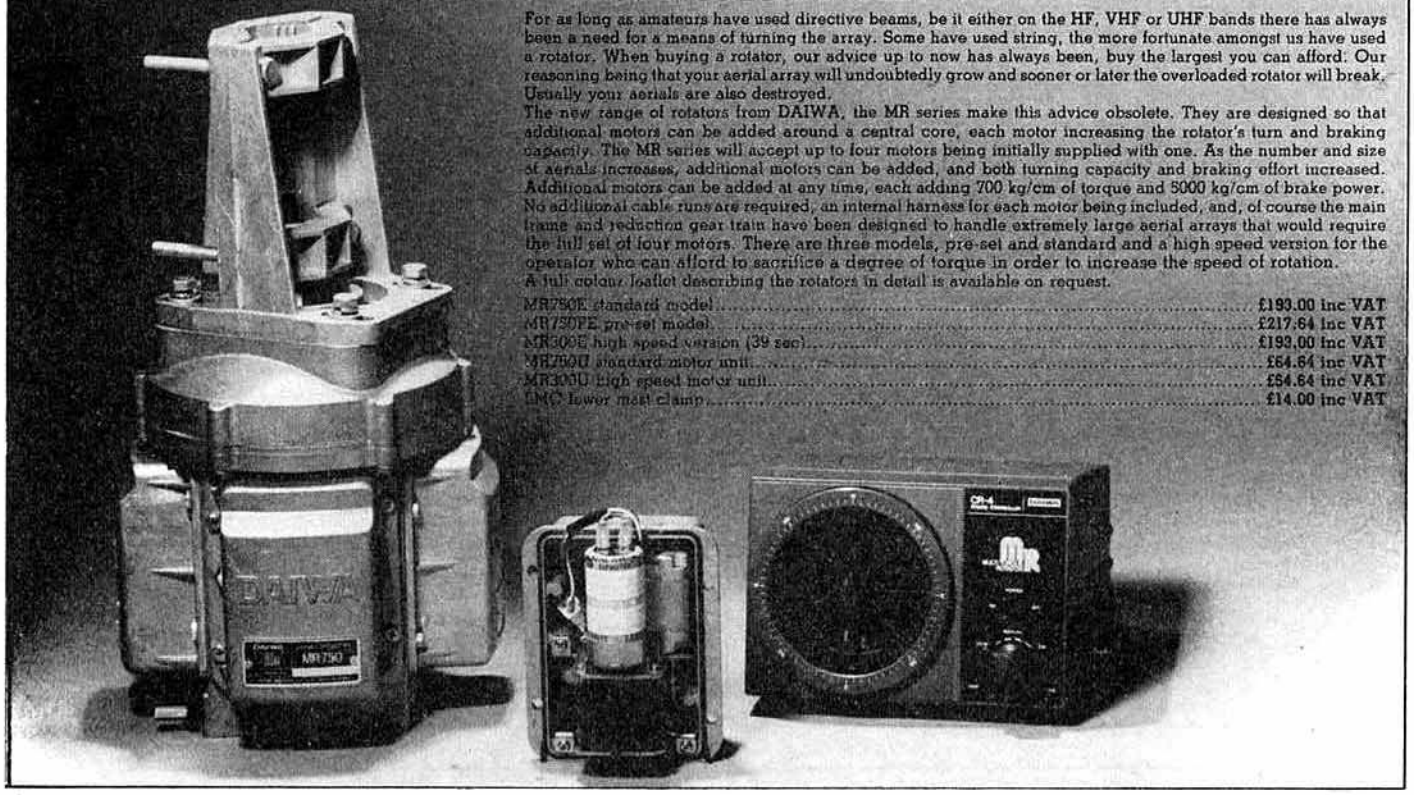

For as long as amateurs have used directive beams, be it either on the HF, VHF or UHF bands there has always been a need for a means of turning the array. Some have used string, the more fortunate amongst us have used a rotator. When buying a rotator, our advice up to now has always been, buy the largest you can afford. Our reasoning being that your aerial array will undoubtedly grow and sooner or later the overloaded rotator will break. Usually your aerials are also destroyed.

The new range of rotators from DAIWA, the MR series make this advice obsolete. They are designed so that additional motors can be added around a central core, each motor increasing the rotator's turn and braking capacity. The MR series will accept up to four motors being initially supplied with one. As the number and size of aerials increases, additional motors can be added, and both turning capacity and braking effort increased. Additional motors can be added at any time, each adding 700 kg/cm of torque and 5000 kg/cm of brake power. No additional cable runs are required, an internal harness for each motor being included, and, of course the main frame and reduction gear train have been designed to handle extremely large aerial arrays that would require the full set of four motors. There are three models, pre-set and standard and a high speed version for the operator who can afford to sacrifice a degree of torque in order to increase the speed of rotation.

A full colour leaflet describing the rotators in detail is available on request.

MR750E standard model	£193.00 inc VAT
MR750PE pre-set model	£217.64 inc VAT
MR300E high speed version (39 sec)	£193.00 inc VAT
MR750U standard motor unit	£64.64 inc VAT
MR300U high speed motor unit	£64.64 inc VAT
UMC lower mast clamp	£14.00 inc VAT

from **AOR**, the **NEW** AR2002.

AOR AR2002 MONITOR RECEIVER . . . £375.00 inc VAT, carr. £7.00

Frequency coverage is now 25 to 550 MHz and from 800 to 1300 MHz.

An improved keyboard making operation much easier.

A front panel knob for frequency stepping in addition to up/down buttons.

Socket for optional RS232 interface board on rear panel.

Front panel **LED strip "S" meter.**

Front panel **headphone jack.**

mobile

Operating from 12 volts DC the AR2002 is also ideal for those days out. To make mobile operation easy a car mounting bracket is available. Having soft pads to protect the receiver and a quick release mechanism, the MB2001 effectively extends the use of the AR2002.

MB2001 . . . mobile mounting bracket for AR2002.....£8.40 carr. £1.00

headphones

So that you can operate anywhere in the house without annoying the family a pair of headphones are useful. The HS6 is the ideal headset for the AR2002 and comes from the TRIO range of equipment. The HS6 is lightweight and comes fitted with a 6.3mm jack. An adapotor is included with the headset which reduces the 6.3 jack plug to 3.5mm for the AR2002.

If you require headphones which are so light and comfortable that you will forget you are wearing them then the HS7 is for you. The HS7 is fitted with a 3.5mm jack plug and included are two adaptors, one to convert to a 6.3mm plug and the other to 2.5mm. Both HS6 and HS7 come with an extra pair of ear pads.

HS6 . . . lightweight headset with adaptor.....£19.21 inc VAT carr £2.00
HS7 . . . ultra lightweight headset with adaptors.....£12.60 inc VAT carr £1.00

aerials

Due to size, wide frequency coverage aerials are not really suitable for mobile operation. Choose the particular section of the band you want to listen to, for example airband and selected the appropriate aerial. Below is a list of suitable mobile aerials.

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"as I said to John"

Last month we discussed how the sensitivity of a receiver and its noise floor are related, and how noise figure could be used as a measure of sensitivity that did not depend on receiver bandwidth. **This month** noise figure is related to aerials, and the sensitivity for good receiver performance is assessed.

Noise comes not only from the circuitry within a receiver, but also from external sources and is received by the antenna. In rural areas atmospheric and galactic noise are often predominant. **Galactic noise,** mainly from the sun, is dominant above about 10 MHz and extends into the VHF and UHF regions. **Atmospheric noise** affects mainly the lower frequencies below 10 MHz, and its level increases rapidly with decreasing frequency, especially at night.

In urban and suburban areas the antenna noise is dominated by man-made noise from vehicle ignition and electrical and electronic equipment. The level of this noise is very dependent on location and frequency, but it will be highest at HF and will fall at VHF and UHF.

For a receiving system to give optimal results the noise from the antenna should exceed the noise generated within the system. If antenna noise exceeds receiver noise by about 6 dB then the receiver noise will have negligible effect on the sensitivity. Receivers are usually designed to be sufficiently sensitive for use in quiet areas, where atmospheric and galactic noise will limit performance. Their sensitivity will then be more than adequate for urban conditions. The table below lists the typical noise levels found at various frequencies. These figures are culled from several magazine articles and the HF figures are in close agreement with measurements taken from a long-wire antenna here at Matlock.

Frequency	Antenna noise power in 2.2 KHz b/w	Approx Antenna NF	Required Receiver NF	Required SSB Receiver 10 dB S/N sensitivity
1.8 MHz	−90 dBm	50 dB	40 dB	−90 dBm 7.0 μV
3.5 MHz	−100 dBm	40 dB	30 dB	−100 dBm 2.3 μV
7 MHz	−110 dBm	30 dB	24 dB	−106 dBm 1.1 μV
14 MHz	−119 dBm	21 dB	15 dB	−115 dBm 0.4 μV
28 MHz	−125 dBm	15 dB	9 dB	−121 dBm 0.2 μV
50 MHz	−129 dBm	11 dB	5 dB	−125 dBm 0.13 μV
144 MHz	−137 dBm	3 dB	<2 dB	< −128 dBm 0.09 μV
430 MHz	−138 dBm	2 dB	<2 dB	< −128 dBM 0.09 μV

The sensitivity required of a receiver will also depend on the type of antenna that is connected to it. Mobile and portable aerials offer much less ouput than a larger base-station aerial, so mobile and hand-held receivers (or transceivers) will need to be more sensitive if the system is to be limited by antenna noise. Low frequency antennas also tend to be less efficient due to size limitations and ground proximity, and receiver sensitivities better than those shown above will be needed for good reception below 3.5 MHz on a short aerial.

At VHF and UHF frequencies, where the noise figure of receivers needs to be better than 5 dB for good performance, the loss in the feeder between the antenna and the receiver can significantly reduce sensitivity. The noise figure of a receiver should really be measured at the connection to the aerial, and this figure will be the receiver's own noise figure PLUS the loss in the feeder. Feeder loss can be quite high at VHF and UHF frequencies, for example 50 feet of UR43 feeder will attenuate by about 3.5 dB at 150 MHz and by about 6 dB at 450 MHz. A receiver with a noise figure of 2 dB (0.09 μV for 10 dB S/N) will have its sensitivity degraded to 1.4 μV at VHF and 1.8 μV at UHF at the connection to the antenna. This highlights the need to use low-loss feeders, especially at UHF, and the advantage of mast-head pre-amplifiers where feeder loss has little effect on noise figure.

So far we have looked at sensitivity only from the requirement of being able to receive weak signals, but it is also important that a receiver is not too sensitive because it must be able to reject strong singals whilst resolving weak ones. Generally a less sensitive receiver will be able to reject stronger singals than a more sensitive one, so receivers that are too sensitive will tend to suffer from overload effects. Most HF receivers are fitted with switchable RF attenuators to reduce sensitivity since this is desirable at the low frequency end of the band.

Next month we shall look at what effects strong signals have on receivers and introduce the idea of **DYNAMIC RANGE.**

LOWE SHOPS

In Glasgow the LOWE ELECTRONICS' shop (the telephone number is 041-945 2626) is managed by Slim GM3SAN. Its address is 4/5 Queen Margaret's Road, off Queen Margaret's Drive.

In the North East the LOWE ELECTRONICS' shop is found in the delightful market town of Darlington (the telephone number is 0325 486121) and is managed by Don G3GEA. The shop's address is 56 North Road, Darlington.

Cambridge, not only a University town but the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (the telephone number is 0223 311230).

For South Wales, the LOWE ELECTRONICS' shop is located in Cardiff. Managed by Richard GW4NAD, who hails from Penarth, the shop (the telephone number is 0222 464154) is within the premises (on the first floor) of South Wales Carpets, Clifton Street, Cardiff.

For South Coast Radio Amateurs, there's a LOWE ELECTRONICS' shop in Bournemouth. Its manager is Colin G3XAS. The shop's address is 27 Gillam Road, Northbourne, Bournemouth. The telephone number is 0202 577760.

LOWE ELECTRONICS' London shop is located at 223/225 Field End Road, Eastcote, Middlesex (the telephone number is 01-429 3256). The shop managed by Andy G4DHQ is easily found, being part of Eastcote tube station buildings.

Although not a shop there is on the South Coast a source of good advice and equipment—John G3IYG. His address is 16 Harvard Road, Ringmer, Lewes, Sussex. (Telephone 0273 812071).

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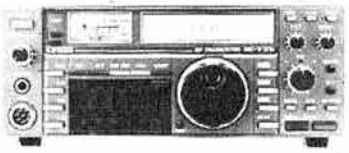

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IC-735, The Complete HF Radio

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The new IC-735 from ICOM is easy to operate and versatile, it has various scanning functions, comprehensive LCD and 12 memories. Computer remote control is possible via the RS-232C jack.

Options include: the AT-150 automatic antenna tuner and shown here the PS-55 AC power supply and SM-8 desk mic.

Please contact Thanet Electronics or your local ICOM dealer for even more information on this latest HF transceiver – the IC-735.

IC-290D/290E Mobile

290D is the state of the art 2 meter mobile, it has 5 memories and VFO's to store your favourite repeaters and a priority channel to check your most important frequency automatically. Programmable offsets are included for odd repeater splits, tuning is 5kHz or 1kHz (25kHz option).

The squelch on SSB silently scans for signals, while 2 VFO's with equalising capability mark your signal frequency with the touch of a button. Other features include: RIT, 1 KHz or 100Hz tuning/CW sidetone, AGC slow or fast in SSB and CW, Noise blanker to suppress pulse type noises on SSB/CW.

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IC-02E, IC-04E Handheld

The direct entry microprocessor controlled IC-02E is a 2 meter handheld, features include: scanning, 10 memories, duplex offset storage in memory and odd offsets also stored in memory. Internal Lithium battery backup and repeater tone are included. Keyboard entry is made through the 16 button pad allowing easy access to frequencies, duplex, memories, memory scan and priority.

The IC-02E has an LCD readout indicating frequency, memory channel, signal strength, transmitter output and scanning functions.

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Authorised Icom dealers in the UK

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A.R.E. Comms. Earlstown, Merseyside, 0952-29881.
Arrow Electronics Ltd., Chelmsford, Essex, 0245-381673/26.
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Listed here are 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.

IC-27E Mobile

This must be the smallest, 2M, FM mobile available today, measuring only 38mm H x 144mm W x 177mm D. It has all the features that you probably require included in this microprocessor controlled unit. In addition, if you feel lonely and can't find anybody on the band, just press "speech" and the optional built in speech synthesizer will tell you the frequency you are tuned to. This is a boon to the blind operator or to those that tuck their rigs out of sight.

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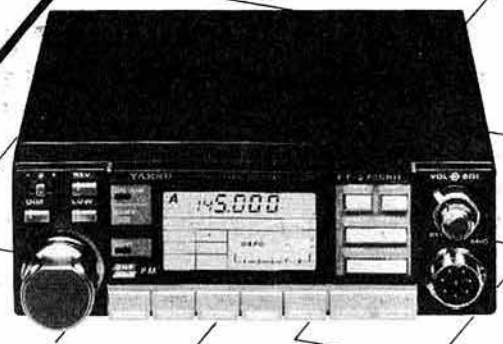

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CP-100

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: £235.50 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, CW, Tx/Rx. Surprisingly good performance for the price.
Price: £89.50 plus £2.50 p&p (UK made)

COMPATIBLE SOFTWARE

MBATOR-64	AMTOR/RTTY/CW/ASCII for Commodore 64. Cartridge, overlays, cable	**£69.00**
MBATOR-20	As above, for VIC-20 Cartridge, overlays, cable	**£69.00**
SWLTEXT-64	Receive only, CBM-64. Cartridge, overlays, cable	**£69.00**
SWLTEXT-20	Receive only, VIC-20. Cartridge, overlays, cable	**£69.00**
MARSTEXT-64	Message handling, CMB-64. Cartridge, overlays, cable	**£69.00**
MARSTEXT-20	Message handling, VIC-20. Cartridge, overlays, cable	**£69.00**
BEEBTEXT	RTTY transceive/CW transmit for BBC model B. E-PROM, cable	**£99.00**
APPLETEXT	RTTY/CW/ASCII for Apple II. Disc, cable	**£51.75**
IBMTEXT	RTTY/CW/ASCII for IBM-PC. Disc only (no cable). RS232 option needed for CP-1, CP-100 @ £35.00 inc	**£51.75**
		p&p: £1.00

Also available from ICS are:

- Our UK produced AMT-2 RTTY/CW/ASCII/AMTOR intelligent Terminal Unit, which will work with any computer equipped with a serial interface and ASCII terminal emulation software.
  Price: **£245.00** plus £2.50 p&p

- 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

- Expected to be available by the time this advert appears is our new low cost PK-64 software/hardware Packet Radio system for the Commodore 64 computer.
  Price is expected to be around the **£200** mark.

Both of the above Packet Radio products are designed to operate with the internationally agreed TAPR protocol standard.

Send SAE for details of any of the above products.

No quibble, 12 months parts and labour warranty

Callers by appointment

ICS Electronics Ltd
PO Box 2,
Arundel,
West Sussex BN18 0NX,
Telephone (024 365) 590

All prices include VAT at 15%. Prices may vary according to prevailing exchange rates

Access

VISA

ICS ALM-203E

Quite Simply, a new benchmark in 2 metre handheld performance and value!

ICS are proud to introduce the new ALM-203E 2 metre handheld transceiver from Alinco International Ltd. This push button, keypad operated transceiver, housed in a robust high impact plastic/cast aluminium case, provides all the most wanted features needed for pleasurable 2 metre operation, but at a price similar to that of comparable, limited facility thumb wheel operated units. Quality and reliability levels are well up to the highest Japanese standards.

INCLUDED IN THE PRICE:
- ✻ 400mAH NI-CAD Battery Pack. EBP-5N (gives 3 Watts out)
- ✻ AC Battery charger. EDC-5
- ✻ Belt clip
- ✻ Antenna and Hand strap.

FEATURES:
- ✻ Up to 5 Watts Tx output (with optional High Power NiCad pack or DC lead)
- ✻ 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 Transmit
- ✻ 140-160MHz Receive.

OPTIONS:
Leatherette case
DC/DC Converter
DC lead
Speaker/microphone
5 Watt NiCad pack
Mobile charger stand (mounts inside car window)
30 Watt amplifier.

COMING SOON:
ALR-206E 25 Watt mobile transceiver. Same features as ALM-203E are available via a keypad on the rear of microphone.

We think you will agree that at **£209.00** inc VAT (plus £2.50 p&p), the ALM-203E represents outstanding value for money. Want to know more?
Send for a detailed four colour brochure on the product.
TRADE ENQUIRIES INVITED.

No quibble, 12 months parts and labour warranty

Callers by appointment

ICS Electronics Ltd
PO Box 2,
Arundel,
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Telephone (024 365) 590

All prices include VAT at 15%.
Prices may vary according to prevailing exchange rate

Access

VISA

✻ FREE FINANCE ✻

HAMPSHIRE, YORKSHIRE, HUMBERSIDE, JERSEY,

SPECIAL OFFER

FRV 7700

CONVERTERS

A	118-130,	130-140,	140-150 MHz
B	118-130,	140-150,	50-59 Mhz
C	140-150,	150-160,	160-170 MHz
D	118-130,	140-150,	70-80 MHz
E	140-150,	150-160,	118-130 Mhz
F	150-160,	160-170,	118-130 MHz

£49 inc VAT

FRG8800 £475 inc VAT

FRV8800 £80 inc VAT

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

The FRG-8800 demodulates 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 within 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 operation is optional.

FM2033

144 MHz, 12VDC Transceiver. 25W/5W Hi/Lo (both adjustable). Compact $2\frac{7}{16}" \times 6\frac{3}{8}" \times 7\frac{3}{16}"$.
$12\frac{1}{2}$ KHz steps (100 KHz fast QSY). Amber LCD 'Sunlight View', Side Lit. Display; 100's of Hz or channel number. Sensitivity $<0.2\mu V$ for 12dB SINAD. Single knob frequency control "Dial". Endless or non-endless dial options. RIT; 1 KHz steps, V.F.O. + memory. Two 5 slot memories A, B, A + B, A × B. 11th memory instant "call" channel. Memories simplex or duplex channels. Band scanning, programmable limits. Scan halts squelch + centre zero. Pause on scan halt for 3 seconds. Scan/tune/RIT from microphone ±600 KHz split, plus cross memory. Repeater input listen by pressing "dial". Setable; steps, tone, splits, limits. Simple controls for safe mobile operation. C/W mobile mount, mic and handbook.

KDK **£219 inc**

NEW LOWER

FT ONE	Transceiver General Coverage HF All Mode	1650.00	FT980	Transceiver General Coverage Rx Amateur Tx	1450.00
D3000286	Curtis Keyer	33.35	SP980	External speaker with audio filter	78.95
RAMTONE	Non volatile memory board	14.95	SP980P	External speaker with phone patch	100.00
FMUTONE	FM unit	48.30	XF455-8MCN	300Hz CW filter (455KHz 8 pole)	44.85
XF8.9KA	6KHz AM filter	19.95	XF8.9HC	600Hz CW filter	28.75
XF8.9KCN	300Hz CW filter	19.95	XF8.9GA	6KHz AM filter	28.75
XF8.9KC	600Hz CW filter	19.95	D410004	Interconnect lead FT980 to FC757AT	28.75
XF10.7KC	800Hz CW filter	18.40	FL2100Z	Linear 160-10M (9 band) 1·2KW P.I.P	699.00
FTV107R	Transvertor (main frame only) 2 band capability	49.00*	FT203R	Tx/Rx Thumbwheel, 2M, 1·5W c/w FBA5 case	175.00
FT77	Transceiver 8 band mobile multimode 100 Watts	479.00*	FT203R	Tx/Rx Thumbwheel, 2M, 2·5W c/w FNB3	195.00
FT77S	Transceiver 8 band mobile multimode 10 Watts	449.00*	FT203R	Tx/Rx Thumbwheel, 2M, 3·5W c/w FNB4	199.00
MRKT77	Calibration marker unit option	10.75	FT703R	Tx/Rx Thumbwheel, 70cm c/w FBA5 cell case	215.00
FMUT77	FM Board option	28.35	FT703R	Tx/Rx Thumbwheel, 70cm c/w FNB3 Nicads, CSC6	235.00
AMUT77	AM Board option	23.35			239.00
FP700	Base station external power supply/speaker	150.00	FT703R	Tx/Rx Thumbwheel, 70cm c/w FNB4 Nicads, CSC7	
FC700	Antenna tuner	105.00			
MMB16	Mobile mounting bracket	15.70	FBA5†	7·2/9V cell case only (6 × AA)	6.50
FV700DM	Digital V.F.O.	200.00	FNB3†	10·8V Nicad Pack (425mAH)	30.65
FTV700R	Transverter main frame only	125.00	FNB4†	12·0V Nicad Pack (500mAH)	34.90
50TV	6m Transverter module All models FTV	115.00	CSC6	Soft-carrying case (FBA5 or FNB3)	5.75
70TV	6m Transverter module All models FTV	120.00	CSC7	Soft carrying case (FNB4)	6.90
144TV	2m Transverter module All models FTV	150.00	YH2†	Headset (PTT via vox)	14.95
430TV	70cms Transverter module All models FTV	275.00	MH-12A2B†	Speaker microphone	16.50
FT757GX	General Coverage, Ham bands Rx/Tx	739.00	MMB21†	Mobile hanging bracket	7.65
FC757AT	Automatic antenna tuner—Ham bands	255.00	PA3†	Charger/eliminator for 12VDC	18.00
FP757GX	Switch mode psu (50% duty FM service)	160.00	NC9C†	Charger mains (FNB-3)	9.60
FP757HD	Heavy Duty psu (100% duty FM service)	175.00	NC18C†	Charger mains (FNB-4)	9.60
FRB757	Switch box for FT757GX to FL2100Z	9.95	NC15†	Charger quick/DC adaptor	59.00
MMB20	Mobile mount for FT757GX	18.00	YHA14	Antenna helical (BNC fitting) 2M	8.45
FIF65(A)	Computer interface for Apple II	47.15	FT270R	Transceiver 2M, FM, 25W synthesised	315.00
FIF232C	Computer interface RS232C	57.00	FP270RH	Transceiver 2M, FM, 45W synthesised	365.00
FRG9600	60-905MHz Scanner, FM, SSB, AM, CW	449.00	FVS-1		20.70
PA-4(C)	DC power supply	12.65	FT2700RH		499.00

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SMC (Leeds)
257 Otley Road,
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Leeds (0532) 782326
9-5.30 Mon-Sat

CHESTERFIELD
SMC (Jack Tweedy) Ltd
102 High Street,
New Whittingdon, Chesterfield
Chesterfield (0246) 453340
9.30-5.30 Tue-Sat

BUCKLEY
SMC (TMP)
Unit 27, Pinfold Lane
Buckley, Clwyd
Buckley (0244) 549563
10-5 Tue, Wed, Fri
10-4 Sat

STOKE
SMC (Stoke)
76 High Street,
Talke Pits, Stoke.
Kidsgrove (07816) 72644
9-5.30 Mon-Sat

GRIMSBY
SMC (Grimsby)
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Grimsby, Lincs
Grimsby (0472) 59388
9.30-5.30 Mon-Sat

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SMC **South Midlands**

● 2 YEAR GUARANTEE ●

DERBYSHIRE, STAFFORDSHIRE, CLWYD, CO. DOWN

FRG9600 £449 inc VAT

PA-4 (c) £12.65 inc VAT

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 customized control functions; such as multiple, organized 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.

SPECIAL OFFER

FT290R FREE! — WITH EVERY FT290R PURCHASED FOR £315 — A NEW NICAD BATTERY CHARGER.

£315 inc VAT

YAESU PRICES

FL2050		115.00
FT209R	Tx/Rx "Keyboard" 2M, 1·8W c/w FBA5 case	219.00
FT209R	TX/Rx "Keyboard" 2M, 2·7W c/w FNB3	239.00
FT209R	Tx/Rx "Keyboard" 2M, 3·7W c/w FNB4	245.00
FT209RH	Tx/Rx "Keyboard" 2M, 2·3W c/w FBA5 case	225.00
FT209RH	Tx/Rx "Keyboard" 2M, 3·7W c/w FNB3	245.00
FT209RH	Tx/Rx "Keyboard" 2M, 5·0W c/w FNB4	249.00
FT709R	Tx/Rx "Keyboard" 70cms, c/w FBA5 cell case	239.00
FT709R	Tx/Rx "Keyboard" 70cms, c/w FNB3 Nicads	259.00
FT709R	Tx/Rx "Keyboard" 70cms, c/w FNB4 Nicads	265.00
CSC10	Carrying case (FBA5/FNB3)	6.90
CSC11	Carrying case (FBN4)	8.05
FT208R	Tx/Rx Handheld, 2M, 2·5W, Keyboard	209.00
FNB2	Nicad Battery Pack	27.02
FBA2	Battery pack sleeve (fits FNB2)	3.85
FBA3	Charging sleeve (for use with FT207 acc)	5.00
NC7C	Base Master	34.65
NC8C	Base Master with quick charge and PSU	64.80
MMB10	Mobile bracket	7.65
FT690R	Transceiver 6M 2·5W multimode synethesised	289.00*
FT290R	Transceiver 2M 2·5W multimode synthesised	315.00
NC11C	Slow charger (180mA)	11.50
MMB11	Mobile mount	30.00
CSC1A	Soft carrying case	5.00
YHA15	Flexible helical antenna	7.65
YHA44D	Antenna 70cms, 0·25 wave, semi-flexi	9.95
YHA44	Antenna 70cms, 0·5 wave, semi-flexi	7.65
FL2010	Linear amplifier 2M 10W	65.00
FL6010	Linear amplifier 6M 10W	50.00
FRG8800	Rx 0·15-30·0MHz AM/CW/SSB/NBFM	475.00
FRV8800	Convertor 118·175MHz	80.00
FRVWFM	Module or wide band F.M.	T.B.A.
FT680R	Multimode transceiver 6M	379.00*
FP80A	Power supply unit	57.50
FT76R(2)	Multimode multiband base station c/w 2M	775.00
FT726R	Main frame only	629.00
21/24/28	HF module for 15M, 12M and 10M	210.00
50/726	6M module	185.00
144/726	2M module	150.00
430/726	70cm module	255.00
SAT726	Full duplex module	95.00
XF455MC	600Hz CW filter	49.85
FYP80	12V power supply	65.55
QTR24D	World time clock quartz	33.35
FF501DX	Low pass filter	29.90
YP150Z	Terminated Wattmeter 5-30-150W FSD	97.75
YC1000L	Data Logger (V, F, T, etc)	419.00*
YM24A	Hand 2K, 6 pin min, speaker/mic, handheld	23.75
YM36	Hand 600, 8 pin, noise cancel	18.80
YM47	Hand 600, 7 pin, scan control	13.80
YM49	Hand 600, 7 pin, speaker/mic	20.20
YE7A	hand 600, 4 pin	9.60
YD148A	Stand 600/50K, 4 pin	24.90
MH-188	Hand 600, 8 pin scan adjustable tone	15.70
MD-188	Desk 600, 8 pin scan adjustable tone	64.80
SP55	External Mobile speaker	14.95
YH55	Headphones padded low Z ¼" jack	15.35
YH77	Headphones lightweight low Z ¼" jack	14.95
MF-1A3B	Boom Microphone Mobile	18.00
YH1	Lightweight mobile headset/boom	14.95
SB1	PTT switch box wired for FT208/FT708	15.70
SB2	PTT switch box wired for FT290/FT790	13.80
SB10	PTT switch box wired for FT2700R/FT270R	14.95

*Special offer—limited stocks.
‡Matches FT980 and FRG8800.
†Accessories for FT209 also.

OSCAR 2–10m

The SMC Oscar Two 10 Metre, was a 40 channel 27MHz, FM, CB, transceiver, designed to satisfy the stringent Government specifications of MPT1320. It has now been successfully modified to cater for the equally demanding requirements of the Amateur Radio service worldwide. Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310 MHz and channel 40 29.7 MHz, a power o/p of approximately 4 Watts and a receive sensitivity of better than 0.3μV for 12db sinad. Also for your enjoyment when the band opens up, we have incorporated a −100kHz repeater shift (by using the original panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM at a remarkable price!

SMC **£65 inc**

FREE FINANCE
*On many regular priced items SMC offers.
Free Finance (on invoice balances over £120)
20% down and the balance over 6 months or
50% down and the balance over a year.
You pay no more than the cash price!
Details of eligible items available on request.

SMC SERVICE
Free Securicor delivery on major equipment.
Access Barclaycard over the phone.
Biggest branch agent and dealer network.
Securicor 'B' Service contract at £5.00.
Biggest stockist of amateur equipment.
Same day despatch whenever possible.

GUARANTEE
Importer warranty on Yaesu Musen products.
Ably staffed and equipped Service Department.
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Communications ltd.

AUTHORISED YAESU

BARGAIN PAGE

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The SMC Traps are professionally made to the same standards as we supply to government users throughout the world.
3.5-28MHz 1000pep. pr **£15.99**
Top band Space Savers **£18.40**
p&p **£2.20**

TELO MASTS

Telescopic 10ft Sections, guyed

Mast only
30ft **£39.10** carr **£5**
40ft **£63.25** carr **£6**
50ft **£78.20** carr **£8**

Complete Rigging Kits
30ft **£45.00** carr **£4.50**
40ft **£56.35** carr **£5**
50ft **£72.45** carr **£8**

SSB TRANSCEIVER

VOYAGER

1·6-4·6MHz 30W hybrid 6 channels xtal controlled. Untested surplus stock. Supplied with CCT for customers own mods we were selling the tested marine version for **£499** **Bargain at £49**

10M FM

Oscar 2
40 Channels 4 Watts
100KHz Repeater Shift
Incredible only **£65 inc**

BASE ANTENNA

The incredible 2M Swiss Quad shown vertically mounted 16dB gain. F/B
£67.95
p&p **£2.85**

FASTEST MAIL ORDER—LARGEST STOCKS AND RANGE IN EUROPE

SPEECH PROCESSOR

SP4 RF Audio to Audio c/w Power adaptor adjustable clipper only **£69**

DIGITAL M/METER KD200

LCD multimeter
DC V 200mV-1kV
AC V .2-600V
OHMS 200-20K
I 200ma (AC/DC)
Only **£29.95** carriage free

COAX CABLE

Quality British Cable

LDF2 50R	£3.22/M
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UR67 50R	69p/M
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UR39 75R	56p/M
UR57 75R	71p/M

Carriage £1 up to 20Mtrs
£2.50 over 20Mtrs

COAX RELAYS

CX120A Cable Entry **£16.90**
CX520D 3 'N' **£44.85**
CX540D 3 BNC **£44.85**
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COAX SWITCHES

SMC2U 2 Way 50Ω **£11.95**
KP21N 2 Way N Type **£24.15**
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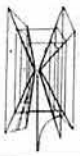
SEND FOR OUR 30 PAGE STOCK P/LIST WITH YAESU COLOURED LEAFLETS

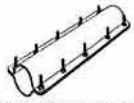
GEM QUAD



The strong Boomless Quad
10-20Mtrs. Send for more details

			p&p
GQ2E	2 ELE	**£299.00**	**£5.90**
GQ3E	3 ELE	**£536.00**	**£9.20**
GQ4E	4 ELE	**£745.00**	**£10.00**

MAST COUPLERS



2" Dia 15" galvd joining sleeve
SMC 59 **£6.84**
p&p **£2.65**

MAST CLAMPS

Mast to boom

SMC3 1-2" to 1-1¼"	£2.58
SMC53 1-2" to 1"	£2.00
CP1 Heavy Duty 2" to 2"	£5.75

p&p £2

WALL BRACKETS

Quality Galvanised

W12"	£8.34	p&p £2.95
W18"	£10.64	p&p £3.75
W21"	£19.50	p&p £3.75
W24"	£13.23	p&p £3.75

HF BALUN

BN-86

1.1 3-30MHz
50ohms 1KW
£33.99
p&p **£2.00**

ANTENNA—TOWERS—ROTATORS & ACCESSORIES 50p p&p

MOBILE ANTENNAS

118M 11/8 × 7dB	£39.85
88F 8/8 × 5.2dB	£22.95
78F 7/8 × 4.5dB	£16.95
2NE 5/8 × 3dB	£7.95
SOCA CABLE ASSEMBLY	£5.65
GCCA Gutter Clips c/w Cable	£11.50
p&p Antenna & Assy.	£2.50

JAY BEAMS

HF Beams

TB3	3ele 10-20M	£212
TB2	2ele 10-20M	£143
TB1	1ele 10-20M	£77

Delivery **£5**

ROTATORS

OSCAR FU200

Super Bargain
Full sized only **£49.95**
p&p Free

MET ANTENNAS

144/19T 2M 14.2dBd **£55.88**
432/17X 70cm 13.4dBd
Xele **£49.17**

POLAR PHASER

The SMC ultimate in polarisation control. This revolutionary product will control your crossed Yagi RH-LH Circ, Vert or Hor whilst TX 2M 100W VSWR <1·5:1.

ONLY £49 inc p&p

SMC AT HANTS, DERBYSHIRE, STAFFORDSHIRE, YORKSHIRE

KDK 2M FM

144MHz 25/5W compact. Memories programmable scan limits. Send for more details of this superb transceiver only **£249**

QUALITY VALVES

6JS6C NEC	£6.90
6KD6 GE/NEC	£7.48
6146B National/GE	£12.85
12BY7 RCA	£4.65
6AN8A Toshiba	£2.99
6AW8 Toshiba	£2.87

p&p one £1 any No. £1.50

DISCONES

GDX1

GDXA 100-440MHz	£41.85
GDX1 80-480MHz	£49.50
GDX2 50-480MHz	£62.85
VHF 65-520 RX only	£19.60

p&p **£2.85**

MAST AMPLIFIERS

Quality TV mast amplifiers ideally suitable for scanning receivers C/W PSU
40-800MHz
only **£29.95**

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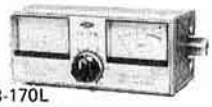

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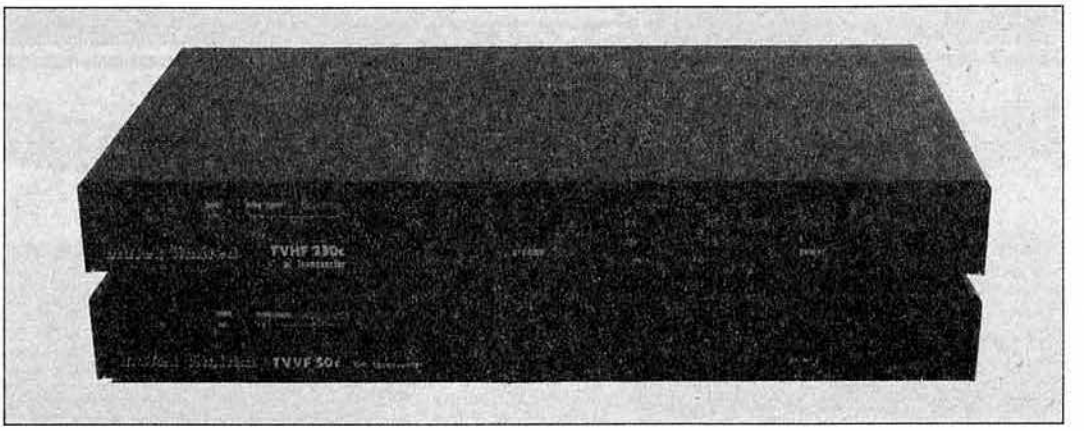

To many vhfer's of my generation, 50MHz has always been something of a 'holy grail'. Now, thanks to the patient work of numerous dedicated people over the last decade, we have the band! Thank you all!

I was lucky enough to have my research proposal accepted as sufficient reason to justify the issue of one of the hundred special authorisations, and I've been active on the band since November last year. It's a fascinating part of the spectrum.

muTek's involvement with 50MHz has largely been in the export field. We've been manufacturing our SLNA 50s switched preamplifier for a couple of years now, whilst at the end of last year we launched out TVVF 50c 144/50MHz transverter. This was followed by the TVVF 50a 28/50MHz design. The transverters have met with a very favourable reception amongst experienced six metre operators elsewhere in the world. To quote from a telex received from KC2PX.....

"I am pleased to inform you that both TVVF 50a units received extensive testing during field day and the June VHF contest. Our contest group S.C.O.R.E. (K2XR) has determined your transverter to out perform the following equipment—FT726R, IC551D, MMT50/28. The TVVF 50a was used with the following HF equipment—KWM380, IC745, IC740, TS820S, + TS830S."

With the coming of the new band, I wouldn't be at all surprised to see large quantities of six-metre equipment dumped in the UK from you-know-where. There's one thing that I'm quite certain of, however. Little, if any, of it will match up to the performance of our products!

See you on 6!

Chris Bartram G4DGU

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LBPF 144u	Low-loss 144-148MHz two-pole bandpass filter. 0·3dB typical insertion loss, 120W power handling	22.40
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TVHF 230c, TVVF 50a, TVVF 50c	5.00
All other products above	1.50

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Following the unqualified success of the POCOMTOR AFR-2000, DEWSBURY ELECTRONICS are proud to announce the arrival of two complimentary products. The AFR-2010 which has the same performance/ specification as the AFR-2000 but with the added facility of AUTOMATIC Morse decode. The AFR-8000 features a built in 40 character LCD display, serial and centronics compatible printer interfaces.
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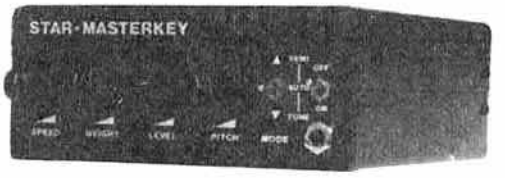

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Headquarters and registered office: **Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW**
Telephone (Dialling code 77 from London, 0707 from outside London) 59015. Telex 25280 (RSGBHQ G)
Secretary and general manager: D A Evans, G3OUF

EDITORIAL

COMMUNICATING INFORMATION

The RSGB "DataBox", a dial-up information service for amateur radio, officially became operational on 1 October 1985. It has some 500 pages of information covering—well, just about everything you want to know about amateur radio from the new 50MHz allocation to the RSGB QSL Bureau, from packet radio to the RSGB slow morse transmission schedule, from RSGB books to repeaters and beacons. The information normally will be updated weekly—or within a few hours for important news items.

To take advantage of this new RSGB information service you require a home computer, a telephone line and a modem capable of half-duplex operation at 1200/75 bauds (CCITT V23). The DataBox is available on Potters Bar (0707) 52242, 24 hours a day, seven days a week. At the moment there are only two lines, although these may be increased as demand rises and finance permits.

Being Prestel compatible, many members should be able to use the service immediately—indeed, many hundreds from all over the country have already done so during its setting-up stage. We are particularly keen to encourage clubs to use this service as an effective way of outputting information to large numbers at a time. The DataBox can also receive information in the form of direct messages.

Also coming into operation sometime during October will be RSGB pages on the national Prestel service. Out thanks for this free space go to Clubspot 810. The RSGB pages are located from page 810625, and will be used mainly for up-to-date news.

A huge demand has always existed for information and news about all aspects of amateur radio, and the Society has placed high priority on providing good two-way links. Many of these, like the DataBox, have only been developed in recent years. Actually a complete list with an indication of their up-to-dateness runs something like this:

Headline News. Available on Potters Bar (0707) 59312. Normally updated weekly, but within hours for important news.

GB2RS. Nationwide broadcasts on Sundays; news not more than 5-12 days old.

Newsletters. Specialist information can be obtained from the *HF DX Newsletter* published weekly, and the *VHF/UHF Newsletter* and Microwave *Newsletter* published at appropriate times at intervals of 4-6 weeks.

Letter/telephone. Information may also be obtained during working hours by telephoning RSGB HQ directly, or by letter; some 200-300 members do so each working day. The output may be verbal, a standard letter or data sheet, or a letter written specially in reply to the request.

Radio Communication. The main means of communicating within the Society; news content 4-8 weeks old. The *RSGB News Bulletin* contains information normally not more than 2-4 weeks old.

GB2RS special broadcasts. Transmitted from RSGB HQ for special occasions such as shuttle missions, have in the past provided information which is less than 5 min old.

We believe few, if any, organizations ca match this breadth and depth of service.

D A Evans, G3OUF

THE ADMIRAL'S CUP

An account of the part played by radio amateurs in the 1985 Fastnet race

LT CDR ELLIS DIGGLE, G3LSD

THE ADMIRAL'S CUP is a race within a race. Various classes of yachts enter as individual vessels, but the Admiral's Cup entries consist of three yachts from each of the nations competing. Certain races take place in the Solent and the English channel, and the culmination is the major race from Cowes around the Fastnet Rock off southwest Ireland and with the finish at Plymouth.

In the 1985 series there were some 275 yachts in the general class, and 18 nations entering 54 yachts in the Admiral's Cup. Altogether some 3,000 people were at sea and, following the loss of life during the 1979 Fastnet race, the Department of Trade & Industry reviewed its policy with regard to mf and hf ship-to-shore communications. As a result, a number of special dispensations were granted to the Royal Ocean Racing Club in connection with the Admiral's Cup. Specific spot frequencies were allocated, and permission given to set up a temporary base station. In addition, the RORC were authorized to use "suitable operators" to man the station at Plymouth. The RORC sought the assistance of the Royal Western Yacht Club of England, whose headquarters is at Plymouth, and it so happened that John Veale, G4SCA, is a member of the club and he volunteered to organize and run the station.

A small *ad hoc* committee was formed, consisting of John, G4SCA, as co-ordinator with the RORC and RWYC: Lawrence, G4HTD, chairman of the Plymouth ARC: Trevor, G3ZYY, as technical officer, and Ellis, G3LSD, as dogsbody. Trevor quickly became engaged in forming a watchkeeping roster of pairs of radio amateurs from Plymouth and the surrounding district into four-hourly watches commencing at 1700 on Saturday 10 August. The watches were planned so as to last until the end of the race, which was estimated to finish on Thursday or Friday 14/15 August. The response from the area was good, with amateurs from as far away as Exeter and Exmouth to the east and the "colony" of Cornwall to the west volunteering.

A communications briefing was held at the Plymouth Albion Football Club (headquarters of the Plymouth ARC) on Friday 9 August. Forty amateurs attended and heard introductory remarks from John Veale; Donald McDonald, chairman of the RWYC Fastnet Committee; Air Vice-Marshal "Jimmy" James, the RWYC race information officer; and Brian Wing of the RORC. All speakers emphasized the importance of communications and gave an outline of logistical support, some general information and some background to the race itself.

Meanwhile, back at the shack (which was a portable cabin at Millbay Docks, Plymouth), G4HTD commenced work on the antennas using his 60ft tower. He was assisted by G3YJQ, G3ZYY, G4HZA, G6BJJ and G8XTE. Since the allocated spot frequencies were in the 2, 4 and 6MHz bands, Trevor decided to construct individual dipoles for each frequency. The intention was to reduce the amount of antenna tuning and switching to a minimum, and to this end all three dipoles were paralleled to the same coaxial feeder. After a small amount of trimming of each dipole, resonance was achieved on all bands with a good vswr. The 60ft tower provided an ideal support, and each antenna formed an inverted-V; the top of the tower

Briefing night. L to r: (back) G3LSD, Donald McDonald, Air Vice-Marshal "Jimmy" James, Brian Wing; (front) G4HTD, G4SCA, G3ZYY. *Photo:* G8XTE

sported a vhf colinear for the maritime Channel 72 frequency. The RORC provided the main transceiver, which was an Icom IC-M700 UK marine band hf ssb rig, which provided fully-synthesized coverage of the hf spectrum with some 150W peak output. The use of pretuned antennas and a transceiver made operating the gear the proverbial "piece of cake", which was good since the experience of the station operators in hf and indeed ssb, varied between a great deal and very little; Class B licensees were also taking part. A Yaesu FRG8800 communication receiver was also used for scanning purposes.

On Saturday 10 August, a few hours before the start of the race at 1730, radio checks were carried out and contact was made with *HMS Yarmouth*, a Type 12 frigate, which was acting as guardship off Cowes. G3LSD carried out the initial checks and took the opportunity of "warning" *Yarmouth* that radio amateurs would be at the other end and that procedures would, to say the least, not be those to which they were normally accustomed! On Sunday 11 August at 0045 the first contact schedule was due, but conditions on 2241kHz were not good, with heavy teletype interference. No contact was made with the yachts, but *Yarmouth*, now under way down the Channel, was able to read about 50 percent of the vessels and relayed their messages to our radio room. Next came the 0800 schedule on the 11th, and there were anxious faces at the Plymouth race headquarters—there was a southwesterly gale and driving rain—here again, *Yarmouth* was of great assistance in relaying signals.

The forenoon watch on the same day was busily engaged in receiving reports from yachts, *Yarmouth* and HM Coastguard, and there were now some expected retirements because of weather conditions. There was much the same story of retirements during the afternoon watch, and some two dozen yachts put into Millbay Docks only a few metres away from the shack. There was also the much-publicized capsize...! However, the weather situation had improved by the time of the "communications sitrep" at 1800 on Sunday, and radio conditions on 2,241kHz had also improved considerably. Also on Sunday evening, the Irish Naval Service brought in their guardship *Le Emer*, to assist in communications and she was read loud and clear off Southern Ireland. Her duties included monitoring the progress of the race and, in particular, reporting the names of yachts rounding the Fastnet Rock.

Monday 12 August proved to be a busy day, with yachts beginning the return leg and the now familiar relays and exchanges with *Yarmouth* and *Le Emer*. After the 180° turn round the Fastnet, the speed of the yachts increased with the benefit of the prevailing wind, and from signals and plotting it was evident that a fast run was under way. However, a signal from *Yarmouth* stating "I have increased speed from 13 to 22 knots and am still being overtaken" was greeted with smiles and large lump of nautical salt.

We had the pleasure of visits to the shack from both Independent Television News and the Danish TV and Radio News Service. Both were interested in the exhange of signals with *Yarmouth* and *Le Emer*, and both were impressed by the co-operation between the radio amateurs and the "professionals".

Late on Monday night, with arrivals expected early on Tuesday, the Channel 72 maritime frequency was brought into use. This net formed a link with Breakwater Fort in Plymouth Sound, where members of the RORC would time and check the finishers.

HMS Diomede, a Leander class frigate, relieved *Yarmouth* at 0040 on Tuesday 13 August, and we sent a "thank you" signal to *Yarmouth* for her excellent co-operation. It was amusing to note that *Yarmouth* "warned" *Diomede* that she would be dealing with radio amateurs! Contact with *Diomede* in the early hours of the morning proved very difficult, but conditions improved towards dawn when the yachts made their 0600 schedule of positions. As had been the case with *Yarmouth, Diomede* was invaluable in relaying and exchanging information. The 1800 schedule also worked well. At 1900 one yacht was having problems with her sailing gear, and Falmouth Coastguards were alerted for possible assistance: *Diomede* also made ready to fly off her helicopter.

A minor panic occurred early in the morning of Wednesday 14 August, with a message that there was a dismasted yacht off the Kinsale Head gas field. *Diomede* and *Le Emer* were closely involved in signals traffic, and the vessel was given assistance and then escorted into Cork. On the afternoon of the same day the last of the Admiral's Cup competitors passed the

G8XTE manning the station

finishing line, although the "non-team" yachts were still in the race—by this time there was little traffic on 2,241kHz and almost all signals were on vhf Channel 72. It was at this stage that a "thank you" signal was sent to *Le Emer* for her splendid service, and this was acknowledged and appreciated by her captain.

Thursday the 15th was obviously to be the last day, and the general running-down of the station took place by mid-afternoon when the few remaining yachts were in the immediate area of Plymouth. However, we should place on record the final signal sent to *Diomede* and her reply:

To *HMS Diomede:* *As we shall be standing down later today we should like to thank you for your excellent services. Particularly appreciated has been your co-operation on procedures with the radio amateurs here. Best wishes for the future.*

From *HMS Diomede:* *Thank you very much. It's been our pleasure.*

In conclusion, a worthwhile exercise involving 120h of continuous watchkeeping which enabled radio amateurs to see "how the other half lives" outside the amateur bands. The co-operation of the Royal Navy frigates was outstanding, despite the fact that some of their operators may have occasionally winced at our procedures!

And finally—a letter received from Air Vice-Marshal "Jimmy" James:

Dear Ellis

I find it difficult to find adequate words to express my admiration of the performance of all radio amateur station members throughout the Fastnet race. When I first heard of the proposal to use them I was frankly sceptical about the outcome of having yacht crews whose sole objective is racing their boats trying to work with chaps who might have no experience of ocean racing and who live in a different world, almost speaking a different language. In the event my fears proved groundless. Inevitably and understandably it took about a day and a half to get the bugs out of the system as originally planned, but from then on all went smoothly to the extent that towards the end of the race the radio crews were able to take in their stride several last-minute changes in their method of working.

For me the most impressive part of the operation was the manner in which the radio watchkeepers coped with the first 48 hours when the weather was doing its best to scupper the whole race. Boats were retiring almost faster than we could write down the details, but the flow of vital information from the radio room never faltered.

Thanks to the enthusiasm and leadership of John Veale, morale among his "chaps" went from strength to strength as they grew in confidence, gradually assimilating the atmosphere that has always been a feature of the Fastnet, now in its 50th year.

I know that the amateurs were drawn from a wide area of southwest England and that a considerable number took leave, or in other ways put their private or family commitments on one side to participate.

To everyone involved in the communications side of the race I send on behalf of the Royal Western Yacht Club our warmest congratulations and thanks on a job well done.

The Plymouth Amateur Radio Club wishes to thank Messrs SMC Ltd, Reg Ward & Co, Revco Electronics and Mobile Radio Parts (Plymouth) for their assistance. □

Amateur Radio News

Shuttle update

Following the successful *Challenger* mission, during which several contacts were made with astronauts aboard the shuttle, there will be another chance to speak to space soon. Mission 61-A, which as we went to press was due for lift-off on 7 November, will have two German radio amateurs on board and they intend to operate on 144 and 430MHz during the mission using the callsign DP0SL. The two amateurs are Dr Ernst Messerschmid, DG2KM, and Dr Reinhard Furrer, DD6CF, and it is understood that a Dutch mission specialist who has a PE1 callsign may fly on this mission.

The three main modes of operation likely to be used are:

1. Beacon operation with inserted callsign, no receive.
2. Beacon operation with automatic recording of "incoming" calls; in this mode the equipment will transmit a CQ call in F2 (morse) followed by a 1min reception period. Replies to the spacecraft must use F3E (ie fm).
3. Two-way voice operation using F3E.

Those wishing to contact the spacecraft will need to have fm capability on both 144 and 430MHz. The equipment on board the shuttle will have four transmit and six receive channels and they will be paired as follows:

Ch	Transmit	Receive	Ch	Transmit	Receive
0	145·450	437·125	3	145·575	437·275
1	145·475	437·175	4	—	437·325
2	145·550	437·225	5	—	437·375

Channel 3 (145·575/437·275MHz) will be the one which is normally used. However, to quote the words of the press release from the German national society DARC, ". . . in case of strong pile-up the astronauts will change their receiving frequency without notice. In such cases ground stations will have to choose one out of six uplink frequencies with equal contact likelihood, and the pile-up for the astronauts, as a consequence, will be reduced by a factor of six."

DARC has said that amateur activity is expected to start on Day 3 of the mission and that about five days of operation should take place. As we went to press it was understood that DARC would broadcast daily news bulletins concerning the mission on 3·5, 14 and 144MHz but no frequencies were available. More details will be given on GB2RS and the Headline News Service as they become available, and there will be special GB2RS broadcasts from RSGB HQ during the mission at 1200 and 1900gmt on the usual 3·5, 7 and 144MHz frequencies.

A note from Pat Gowen, G3IOR, who is AMSAT's European co-ordinator, reminds us that most sets of Keplerian elements for artificial earth satellites, of the type which were broadcast during the *Challenger* mission for the benefit of those with the appropriate software to convert them to information on "passes", contain data for drag in one form or another. This allows the long-term observer to compute the effects of friction on the period and increment of the spacecraft. This is an insignificant factor for high-orbit satellites (ie greater than about 1,500km altitude) but it is important for low orbiting bodies such as Uosat or the Iskra satellites. The orbit of these craft decays quite rapidly because of the effects of the solar wind and the outer layers of the earth's atmosphere, and the process is cumulative; the satellite's "pass" becomes earlier on each orbit. However, the drag factor is normally not valid for manned missions such as Salyut and the space shuttle even though their orbit is low. The normal procedure for manned spacecraft is that the orbit is maintained by means of a "burn" when required so that it remains reliable for observation purposes, and the duration of manned missions is usually relatively short. For both these reasons it is better to ignore the quoted "drag factor" or "decay" since it is likely to be a source of error in the calculations relating to manned missions.

Region 13 representative

Mr Andrew Givens, GM3YOR, has given notice of resignation as Region 13 representative at the end of 1985 because of work commitments. An election will therefore be necessary to fill the vacancy.

Any five corporate members resident in Region 13 (Borders, Fife, Lothian) may nominate any other qualified corporate member resident in Region 13 for the office

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1330—1345 Opening address
1345—1455 "Testing and evaluation of commercial equipment on the amateur market", Angus McKenzie, G3OSS
1455—1605 "The planning and organization of a vhf dxpedition", David Johnson, G4DHF
1605—1715 "Experiences of equipment development for the 2·304, 3·456 and 5·760GHz bands", Charlie Suckling, G3WDG
1715—1900 VHF forum

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All correspondence to G3UBX, 18 Langley Road, Merry Hill, Wolverhampton WV3 7LH

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 25 October 1985. 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 December 1985 issue of *Radio Communication.*

RAE news

The next Radio Amateur's Examinations will be held on Monday 2 December 1985 and Monday 12 May 1986. The March examination has now been discontinued by City & Guilds.

RAE centres must make applications on behalf of their candidates to City & Guilds before 25 October and 14 March respectively. Prospective candidates should apply to centres at least three or four weeks before those dates to ensure that they have a place. A full list of centres where the examination may be taken is available from the membership services department at RSGB headquarters on receipt of a large sae.

The Society will be running two centres for the December examination, in London and Derby. Applications to sit the examination at these centres must be made on forms available from the membership services department and must arrive at headquarters no later than Tuesday 15 October. The fee will be £33 for taking both parts, or £25 if only one part is taken.

In the past many candidates have taken the RAE at an RSGB centre, but in recent years the numbers have sharply declined. The Society runs these centres on a non-profit basis, and because of overheads such as the hire of halls and desks the examination fees have had to be increased. For the relatively few candidates that now take the examination at an RSGB centre, the cost is disproportionate. Because of this, unless there is a noticeable increase in the numbers of candidates taking the examination at an RSGB centre in December 1985, the Society will not provide centres for the May 1986 or subsequent examinations. There are now many centres at which the RAE can be taken, and it is felt that the Society can better use its resources in other areas.

New Zealand President visits RSGB headquarters

The new president of NZART, Terry Carrell, ZL3QL, paid a short visit to headquarters during August. Mr Carrell is an airline pilot by profession, flying the Boeing 737, and has been president since June this year. He gave an outline of amateur radio in New Zealand, and there was a useful interchange of views between himself and headquarters staff.

Raynet zonal representation

Due to the resignation of Susan Jebb, G6AJF, there is a vacancy for a representative in Raynet Zone 1, which comprises the counties of Cleveland, Co Durham, Northumberland and Tyne & Wear. Raynet members resident in Zone 1 may forward nominations for the post to "The Secretary (Raynet)" at RSGB headquarters. Nominations should be supported by five Raynet members who are currently resident within the zone, and they must be received no later than 5·15pm on 31 October 1985. They should be accompanied by a declaration that the nominee is: (*a*) normally resident within the zone; (*b*) is a currently registered Raynet member; (*c*) is a member of RSGB; and (*d*) is willing to serve if elected.

The period of appointment is normally three years. Where more than one valid nomination is received by the due date, an election will be held during the month of January 1986.

"Council Proceedings"

In the brief report on the Council meeting of 4 May 1985, the heading "Raynet Ltd" was used. This should have been "RSGB Raynet Ltd", which is a company registered in the names of RSGB officers. Raynet Ltd is privately registered in the names of Mr T I Lundegard, G3GJW, and Mr L Crane, G3PED.

Trophy news

Milne Trophy. It is regretted that in recent years there has been confusion over the terms of reference of the above Society award, resulting in its incorrect allocation for 1982 and 1983. For the record the Milne Trophy, which is awarded to the leading UK station other than a G in the ARRL DX Contest, was won by the following:
1982—J T A Johnson, GM3LYY;
1983—Guernsey ARS, GU3HFN (operator GU3MBS);
1984—Guernsey ARS, GU3HFN (operator GU3MBS).

Apologies are extended to those who failed to receive due credit and to those who were incorrectly given the trophy in 1982 and 1983.

Braaten Trophy. This is awarded annually to the leading G station in the cw section of the ARRL DX Contest. The 1984 winner was S V Knowles, G3UFY.

QSL Bureau news

Sub-managers for G0EAA-G0HZZ callsigns have now been appointed as follows:
G0EAA-EZZ: Mr P Barry, G8OPA, 32 Rutland Avenue, Sidcup, Kent DA15 9DZ.
G0FAA-FZZ: Mrs M Burchmore, G0ARQ, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
G0GAA-GZZ: Mr N P Roberts, G4KZZ, 79 Mellowdew Road, Coventry CV2 5GP.
G0HAA-HZZ: Mr J T Macroe, G4DXI, Park House, 1 Highsted Road, Sittingbourne, Kent ME10 4PS.

A new Christmas rally

The St Albans (Verulam) Christmas Rally to be held on 1 December is intended to fill a gap in the rally calendar and at the same time a geographical need. St Albans, sandwiched between the A1 and M1 and virtually on the M25, is only 20min by train from St Pancras.

The venue is the City Hall, St Albans, and the doors open at 11am. All the usual dealers will be there, plus the traditional attractions—large raffle, bring-and-buy, components stands, free parking, catering all day, bar extension and talk-in on 144 and 430MHz. Entrance 50p.

The rally is being organized by Gore Management Services and the Verulam ARC. Enquiries to Hilary, G4JKS, on St Albans 59318.

Sideband

BYLARA's address is PO Box 49, Colchester CO4 3SF—we hear that some members thought it was still based in Cheltenham. Chairman/editor of BYLARA is Angelika Voss, G0CCI.

Future Events

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

6 October
Welsh Amateur Radio Convention. Details in September issue.
12 October
RSGB Midlands VHF Convention, Madeley Court Centre, Telford, Shropshire. (Please note changed venue).
13 October
Second Yeovil QRP Convention. Details G4JBH, tel 0935 23873.
20 October
ELHOEX 85, the Hornsea ARC exhibition and demonstration of amateur radio, computers and electronics. Floral Hall, Hornsea, North Humberside. 11am to 5pm. Admission 30p. Traders, club stands etc. Cafeteria and bar. Talk-in on S22. Details G4IGY, QTHR, tel 04012 3331.
25-26 October
Leicester Amateur Radio Show, Granby Halls, Leicester. Facilities to take cw test at exhibition. Details G4PDZ, tel Leicester 553293.
7 December
RSGB AGM, IEE, Savoy Place, London.
16 March 1986
Pontefract & DARS Components Fair, 11am-4.30pm, Carleton Community Centre, Pontefract, mid-way between Pontefract and Darrington on the A1.
16 March 1986
RSGB National VHF Convention, Sandown Racecourse.

RAE Courses 1985-6

(see also *Rad Com* August p610 and September p685)

The following courses have already started, but it may still be possible to join them.

Basildon. Basildon College of Further Education, Nèthermayne, Basildon. Commenced third week in September. Details from S A McCarlie, G4LJL, at the college, tel Basildon 289281.
Bristol. Brunel Technical College, Ashley Down Rd, Bristol BS7 9BU. Mondays, radio amateur theory; Thursdays, radio amateur practical. Commenced 23, 25 September. Details from Dept of Aerospace and Radio-communications, tel 0270 4142, ext 64.
Congleton. Heathfield High School. Thursdays 7pm. Commenced end September. Details Tony Squires, G4DWW. Tel 0260 276634.
Fareham. Adult Education Centre, Wickham Rd, PO16 7DA. Fridays, 7-9pm. Commenced 27 September. Details from centre, tel 280709 or course tutor G3CCB, tel 288139.
Guildford. Guildford County College of Technology, Stoke Park, Guildford, Surrey GU1 1EZ. Commenced 16 September. Details B Purse, tel Guildford 31251, 9am-5pm.
Halifax. Adult Education Centre, Holmfield High School, Holdsworth Rd, Holmfield, Halifax. 32 sessions. Details Revd H Makin, G3FDC, tel Halifax 244642.
Heckmondwike. Heckmondwike Grammar School. RAE, 7-9pm commenced 16 September. Radio Amateur Workshop, 7-9pm, commenced 19 September. Details from course tutor, F Stork, G3TEE, 75 Waterloo Lane, Bramley, Leeds LS13 2JE.
London. Paddington College, Dept of Engineering Technology, 25 Paddington Green, London W2 1NB. Course pitched at beginners. Usage of all facilities in Electrical Engineering dept. Commenced 24 September. Details David Peace, G4KKM, tel 01-402 6221 ext 54.
Loughborough. Loughborough Technical College, Dept of Electrical Engineering and Computing, Radmore, Loughborough, Leics LE11 3BT. Tuesdays, 7-9pm. Commenced 10 September. Course fee, £15.90. Contact the college, tel 0509 215831.
Merseyside. Knowsley Central Tertiary College, Rupert Rd, Roby, Merseyside L36 9TD. Tuesday evenings. Commenced 17 September. Details from Alan Ponsford, BRS52062, at the college, tel 051-480 6161 ext 141.
Weston-Super-Mare. Weston-Super-Mare Technical College, Room 613. Tuesdays 7-9pm. Commenced 10 September. Details Brian Harris, G3XGY, tel 0934 514674.

MORSE CLASSES
Aldridge. Aldridge School, Tynnings Lane, Aldridge, W Midlands. Mondays 7-9pm. Commenced 23 September. Details E Winter, tel 0922 53032.
Bangor. Gwynedd Technical College, Ffreddoedd Road, Bangor, N Wales. Commenced 1 October. Details Chris Barnes, GW4BQD, tel 0248 361315; or from the college registrar, tel 0248 364186.
Bristol. Brunel Technical College, Ashley Down Rd, Bristol BS7 9BU. Tuesday evenings. Commenced 24 September. Further details from Dept of Aerospace and Radio-communications, tel 0270 4142 ext 64.
Loughborough. Loughborough Technical College, Dept of Electrical Engineering and Computing, Radmoor, Loughborough, Leics LE11 3BT. Tuesdays 6-7pm. Commenced 10 September. Course fee, £7.30. Details from the college, tel 0509 215831.

OBITUARIES

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

Mr R M Attfield, G3UMJ
Roy Attfield died on 17 July aged 63. First licensed in the mid 'sixties, he was an RSGB member for over 20 years, and a founder member and trustee of the Northumbria RC. A dx operator of no mean ability, his modesty prevented him claiming the many awards for which he had qualified.

Mr C J Beckinsall, G3DHS
Jim Beckinsall died in July aged 85. An honorary life member of Gloucester ARS, he had served earlier as treasurer for 10 years. He was well known for his 3·5MHz a.m. operation on morning nets.

Mr J W Booth, ISM, G2AJB
Jack Booth, who died on 9 August 1985 aged 72, was licensed in 1939, when he joined the RSGB, and active on cw only from then until June 1985. He was also a member of the ARRL, and a founder member of the Grimsby ARS. He was a keen contest operator, and he achieved DXCC many years ago with all-homebrew equipment. Jack rose from Post Office telegram boy to assistant superintendent; he retired in 1972 and was awarded the Imperial Service Medal. He served in the Royal Corps of Signals from 1940 to 1945.

Mr A Burnell, G4PRE
Alan Burnell died on 19 June. A member of the Pontefract & DARS, he was a most willing and dependable worker who was always ready to tackle any job.

Mr E Dean, G4ZFH
"Dixie" Dean died in April. Although only recently licensed he had derived much enjoyment from the hobby and was already a highly proficient cw operator who had helped several other local amateurs to obtain their Class A licences.

Mr R Ferguson, OBE, G4VF
Ronald Ferguson, who died on 28 July aged 91, was a grand old man of radio whose distinguished career covered the years 1909-70. In 1914 he was chief wireless operator of the liner *Empress of Ireland* when it sank in 14 minutes after a collision in fog in the St Lawrence River, and he sent out distress signals until the ship heeled over and the power failed. More than 1,000 of the 1,477 people on board perished in the icy waters, but his action undoubtedly saved many lives.

During the first world war he recruited and trained wireless operators for artillery spotting with the Royal Flying Corps and, later, the US Flying Corps. After the war he joined the Radio Communication Company and became general manager. The RCC was one of the six companies which established the BBC, and he was closely involved in the early development of broadcasting. In 1927 he returned to marine radio and became joint general manager of the Marconi Marine Company in Chelmsford.

In 1934 he was seconded to Cairo to run Egyptian State Broadcasting, and he remained in charge there until the end of the second world war. For his services he received the OBE and Egypt's Order of the Nile.

After the war he returned to Marconi Marine, became general manager in 1947, managing director in 1959, and continued as a director for six years after his retirement in 1967.

In his early years in Chelmsford he was an active member of the local amateur radio club and an enthusiastic field day operator. He was a member of the RSGB for many years, and in 1980 he attended the Society's agm to present the 1981 Marconi Medal to G3WDG.

Mr B Foster, G6LMT
Brian Foster died on 18 January. He first encouraged his son Guy, G6CUN, to become licensed and then obtained his own licence. A member of Cheltenham ARA, he was often heard on 145MHz around the Cotswolds.

Mr F B Jones, G2AKQ
Freddy Jones died on 15 July. A long-time member of the RSGB, G2 Aces, Kings and Queens was well known on the dx bands in previous years. He gave up active transmission five years ago, having "worked" every country in the world.

Mr E D Power, G3ASC
Ernie Power died on 29 July aged 80. A respected member of Oswestry Radio Club, he had been constantly active on all bands since 1946 and made the first QSO at the start of the Rotary Net in 1966.

Mr G Thomas, BA, G3OGT
Graham Thomas of "Le Court", Cheshire Foundation, Liss, Hants, died on 1 July, aged 47. He was a long-standing member of RAIBC and a trustee of the Cheshire Foundation, and held the Mullard Award for courage and fortitude displayed by a radio amateur during 1962. Against all odds, Graham achieved much!

Mr J Walker, G1EJN
John Walker died on 20 June. While only newly licensed, he was very active on 144MHz and made regular contact with many local amateurs.

Mr J Wherton, G4YFM
John Wherton died in June aged 57. He had a long career in the army, and took service standards into amateur radio. He was a member of the RSGB for many years.

Mr K P B Wood, G3SME
Ken Wood died on 11 June aged 57 years. He became licensed in 1963 and was an active member in the early years of Bedford ARC. He enjoyed working contests, and in 1969 was the England winner of the CQ Worldwide Sideband DX Contest for 21MHz, single operator.

Also:
Mr J M Anderson, RS86450, on 30 May
Mr W V Champion, G8CY
Mr F T Etheridge, RS45203, on 4 June
Mr N Filek, RS48422
Mr A C Finlay, G6LKO
Mr E S G Fish, GM2HCZ, on 10 July
Mr E Gadsden, G2BHZ
Mr E J M Gibbons, RS51970, on 6 June
Mr J F Gomer, G3BUE, on 7 August
Mr A Harvey, G4WTQ, on 4 January
Mr G Hill, G2BQZ
Mr L Hukins, G3ZPH, on 13 July
Mr G A L Johnson, G6DZE
Mr V B Knowles, G4KQN
Mr S Lambert, G4MNU
Mr S C Lowndes, G6JSX, on 24 December 1984
Dr B Malins, G4WFD
Mr K J Marshall, RS19432, on 29 June
Mr P Powell, RS84669
Mr A D Rock, G8PR, on 9 July
Mr A K Sadler, RS20721
Mr R V Salmon, RS48546, on 28 June
Miss W Shelley, RS25254
Mr H Smith, G3WU
Mr K Stead, G3AYQ, on 24 June
Mr W R Watson, G3BMT
Mr D L Wightman, G3SOV, on 16 June

Mr R Butcher, ex GC3FSN We apologise for a typographical error in the callsign of the late GC3FSN last month.

Members' Mailbag

QSL CARDS

Sir—Regarding Mr M Ruddocks', G6WZR, letter "Howzat for speed", *Rad Com* June, we have a better one, "Concorde by speed"; we worked Japan on 20 May 1985 and received the QSL cards through the QSL Bureau on the 10 June. Can anybody do better than that? Thanks to the bureau for another fantastic door-to-door QSL in 22 days only.

Mrs D Johns, GW4XES
Mr W D Johns, GW4TOU
Mr J A Johns, GW4ZBU

The QSL Bureau is a very good service which is appreciated by many members. However, most cards which come via the bureau take a good deal longer than the examples in the above letter! This is an intrinsic feature of any bureau operation and, especially where certain countries are concerned, one may have to wait some considerable time to receive cards in this way.

Sir—Having held a G6 callsign for nearly a year and eventually obtaining a G4 callsign, I became interested in exchanging QSL cards. Having had cards printed and envelopes sent to the appropriate sub-manager, I was slightly upset to say the least when five of the six cards sent to me were not contacts in my log. It seems pirates are not a figment of the imagination.

I take this opportunity to apologise to any amateurs and swls who may be awaiting QSL cards from me. I would also like to say a big thank you to all those involved in the running of the QSL Bureau.

Dave Gully, G4YOC

LET OSCAR THROUGH

Sir—I've been listening with great delight to 28MHz fm during band openings and it is great to hear the large number using converted-cb sets etc—long live the amateur spirit and homebrewing. However, when working the Oscars, ie. RS series, there is nothing worse than a big fat 59 fm signal wobbling across your downlink. Satellite signals are difficult enough to copy as it is with downlink QRM QRN etc on the passband. Most of the "offenders" are European stations, but they do work into G-land. Hence there are numerous replies and QSOs with G stations on the satellite downlink frequency (29·4-29·5MHz).

Gentlemen fmers: **please keep out of the segment** 29·4-29·5MHz.

Once there is a band opening and an fm signal looms up in that segment, skip propagation causes it to interfere over a large geographical area, not just locally! Just because you cannot hear the 29MHz satellite beacons does not mean that the satellite downlink signals will not be interferred with; the 28MHz skip covers an enormous area beyond line of sight because of ionospheric reflection, and the satellite is not able to use the ionospheric reflection phenomena as it is above it. Hence you will not hear it below the horizon (normally) but you will hear terrestrial stations below your horizon on 28MHz when the band opens.

I'm sure a lot of these folk who line up on these frequencies do not operate the satellites, they know they are somewhere in the 28MHz band so mistakenly call or QSO on the downlink band segment. I hope this letter makes things a little "clearer" for all concerned.

Mike Pinfold, G0-ZL1BTB

VHF NET

I wonder if some kind vhf enthusiastic member can help me with the definition of a net. I was always under the impression that it was a number of transmitters working as a group on one frequency and so only taking up the space occupied by one transmitter, and that usually anyone drifting off frequency was asked to come back to the net frequency.

The Ex-G Club is currently trying to operate its net on 14,346kHz at around 1130gmt, but we are having a lot of trouble with stations calling CQ VHF Net—as we can hear them they presumably should be able to hear us—and at the same time other stations are calling CQ VHF Net on many frequencies between 14,330 and 14,350kHz. Surely they would be able to make many more contacts if they had a fixed frequency on which to work and cause a lot less interference. Will European magazines please copy.

F W Fletcher, G2FUX

Traditionally the VHF Net meets somewhere around 14,345kHz. Any comments from vhf dx chasers?

THANKS TO ALL CONCERNED

Sir—I feel impelled to put pen to paper, through elation at yesterday's attempt and success at the morse test. My rapid path to success was certainly due to the Class B morse experiment, the variation for individual Class B Licensees, and of course my ability to stick at the task.

However, I originally started learning the code in February this year using a morse tutor, and then from 1 April with the help of a local G4 maintained steady progress using the variation. I used the all-mode section on 430MHz, while two other local amateur friends used the same on 144MHz. My point is that we used the section we were advised to use, we followed the guidelines laid out, annoyed no one and passed the test quickly.

Without this variation negotiated by the RSGB with the DTI, we would not have had the same opportunity or, indeed, the same incentive to get on with the morse code. I, and I know my amateur friends are, extremely grateful to the RSGB for their efforts in securing the variation on our behalf.

I hope the parties concerned will indeed allow this variation to continue beyond its expiry date, as I believe it is a marvellous aid to those who live in rural areas. Many thanks also to the A licensees who have given up hours of their time teaching us.

R J J Tyler, G6LJN

This letter is typical of several which have said virtually the same thing. The experiment seems to be working well, and the Society hopes that it will be continued.

GV4SUN

Sir—In response to interest generated from the operation of the VE-Day celebration station GV4SUN on the site of RAF Castle Archdale, our club members along with W/O Bill Parker Canadian AF, Lough Erne Aviation Museum and Castle Archdale Country Park Museum are interested to learn of any stories, photographs, equipment and personnel of that time associated with "Archdale", "Killadeas" or "St Angelo", either service or civilian. Interest has been expressed in the radio ham population of Co Fermanagh before the 'sixties; a chemist named Taylor of Town Hall Street, Enniskillen, is talked of but present location not known.

Enquiries or information to

Cliff Corderoy, GI4CZW
9 Tarmon Brae,
Enniskillen,
Co Fermanagh, N Ireland.

SPECIAL PREFIXES

Sir—The ITU allocations for prefixes enables the country of origin of a station's callsign to be identified. I am disappointed to find some national radio societies (RSGB included) encouraging the use of various prefixes within their ITU allocations to meet the whims of some of their members for one reason or another. Consequently one will find the GV prefix in use to commemorate VE day, OT to celebrate 150th anniversary of the Belgian railways and VI to celebrate 150 years of the state of Victoria. None of these events are remotely connected with radio or the amateur radio service, so why a special prefix?

ITU prefixes are used for civil aviation, marine and radio station identification by the licensing bodies of a country. Consequently anyone who comes across a P2 prefix is able to tell the station originates in Papua New Guinea; viz P2M is Port Moresby coast radio station, P242DW is an hf radiotelephone subscriber in area code 42, P2ANE is an Air Niugini F28 aeroplane, and P29RAE is an amateur radio repeater (Mount Albert Edward, 13, 080ft).

All very logical, let's keep it that way.

R E Parkes, P29PR ex G3REP, VS5RP

BBC MICRO

Sir—Unlike GI4CZO (*Rad Com* July) I am not a computer engineer, so I bow to his greater knowledge and withdraw my remarks about the memory (or lack of it) on his BBC micro. However, I do know that my CPC464 came with 64k, monitor and cassette unit with a good printer thrown in for just over half the price of a working BBC system. Off the shelf the BBC is of little use until it has been equipped with a monitor and cassette unit which takes it to about £570.

Having said that, the BBC is a superb machine in many ways but is not usable off the shelf. Hence I stand by my remark that it does not represent value for money.

My greyline program now works perfectly—Amstrad users should ensure that the instruction 'RAD' appears at the start of the program to ensure that angular calculations are carried out in radians. I have available a fast QSO-checker which uses very little memory and is at least as fast as the BBC. Anyone wanting a printout need only ask or send a tape for a copy.

J M Dunnett, G4RGA

ROCKALL OPERATION

Sir—I am aggrieved and very angry, and I suspect many of our Society members are too, by the clearly boastful item (*RSGB News Bulletin*, July) on the Society's action taken against the modern adventurer Tom McLean. I find this attitude extremely petty, churlish and in my view very bad taste by the apparent attempt to gain capital from the irregular usage of our hobby by this hero of our time. In my opinion "sneaking to mummy" (authority) that someone is playing with our toys without permission is, again in my view, contemptible and contrary to the dignity one would expect from the RSGB.

I cannot of course condone Tom McLean's misuse of the amateur frequencies, but I would have thought that the matter could have been resolved between all parties concerned in a diplomatic manner rather than by what is clearly evident from the item—prosecution. To me, and possibly many others, the Society has taken to task an easy "target", presumably to justify itself to the membership that it is doing a great job. I for one do not accept this pillory of a very able and brave man as anything of value, and no doubt there will be others sharing my view. It is so easy to sit in armchair comfort and have a holier than thou attitude to this irregularity, but I feel certain that Tom McLean did not wilfully misuse the amateur frequencies but rather used them through lack of knowledge of their conditions of use, possibly by default by his sponsors. He did at least get up off his backside and do something for the UK, albeit at the same time causing upset to the high and mighty RSGB. One could ask: "Who has not unwilfully sinned at some time or other due to ignorance?"

What I think the Society should be doing, is showing clear evidence that something positive is being done to aspects of real major concern to amateurs, such as to the not-so-easy "targets", ie interlopers in our primary bands, jammers and bad language on vhf, removal of the cbers from 28MHz etc. That is where, in my view, the vast financial resources of the RSGB could be spent, which would surely be the worthwhile activity agreeable to all members instead of this wholly demeaning attack on Tom McLean.

I am still angry, I do assure you.

I wish now to turn to the letter by G3XWH

(*Rad Com* July). No doubt he has now gained the answer to the high pass rate for those now-questionably-called "radio amateurs" (*sic*); I do not pretend to be a scholar, but it was certainly necessary at the time I sat the RAE to be able to read, write and express oneself. If this was beyond you, you failed. However, it is now apparent that the CGLI regards the present-day applicants for the RAE as illiterate, in that they are unable to cope with the strain (?) of reading, writing and expression. Therefore the RAE has had to be reduced to the mental level of a 10-year-old child, and it is well known that the children of today are suffering from mis(missed)-education leading to their inability to be able to be anything else than muddled, unable to spell, barely able to write and certainly lack expression.

Surely it is now time, therefore, to do away with the RAE and the morse test (now believed to be a farce in some areas) and issue licences as cbers, and thereby finish off the argument once and for all that the RAE is not what it was, or what it should be. While the older amateurs would find their valued hobby in a state of disarray, the new members would not probably notice anything different from their days as cbers (not all new members would of course be ex-cb). The Chancellor and the business fraternity would be delighted with the proposal and would laugh all the way to the bank. Who knows, even the RSGB might get a spin-off by a huge increase in membership. Somehow I doubt it.

Anyhow, these are my views of what is apparently occurring now as a direct result of the standards set by whomsoever has the authority to do so. I would suggest there are many who also share my view.

To conclude, I note the news item "Interception of Communications Bill" (*Rad Com* July) and would pose the question; does the Society condone the opportunity to intercept communications from other than amateur sources? If not, and I would presume that to be so, why does it cater for the advertising of scanning devices covering other than amateur frequencies? Surely this is an invitation condoned by the RSGB to commit an offence against the laws of the land. If so, I want no part of it and would ask you to refuse any advert which could lend itself to law breaking. If you continue to publish adverts of that nature then it must follow that you are reported to the appropriate authority.

This letter has been written in the spirit of continuing the hobby of amateur radio to its best level and no doubt you will do me the honour of publishing the contents and, in so doing, allow the members to judge my views and opinions.

W F Hunter, GM3HUN

The first section of this letter raises several points. First, to cite ability and bravery in certain spheres as though they somehow excused an individual breaching the law in other areas is bad logic and dangerous moral philosophy. Whatever masculine virtues Mr McLean may or may not have displayed during his tenure of Rockall are quite irrelevant to the legislation relating to wireless telegraphy. Operation in amateur bands without a licence and under an assumed callsign is simple piracy —just like that of the "interlopers in our primary bands" mentioned by Mr Hunter in his third paragraph. Mr McLean was an "interloper" in at least two "primary bands". In simple terms, no unlicensed operation except in dire emergency can be condoned, however noble the unlicensed operator's motives.

What is worse is that Mr McLean's operations were given wide publicity by Independent Television News, which consistently gave the impression that his operations were not only legal but that Mr McLean was in some way setting a shining example of what amateur radio can do. Ironically, it is the Society's understanding that the DTI gives serious consideration to applications from adventurers such as Mr McLean for temporary facilities for communications. No doubt Mr McLean's case would have been given such consideration if he had asked, but he did not—neither for his foray on Rockall, nor for a previous adventure in crossing the Atlantic single-handed during which he also operated illegally in the amateur bands (which, incidentally, demolishes the plea of "unlawful sinning due to ignorance"). For various reasons the Society, at any rate, is not at all convinced that Mr McLean was ignorant of the fact that his amateur radio operation was wholly illicit. Given that he did not apply for such permission, he becomes a simple pirate, whose piracy received a good deal of publicity and which therefore demanded some action on the part of the RSGB.

If the law of the land is seen to be "waived" on the dubious grounds that someone's actions have raised them to the status of a media folk hero, the less knowledgeable may incorrectly assume that it is in order for them to break the law too. No-one in their senses would deny that, had Mr McLean run into some kind of emergency situation he would and should have used any radio on any frequency which was available to him—especially in amateur bands, where there are always many vigilant listeners. But use of the amateur bands on a casual and unlicensed basis is simply unacceptable to the Society, especially when done in such a public and superficially acceptable manner. Spectrum abuse remains spectrum abuse, whether the abuser is a brave adventurer or a bored child, and both remain a serious concern of the Society.

We would be interested in members' comments on these points, and the others raised in Mr Hunter's letter.

Sir—May I through your magazine express my thanks to the members of the Chester & DARS and other members of the RSGB in the Chester area for all their sterling work for our Scout group, the 25th Chester (Oldfield) Scouts. I cannot praise them enough. They have organized two JOTA stations for us, and recently the special event station GB4CSB at Eaton Park, Chester. This event clashed with the National VHF Contest, but they decided to do both from the camp site at Eaton Park so that the boys would not be disappointed. This might have been considered a disadvantage in the contest as more fruitful sites could have been used. Nevertheless they kept their promise, and the camp and the special event station were a great success.

I know there are people who might say that radio clubs and societies are just to do with radio, but I don't think they realize what good they do—not only for others but for the image of their hobby which is greatly enhanced. In a hobby where people could be accused of being loners, these men of all ages and abilities have given up a lot of their own time and energy to our movement and sparked many an interest among the boys. I would like them to know that we do appreciate everything they do for us and the time they give. Last year they even came to our summer camp and set up a station. I hope they realize that they are making a very useful contribution to the training and awareness of the youth of today.

May they keep up their good work. We are grateful for their help.

A W Brighton, group Scout leader

MORE ON A.M. CONSPIRACY

Sir—I felt most grateful to G6ZC for his kind contribution to "Members Mailbag" (July) on the subject of the reality of amplitude modulation and the conspiracy of silence. It was fascinating to this old newcomer to know that others had thought on similar lines much earlier, but still within a lifetime! I had never heard (until *TT* June) of Dr Robinson's Stenode Radiostat receiver, and I am grateful to G3VA and G6ZC for the references. It does seem, however, unfortunate that the method disappeared like a flash (in the pan!) because it perceived monkey chatter. An element of the latter chatter is surely the product of transmitters' interactions which even the most selective receiver could not reject. What it seems was needed was the sending equivalent of the receiver—perhaps a Stenode Radiomit!

The question is, is the amplitude of the carrier altered during "amplitude modulation"? If it is, then on a slowed-down spectrum analyser (if we could have one), we would see the peak altering continuously from short to tall and back, and at rates corresponding to the varying modulating frequencies. If it is not altered, why not?

We know we can interrupt the carrier with a key so that it can go from zero to maximum and back at a couple of strokes. If the key were replaced by a suitable circular rheostat, then by turning the shaft round and round we could make the carrier increase and decrease in a simple harmonic way.

If, however, we now coupled the shaft to a motor going at, say, 300rpm (5Hz?) would we still see the analyser trace going up and down? At 50Hz it might be a bit of a blur, but would it still be going up and down? If not, why not? And if, while we go on increasing the rpm it stops going up and down, when does it and why? The questions do not disappear if the rotating rheostat is replaced by any amount of modulating frequencies.

If the carrier really varies in amplitude while being "amplitude modulated" then clearly there is information in the fluctuating carrier which can be recovered. Bandwidth is unimportant and can be reduced as necessary. Power in the sidebands can be recovered and returned to the carrier, if indeed they have to be generated in the first place.

It seems to me that all that lies between us and true amplitude modulation is the army of silent conspirators. Are there no deserters?

Gordon Lines, RS386997

Sorry, Gordon, there is no information in the carrier, only in the sidebands (ie carrier summed with sidebands equals envelope)—Ed

RAE

Sir—What a contrast between the excellent letter from G3XWH on the subject of the RAE and the stuffy reply from the CGLI. If this body examines half a million individuals each year and has a list of subjects 300 long then perhaps that in itself is a good reason to take a closer look at the problem. Bureaucracy feeds upon itself. Even if the CGLI does a good job for radio amateurs there should still be much more public evidence that they do so. This should include free availability of past RAE papers.

But why should the whole system be so monolithic? Why should we not have variety in the form of a whole series of qualifications which could be assessed, by some government appointed body (*cf* the General Medical Council), as suitable for the possessor to be entered on the register as a radio amateur? Why indeed the term "radio amateur"? The concern of authority is mainly to prevent entry to the airwaves by people who are incompetent to exercise the privilege without abuse (irrespective of what other official formulas may be used) or, if need be, to restrict such individuals to as small a part of the spectrum as possible.

Why should qualified professional radio operators (such as the editor of this esteemed journal) be denied access to the amateur bands except by permission of the City and Guilds of London Institute? If I were in that position I'd be damned if I'd take the RAE, it's an insult to accomplishment under those circumstances.

We simply need an official register of radio operators with their qualifying certificates endorsed for differing wavelengths, modes and functions according to the competence of the operator, professional or otherwise. The basic minimum should be Class B radio amateur licence examination. Any examining body should be encouraged to apply for its award to be registerable. In this way we can allow for a variety of accomplishment and function which the present bureaucracy cannot.

Anyway, apart from all that, thanks to G3XWH for his excellent letter, and I sign myself, somewhat in anticipation, as:

Stuart Kind, G4AYP
(Registered radio operator)

APPRECIATION!

Sir—Having gained my G0 licence early this year, I am now sending and receiving many QSL cards, and I feel I must thank the QSL Bureau officers for the time, diligence and help in sorting and sending these cards.

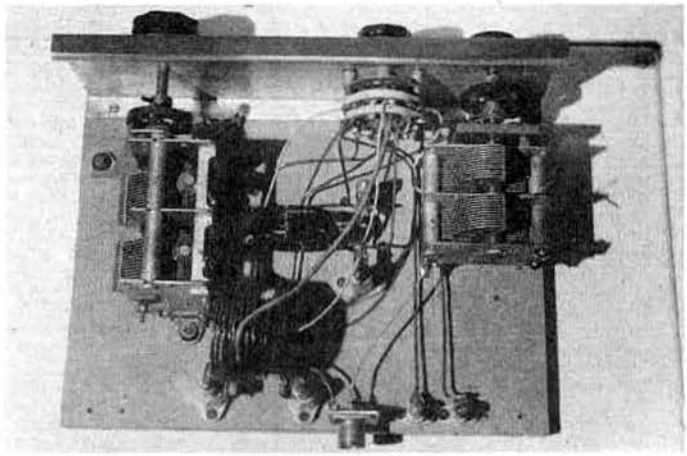
I am also very pleasantly surprised by the help and encouragement given to "new lads" by the "old hands"; it is much appreciated.

Thanks also go to *Radio Communication* for invaluable information and help.

F J Riley, G0AKX

AN IMPROVED Z-MATCH ASTU

Louis Varney, CEng, MIEE, AIL, G5RV*



Top view of the unit with cover removed

THE ORIGINAL multiband, switchless, pa tank circuit was described by King, W1CJL, in his article "No Turrets—Just Tune", *QST* March 1948, and subsequently covered by Rogers, G6YR, in "The design of tank circuits of constant Q", *RSGB Bulletin* April 1950. Leiner, W4NKQ, described a similar circuit in his article "All Band Tank Circuit" *CQ* magazine May 1949. In *QST* July 1954, Chambers, W1JEQ described in rather more detail the "Simple Fundamentals of a popular Six-Band Tank Circuit". In all of these articles, the circuit was intended for use as the tank circuit of a *valve* pa, the anode of which was connected in the usual way to the top or "hot" end of the multiband tuned circuit. We may assume that the generator, the pa valve, had an internal (source) impedance of several thousand ohms. Thus, coupling to the "top" end of the tank circuit via a, typically, 1,000pF fixed capacitor was reasonable.

However, in the description of "The Z-Match Antenna Coupler" by King, W1CJL, *QST* May 1955, and in all subsequent descriptions by others, the circuit is shown as being fed directly from a source which requires a 50Ω load via a 350pF variable coupling capacitor connected to the top (or "hot") end of a multiband parallel-tuned LC circuit. This arrangement has always seemed to me to be rather unsatisfactory, due to the great disparity between the required 50Ω load condition for the transmitter and the relatively high impedance of the multiband tuned circuit which, even when loaded via one or other of the two output coupling coils connected to a suitable antenna system, still presents a high impedance load to the feed source, see Fig 1(a).

Before proceeding further, an explanation of how the multiband tuned circuit of the Z-Match functions is in order. Examining Fig 1a we see that, for the 3·5, 7 and 10MHz bands, the main inductance, L1, is connected in parallel with the two sections of C1, which are also paralleled. The effect of the much smaller inductance, L2, can be considered as a rather long connecting lead between the top of C1a and the top of C1b, and since the inductance of L2 is very much less than that of L1, this assumption is valid for the relatively low frequencies of 3·5 and 7MHz. For these bands, therefore, L1, C1a plus C1b may be considered as a simple tuned circuit with one end earthed. Provided that the capacitance range of C1a plus C1b is sufficient, the circuit will also tune to 10MHz. It may be necessary to reduce the inductance of L1 by one or two turns to achieve resonance on that band. However, it should be noted that care must be taken to avoid the occurrence of harmonic resonance between the two circuits comprising the multiband tuned circuit and the values of the inductances L1 and L2 must be selected with this in mind. On the 14, 18, 21, 24 and 28MHz bands the active tuned circuit consists of the two variable capacitor sections C1a, C1b as a split-stator capacitor, with the moving vanes earthed, and L2 connected between the two sets of stator vanes. Because its inductance is much greater than that of L2, L1 may be considered as an hf choke coil connected in parallel with C1a and having no noticeable effect on the performance of the split-stator tuned circuit L2, C1a, C1b. This can be proved by first tuning this circuit to any band from 14 to 28MHz, noting the dial-reading of C1a, C1b and then disconnecting the top of L1 and retuning for resonance. It will be found that the effect of L1 is negligible. Fig 1b shows the effective 14 to 28MHz tuned circuit in a more conventional manner.

In practice, the relatively high impedance LC circuits L1, C1a and C1b (paralleled) for the 3·5, 7 and 10MHz bands and L2, C1a, C1b (as a split-stator capacitor) for the 14 to 28MHz bands must be detuned slightly off resonance at the particular frequency in use, so as to present an inductive reactance component. This, in conjunction with the coupling capacitor C2, functions as a series resonant input circuit which, when correctly tuned, presents a 50Ω non-reactive load to the transmitter output. Typically, C2 has the capacitive reactance values approximately as shown in Table 1.

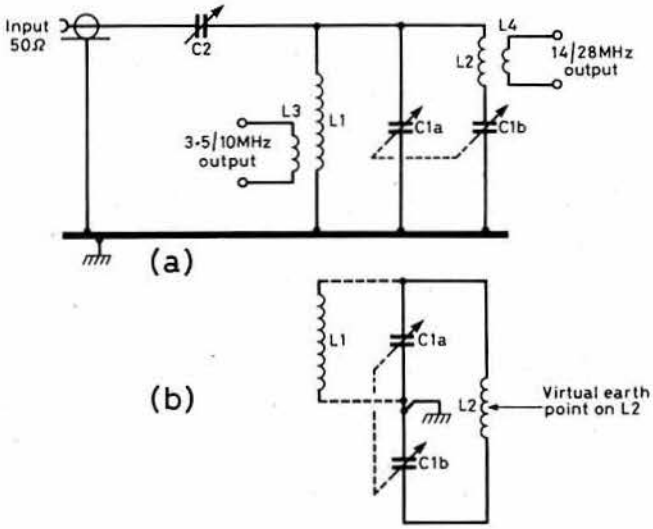


Fig 1. (a) The basic Z-match circuit. (b) The 14/28MHz tuned circuit shown in a more conventional form

Table 1. Capacitive reactance values of C2 for 3·5 to 28MHz, feeding to the top of L1 and L2.

Band (MHz)	C2 (pF)	XC2 (Ω)
3·5	40	1,200
7	30	700
14	50	220
21	30	250
28	35	160

Table 2. Optimum values of coupling capacitance C2 and equivalent XC2 (Ω) and input coupling taps on L1 and L2 for the range 3·5 to 28MHz (1)

Band (MHz)	L1 cplg tap (2)	L2 cplg tap (3)	Optimum C2 (pF)	XC2 (Ω)
3·5	4t	—	100	450
7	4t	—	70	320
14	—	1·5t	125	80
21	—	1·5t	50	150 (4)
28	—	1·5t	52	100

Notes.
(1) It was not possible to make measurements on the new WARC bands with the TS120S used for the tests.
(2) Turns from the earth end of L1.
(3) Turns from the *virtual* earth point on L2. (ie centre of coil).
(4) Not sure why this value is so high. Possibly due to some secondary resonance effect.

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Table 3. Test results of performance of standard and modified Z-match circuits compared with standard (G5RV) astu (1)

Frequency (kHz)	Type of astu	50Ω input tap	VSWR	I_{dc} amps input (4)	I_{rf} amps output (5)
3,560	Z-match standard	Top L1	1:1	10	0·28
	modified	4t (2)	1:1	10	0·30
	G5RV	5t link	1:1	10	0·45
7,050	Z-match standard	Top L1	1:1	10	0·92
	modified	4t (2)	1:1	10	1·00
	G5RV	5t link	1:1	10	1·10
14,175	Z-match standard	Top L2	1:1	10	0·24
	modified	1·5t (3)	1:1	10	0·25
	G5RV	3t link	1:1	10	0·28
21,225	Z-match standard	Top L2	1:1	10	0·10
	modified	1·5t (3)	1:1	10	0·15
	G5RV	3t link	1:1	10	0·20
28,000	Z-match standard	Top L2	1:1	10	0·45
	modified	1·5t (3)	1:1	10	0·46
	G5RV	2t link	1:1	10	0·50
28,500	Z-match standard	Top L2	2:1	10	0·56
	modified	1·5t (3)	1·5:1	10	0·65
	G5RV	2t link	1:1	10	0·77

Notes.
(1) As described in *Radio Communication* September 1980.
(2) From earth end of L1.
(3) From centre (virtual earth point) of L2.
(4) PA input current at 13·8V dc to TS-120S.
(5) RF current measured at station end of 84ft of 300Ω open-wire feeder to G5RV antenna.

It seemed to me that feeding the rf energy from the output of a transmitter requiring a 50Ω resistive load to the top of a parallel-tuned LC circuit cannot be the most efficient method. In order to test this theory, a modified form of Z-match circuit was constructed in which the input feedpoints to the LC circuits could be tapped down L1 and L2 to optimum positions on these inductances, see Fig 2. The test results are shown in Tables 2 and 3.

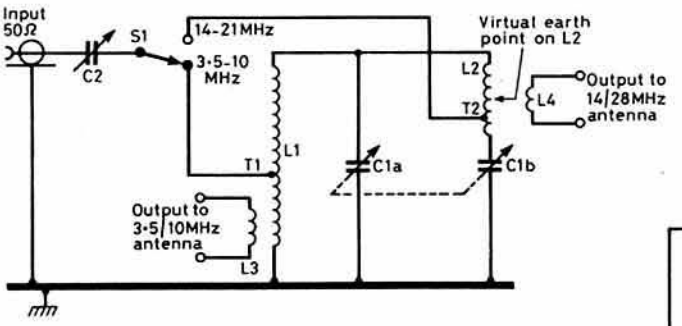


Fig 2. The basic modified Z-match circuit showing the tapped-down feed arrangement

Table 3 shows clearly the advantage of tapping down the input coupling connection on both L1 and L2 in the modified Z-match. On all bands this arrangement was more efficient than the standard form of Z-match. It will be noted that on all bands the efficiency of the G5RV astu was better than that of either form of Z-match, and that a 1:1 vswr was obtained with it right up to 28,500kHz, whereas at that frequency it was impossible to obtain a vswr better than 2:1 with the standard Z-match and 1·5:1 with the modified circuit. While the rf current amplitude differences *between bands* are due, mainly, to the differences in the reactive load conditions presented at the station end of the feeder on any particular band and therefore cannot be compared directly, it should be noted that differences in rf current between types of astu on a given frequency within a given band (for a constant input power) *can* be compared to give an indication of the relative power transfer efficiency. However, it should be noted that the rf *power* output is proportional to the *square* of the rf current. The marked advantage of the G5RV astu over both forms of Z-match on certain bands, notably 3·5 and 28MHz, is largely due to the use of plug-in or switched coils for each band so as to obtain the optimum LC ratio; careful selection of the optimum feeder tap positions, and the selection of optimum coupling conditions between the transmitter and astu by use of a swinging link coupling coil of optimum number of turns for the band in use.

By virtue of its design, the Z-match cannot satisfy all the required circuit conditions for *all* bands. However, in its original form it does provide the convenience of 3·5 to 28MHz coverage without the necessity for plug-in or switched coils. Nevertheless, the inclusion of the simple switching shown in Fig 3 is an undoubted advantage.

Neither form of Z-match would tune to the upper part of the 28 to 29·7MHz band. Unfortunately, the only split-stator variable capacitor available had a (measured) minimum capacitance per section of 20pF, which is rather high for this particular application. For fear of spoiling the performance on the 14 and 21MHz bands, it was not thought desirable to further reduce the inductance of L2, which had originally consisted of six turns but was reduced to five to enable it to be resonated up to 28·5MHz. The relatively low dc input power used during the tests (10A at 13·8V) was selected so as to ensure that the transmitter was not overloaded during the course of the rather lengthy test measurements. Normally, the dc input current to the TS-120S is set at 15A on cw for all bands except 28MHz, where it is advisable not to exceed 10A.

The final modified Z-match

The circuit, Fig 3, shows that switching for the appropriate coil coupling taps has been incorporated. Also, where an all-band antenna is used, switching of the feeder to the appropriate output coupling coil (L3 or L4) is achieved automatically, and for maximum output coupling efficiency on

(Continued on page 776)

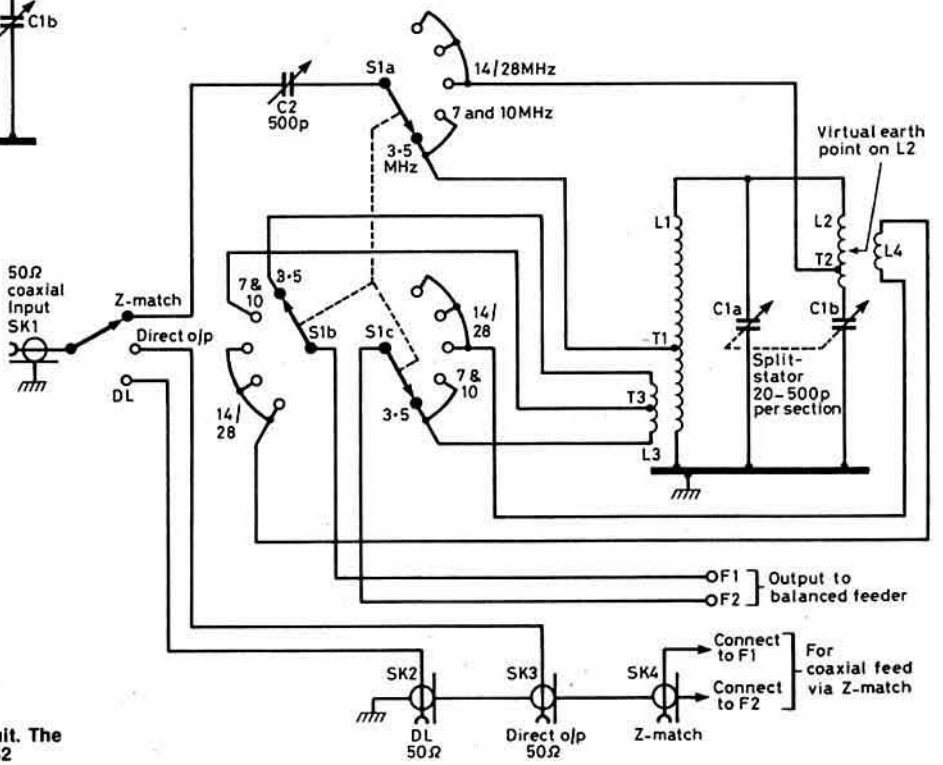
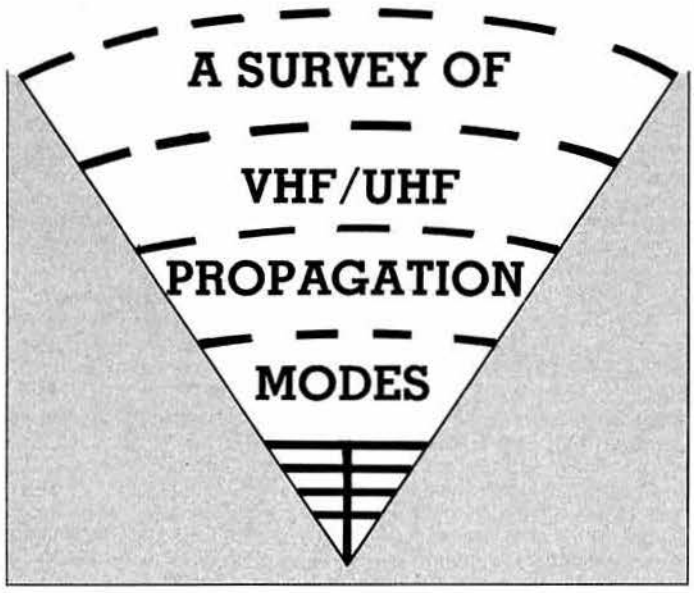


Fig 3. Final modified Z-match circuit. The switch adjustment to SK1 is S2



Quentin Campbell, G4OEU*

(Part 2)

Transequatorial scatter propagation (tep)

American amateur radio operators discovered in 1947 that when sunpsot activity was high they could communicate on the 50MHz band over long north-south paths across the magnetic equator. What made this surprising was that this frequency was well above the maximum usable frequency (muf) for the distances involved. Tests since 1947 have established the base of the F2 layer as the scattering centre for this mode.

TEP, also called Equatorial F-scatter propagation, is, in general, dependent on high solar flux, and appears to be most prevalent around the autumnal equinox. However, at frequencies below about 50MHz, tep can persist for long periods during the day over some paths even when sunspot activity is low. This daytime enhancement is probably related to the regions of high electron concentration that form along the magnetic equator during the afternoon and early evening [2].

The mode is used by amateurs mostly on 50MHz paths between North and South America, Africa and Europe and Australia and Japan. In a recent paper [11] the authors categorize this propagation as "F" or "afternoon" type tep, and distinguish it from "pure" or "evening" tep which is a form of F-scatter associated with a geophysical feature known as equatorial spread F. This latter form of tep, they believe, is responsible for propagating signals at frequencies as high as 144MHz over distances of up to 8,000km between Greece and Southern Africa. But there is an unwanted side to tep however; this is the occurrence of rapid flutter fading and "chopping up" of voice modulation during the 2 or 3 hours after sunset which can make voice communication channels that cross this equatorial sector virtually unusable.

Chaff and Needles

This is one of the two man-made scatter phenomena; the other is field aligned scatter (fas), which is dealt with next.

Needles are a special version of Chaff in which extremely thin dipoles could be spread in two 8,000km altitude belts, one polar and one equatorial, to give continuous, worldwide coverage which is immune to physical attack and direct jamming. Other advantages of this orbiting dipole communications technique are the high reliability which is inherent, since all the electronic equipment is on the ground, the frequencies are in the microwave region (1 to 10GHz) and both the nature of the dipole belt and the transmission methods to be used (high-bandwidth, spread spectrum as well as multiple independent circuits) provide a high degree of resistance to interference. Low antenna tracking rates and absence of satellite "handover" permit the simplification of ground and tracking systems [12].

This idea is based on the results of the "West Ford" project where, in 1963, about 20kg of copper in the form of some 480 million hair-like fibres, each 1·8cm long, were released by satellite to form a dipole belt around the earth with an average altitude of about 3,700km and a near polar orbit. Very soon afterwards, transcontinental orbital scatter communications were made with teleprinter, voice and high-speed digital data transmission using two 18m dishes operating at a frequency of about 8GHz. However, this experiment was deliberately designed to limit both the density and the lifetime of the belt, but provided much interesting data and confirmation of theoretical predictions which were of benefit to radio physicists and radio system designers alike. One particular contribution this project made was a concentration of effort into overcoming the problems of multipath effects. The problem is particularly acute in this form of scatter communications because the dipoles in the scattering volume result in a spread of propagation delays due to the spread of the dipoles in space and a spread of doppler shifts due to the spread of dipole velocities.

The "West Ford" experiment was not without its critics, particularly among the optical and radio astronomers. In 1960, the Royal Astronomical Society passed a resolution which viewed "West Ford" with the greatest concern. Many other national scientific bodies also expressed their unease about the project. The general feeling seemed to be that although most scientists could accept the estimates that this first belt would not prove harmful, they were fearful of future denser belts if the initial experiment proved successful. The whole issue came to a head at the 11th General Assembly of the International Astronomical Union, held in Berkeley in August 1961, where it was resolved to work with the "West Ford" project but to stress the danger of a long-lived dipole belt to astronomy [13, 14].

While Chaff is normally used to deceive enemy radar, it can also be used to provide a temporary scatter system of communications. A requirement of this nature could arise in military communications if the middle terminal of two troposcatter links in tandem were out of action. Chaff could be dropped in the common volume by plane or rocket, and the signals would then overpass this terminal up to a distance of perhaps 600km.

For use between mobile stations, a suggested system would use 1kW of power at 3GHz with 1m dishes. Then a rocket releasing a payload of 4kg of Chaff at 30,000ft could provide a single fm voice channel for about 1h while the two stations tracked the cloud of Chaff as it fell to about 7,000ft. A number of tests involving aircraft and missile dispensers have been carried out to validate these techniques [4, 15].

Field-aligned scatter propagation (fas)

Field-aligned scatter (fas), on the other hand, relies on increasing the electron temperature of the F-layer by turning on a heating transmitter.

Some 50 years ago it was suggested that the lower ionosphere could be heated by the use of a powerful transmitter operating at a frequency near the natural rotational frequency of electrons in the earth's magnetic field (often called the "gyro frequency" or "plasma frequency" and has a value of about 1·4MHz). However, there are too many practical difficulties to be able to experiment effectively at this frequency but, by making use of deviation absorption to cause heating, a much higher frequency can be used. This frequency ranges from about 0·5 to 1·0 of the maximum critical frequency of the ionosphere.

The first observed, deliberate, modification of the F-region was produced in April 1970 by the US Department of Commerce's, Platteville, Colorado, high-power transmitter facility. Since then many unexpected physical phenomena have been observed, and new understanding has been gained in this area of plasma physics because of the ability to carry out controlled modifications of the ionosphere. Of more immediate interest to us is that it has been shown that the modified ionospheric region acts as a significant radio scatterer to radio frequencies as high as uhf. It has also been shown that a usefully large scatterer in the ionosphere can be produced with powers as low as 200kW and simple dipole antennas.

From a communications point of view, the most important change that this causes is the formation of field aligned irregularities which consist of "filaments" of increased ionization aligned with the earth's magnetic field. Although such field-aligned scatterers can provide communications over ranges in excess of 2,000km, it is highly aspect-sensitive, so that communication via fas is limited to certain zones. The main operational difficulty is that of managing the frequency of the heater transmitter so as to maintain a continuous cloud of field-aligned scatterers at the altitude appropriate for the path geometry and prevailing ionospheric refraction conditions. A practical communications system would therefore need to use a judicious mixture of ionospheric predictions and soundings coupled with real-time computer control of the heating transmitter [16, 17, 18].

The Platteville facility is interesting in itself. It consists of two 10-element ring-arrays, one for the frequency range 2·7 to 3·5MHz, the other for 4·5 to 10MHz, along with a 1·9MW transmitter. This comprises 10 identical amplifier channels each putting out about 200kW which can be switched to an element of either antenna array. Each amplifier is tunable from 2·7 to

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25MHz, and tuning can be altered at a rate of about 600kHz/min while delivering almost full power. There is also a capability for reducing power in steps of 3dB down to −18dB of full power, and many different forms of modulation can be employed to suit different experimental conditions.

One aspect of the planning and construction of this facility demonstrates that both amateur and professional radio engineers have some unexpected problems in common and tackle them in a like manner. It seems that when the request for funding was submitted to Congress for approval, the designers were able to keep the estimate acceptably low by some judicious home-brewing and purchasing of surplus parts; the high-voltage power supply (3MW) was obtained from a surplus ballistic missile early warning system (bmews) transmitter, while the 5km of 50Ω coaxial transmission line needed was built in their own workshops from aluminium irrigation pipe with Teflon sleeves and spacers. They quote, with evident satisfaction, figures for the performance of a 366m length of this containing no less than 23 right-angle elbows which had a vswr of 1·07 over the frequency range 5 to 30MHz. A 30m length has an attenuation of only 0·02dB measured at 16MHz. These figures were only slightly higher than those for conventional 50Ω rigid copper line, while the power handling capacity was about the same [19].

The main use of Needles, Chaff and fas seem to be in military applications, where the latter two have the added advantage that they can be created at short notice.

Non-scatter modes of propagation at vhf

Most of the modes described here are too unstable and infrequent to provide regular communications. However, they include the modes encountered by amateurs during "lift" conditions, and thus an understanding of the underlying phenomena can help in their exploitation as well as explain why they cause such serious problems to non-amateur communications and to radar.

The irregularities giving rise to these modes includes:

(*a*) stratification of air masses in the troposphere giving rise to large changes in refractive index with height; and

(*b*) sporadic appearance of highly-ionized regions in the E-layer.

Also grouped under non-scatter modes, but able to provide more regular propagation, are:

(*a*) diffraction caused by sharply-edged ridges and mountains in the path of the radio wave; and

(*b*) signals reflected off the surface of the moon.

Super-refraction, ducting and reflection in the troposphere

One of the most important parameters in the influence of the troposphere on radio wave propagation is the large-scale variation of refractive-index with height. Variation in the horizontal direction is negligible by comparison. Such localized changes of refractive index with height cause reflection from elevated layers and ducting.

Changes in refractive index, n, of only a few parts in a million can have a significant effect on radio waves, and as values are so near to unity (typically 1·00035) it is usually more convenient to work in parts per million above unity, N; ie we subtract 1 from the refractive index value, n, and then multiply the difference by one million. In mathematical terms:

$$N = (n - 1) \times 10^6$$

which is, strictly speaking, the refractivity, but is more usually referred to as refractive index or N-units. Interested readers are referred to the RSGB's *VHF-UHF Manual* [20] for a more detailed discussion of radio refractive index and its measurement in air.

The degree of radio wave bending which results from refractive index changes can be assessed by calculating the decrease over unit distance. In practice, the measured median of the mean refractive index gradient in the first kilometre above ground in most temperate regions is about −40N-units/km. That is to say, in the UK there is a decrease in refractive index from the ground upwards of about 40 N-units in the first 1,000m of the atmosphere.

It is still possible to represent this refracted radio wave as straight-line propagation by a geometrical transformation to produce a model for which straight rays propagate above a "modified" earth of effective earth radius. When the refractive index gradient may be assumed to be constant over a considerable height interval, it can be shown that the effective earth radius is normally greater than the true earth radius. The ratio of the two is referred to as the effective earth radius factor, k. A mean refractive index gradient near the ground of about −40N-units/km gives a value of $k = 4/3$; ie effective earth radius is equal to the normal earth radius, a (a = 6,400km) multiplied by 4/3 which works out to be about 8,500km. For this reason it is common practice for radio system designers to use a 4/3 earth radius when drawing to scale the progress of rays (radio waves) from a transmitter. The special case when the ray curvature is the same as the earth curvature occurs when the refractive index gradient is equal to $1/a$; ie, this gradient is −157N-units/km. When the gradient is more negative than −157N-units/km the ray bending is towards the earth's surface.

By way of naming convention, if the ray is bent downwards less than the normal, it is said to be subrefracted (refractive index gradient is less negative than −40N-units/km). If the ray is bent downwards more than the normal, it is said to be superrefracted (refractive index gradient is more negative than −40N-units/km). If the ray is bent downwards so as to have a radius less than that of the earth, the possibility of ducting occurs (refractive index gradient is more negative than −157N-units/km).

If the boundary between two large horizontal masses of air is sharply defined, partial reflection may also take place for radio waves striking the boundary at grazing angles. The most common cause of this sharply-defined layering is temperature inversion. Normally, the temperature of the lower atmosphere decreases on average by 1°C for each 150m of altitude. When this rate is decreased for any reason, a temperature inversion is said to exist. Temperature inversions also cause a layering of refractive index profiles, and are often linked by many amateurs with periods of high pressure. The reason that there is any correlation is that high pressure generally indicates the presence of an anticyclone and settled weather conditions. This favours the formation of subsidence inversion which is caused by a mass of warm air cooling then slowly descending and producing a distinct boundary with the slightly colder air near the earth's surface. This type of inversion layer may last for several days. Other types of temperature inversion are the formation of dynamic inversion, in which a warm air mass overruns a colder mass, and the nocturnal inversion, brought about by the rapid cooling of surface air after sunset. These latter forms of inversion layers are usually short-lived, as convective activity at the ground heats up and destroys the stable layer. Best conditions often occur in the evening and just before sunrise. Poorest conditions are generally around midday when the atmosphere is relatively stable and convective activity is reaching a peak.

Whether a horizontally-stratified refractive index gradient more negative than −157N-units/km will cause reflection or ducting depends largely on the radio wavelength. Such a gradient might have inadequate vertical extent to cause ducting of vhf waves but adequate refractive index change at the boundary to cause reflection. For this reason ducting is more important in the uhf region, while reflection is more important at vhf.

Ducts or tropospheric ducting occurs when the refractive index decreases sharply with height over a large horizontal layer of stable air and radio waves are trapped as in a waveguide and experience low-loss propagation over long distances. Simple ducts occur in the type of temperature inversion where a warm air mass comes over a cold surface, such as the sea or frosty ground; the air is cooled from below, so that its lowest parts are denser and hence have a higher refractive index. This system is stable, so that normal turbulent mixing of air does not occur, and near the earth's surface the temperature increases with height. In this region the rate of change of refractive index can decrease rapidly, and if the gradient exceeds −157N-units/km then ducting occurs. Another important type of duct results from the type of layering where, for example, a warm air mass comes over a cooler mass so that a temperature inversion occurs at some distance above the ground. In this case the duct may not extend to the ground and it is then called an elevated duct.

As indicated above, two conditions are necessary for radio-wave ducting to occur. The first condition is that the refractive index gradient shall be equal to or more negative than −157N-units/km so that the radio waves must remain close to the earth's surface. The second necessary condition is that this gradient should be maintained over a height of many wavelengths. Ducts, therefore, can be likened to metallic waveguides, and in the same way have a wavelength cut-off above which radio waves will not propagate. Since the duct thickness is not limited sharply by a metallic surface but rather by zones where the refractive index gradient varies gradually, the cut-off is not sudden. A simple relationship between duct thickness and maximum wavelength to be propagated exists. By way of example, a typical duct near the ground 25m deep and refractive index change of −400N-units/km gives a computed cut-off wavelength of 0·15m. This gives a minimum frequency that can be propagated in this duct of 2GHz. A duct with the same refractive index gradient would have to extend well over 100m to propagate a wavelength of 2m. Normal duct thicknesses are such that complete trapping occurs mainly at shf (3 to 30GHz) and only in extreme conditions does complete trapping occur at vhf [21,22,23,24].

Due to the nature of reflections within the duct, skip-zones or "shadows" [21] can be created where signal strength is very low. Because the radio waves are trapped within the duct, there is a region above the duct that is shadowed from the radio waves within. However, the duct will

normally be "leaky", and some energy will steadily pass out of the top of the duct and into this shadow region. This adds to the transmission loss within the duct. A consequence of this leakage is that the field strength just above the duct at a distance well beyond the normal horizon may be higher than were the duct not present, and, by reciprocity, the signal level within the duct would be higher than normal even if the transmitter were just outside the duct. The shadow effect may also lead to much lower signal strength above the duct top if the transmitter is within the duct, or much lower signal strength within the duct if the transmitter is above. Both these factors have practical significance for troposcatter radio links and S- and X-band radar. For instance, if a sea-area-surveillance radar is placed on a cliff top to obtain long-distance coverage in normal conditions, a low-level duct may considerably reduce the echoes from relatively close objects due to the shadow effect, but enhance echoes from far beyond the normal horizon by duct leakage. By contrast, fire control radars, which usually operate with elevation angles greater than the limiting (or trapping) angle of the duct, will not be affected.

A quiet atmosphere, with just a gentle breeze to allow warm, moist air close to the ground to mix with that slightly higher up, is essential for the appearance of ducts, and they are mostly encountered across water or deserts. In mountainous areas, strong atmospheric turbulence and upward motion of air mitigate against the establishment of ducts. Ground-based ducts may also be formed by an unusually-rapid decrease of water vapour with height, as well as by an increase in temperature with height (inversion), or both effects together. Two causes which are associated with large bodies of water are evaporation and advection [21]. Evaporation of water vapour from the surface of the sea may cause a zone of high humidity (ie high refractive index) below a region of drier air. Such ducts are particularly likely to occur in the afternoon due to prolonged solar heating. Over tropical seas the high humidity existing near the surface produces almost permanent ducts which may contain a change of more than 400N-units. This sort of ducting is probably responsible for propagating amateur communications between California and Hawaii and between Brazil and Africa, where the paths can exceed 4,500km in length [25]. Advection, the movement of one air type over another, may cause hot dry air (from the land) to be blown over cold wet air, again producing a region of low refractive index above a region of high refractive index. This is most marked at evening with the onset of a land breeze.

Ducting and its related phenomena cannot provide a sufficiently reliable mode for professional communications purposes. While amateurs may welcome the effects of the unpredictable long-distance propagation made possible by ducting, super-refraction and tropospheric reflection, professional radio engineers view it as anomalous propagation and a serious problem. It gives rise to co-channel interference, which is particularly acute in the case of terrestial fixed-point services (eg interference between uhf tv transmitters) and in earth-space services at shf. The latter service suffers because the earth stations transmit unusually high powers and receive unusually weak signals. Any coupling medium within the earth-space beam can cause scattering of energy from the powerful transmission, but may more seriously cause interference to the sensitive receiver. Alternatively, tropospheric reflection and ducting may cause high interference levels by way of the earth-station antenna side lobes. The military don't like it for the additional reasons that it gives rise to random undesirable reception and leads to errors in radar and direction finding.

"Knife-edge" diffraction propagation and obstacle gain

If the antennas at the terminals of a line-of-sight path are so low that parts of the path pass close to the surface of the earth, the transmission loss due to diffraction effects will be well in excess of the free-space value even if the path is not directly obstructed. This loss is usually taken to be 6dB on the assumption that in the grazing condition, half of the wavefront—and so half of the field—is obstructed by the diffracting obstacle.

By ensuring that at least 55 per cent of the first Fresnel zone around a radio path is completely free of obstructions, this 6dB diffraction loss can be avoided. Allowing for any additional clearance, generally gives little further benefit. However, the atmospheric refraction varies with time, and any temporary subrefraction will have the same effect as increasing the height of any objects that might obstruct the path. For this reason it is usual practice to ensure that 60 per cent clearance occurs for an effective earth radius factor, k, less than unity to minimize subrefractive diffraction fading. This diffractive fading is the process most likely to determine the limit of service area coverage for amateur vhf/uhf fixed and mobile radio.

Where a radio path between two terminals is partially obstructed by an obstacle, some energy from the wave front is diffracted into the shadow region of the obstacle. In practice, the diffraction effect will be complicated by the shape of the obstacle and by the effects of the atmosphere, but a simplifying model can be used. For the case of a radio link with a very pronounced ridge of hills running across the line between the transmitter and receiver, this idealized model, known as "knife-edge" diffraction, is a well-established means of calculating diffraction losses relative to the free-space loss. This technique can be extended to propagation over multiple knife-edges. Account must also be taken of hill-top rounding, which can reduce the diffractive effect.

Diffractive effects give rise to the interesting notion of "obstacle gain". This is produced by a large obstacle visible from both ends of a diffraction path between two stations. This gain is the difference between the attenuation over a radio path having such an obstacle, and the usually greater attenuation that there would have been in the absence of any such obstacle. It may occur when a high-loss path is transferred into a single knife-edge diffraction path with less loss. This can produce a reliable radio link but, since diffraction losses are normally large, metallic surfaces may be placed on top of the ridge to aid diffraction/reflection of energy to and from the remote station when it is essential to operate such a path without an active repeater.

It can also happen that an obstacle in the shadow of a diffracting edge may, by double diffraction, cause the received power level in its own shadow to be as much as 15dB greater than if it were not there. A useful consequence of all these effects may be that moving to a site behind a sharp-topped ridge will produce an enhanced signal for a mobile or portable station [21].

A practical examination of the effect of knife-edge diffraction and obstacle gain on amateur transmissions can be found in "The Snowdon effect—an interesting case of vhf propagation", J David Last, GW3MZY, *Rad Com*, February 1983, pp136-8.

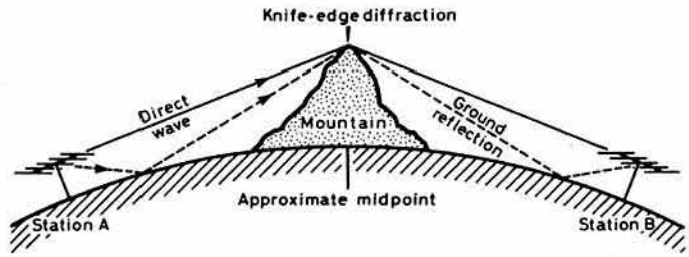


Fig 4. A ridge of hills or mountains may exhibit diffraction of a vhf radio wave travelling over the crest. An obstacle gain of as much as 15dB may be realized when transmitting and receiving sites are optimized for maximum diffraction (from [25])

Sporadic-E propagation

At about the height of the E-layer, highly-ionized clouds are randomly and sporadically formed. These clouds are of limited extent, consisting of horizontal sheets about 1km thick with a radius of between 100 and 2,000km at heights ranging from 90 to over 120km. The clouds do not behave consistently; they last for no more than a few hours at a time, but their lifetime can be much shorter; they vary in intensity and, whereas some will move over many hundreds of kilometres, others appear to remain stationary. Because of their transient nature and their altitude, they are called sporadic-E clouds and to differentiate them from other E-layer phenomena these clouds are designated "Es".

Close to the equator, Es clouds are essentially daytime phenomenon with little seasonal variation. On the other hand, in the auroral zone, Es is most prevalent during the night hours, but again there is little seasonal variation. In the temperate mid-latitudes, between approximately 6° and 60° latitude north and south, the maximum frequency reflected by the Es is less than elsewhere, and the occurrence is subject to daily and seasonal variations.

The ionized layers of auroral Es is probably caused by the precipitation of charged particles triggered by disturbances of the sun, as described earlier. The mechanism for the formation of temperate zone Es is believed to be wind shear; no extra ionization occurs as in the auroral zone Es, but rather the ionization normally present is redistributed and compressed into a ledge of high density. This is believed to occur through the action of neutral winds of high velocity, flowing in opposite directions at slightly different altitudes, producing shears. In the presence of a geomagnetic field, the ions are collected at a particular altitude forming a thin dense layer.

The occurrence rate of Es propagation over a given path is very sensitive to frequency. Propagation by Es at uhf is very doubtful, but as we move down in frequency from 144 to 28MHz, there are more events and they are of longer duration. The probability of a 144MHz opening is only about three to four per cent of the occurrence of 50MHz openings. However, signal strength observed over the vhf range does not appear to be frequency dependent [26]. Normal one-hop, single-cloud, Es dx is limited to about

Table 1

Band	Path loss (1)	Transmitter output power needed (2)	Antenna gain and dish diameter (3)	Comments (4)
144MHz	252dB	750W	20dB 4 × long Yagis 20dB 30ft dish	(a) Yagi arrays generally preferred, since you need 30ft dish to get same gain as four Yagis, but some stations use 8 or 16 Yagi arrays. Polarization mismatch can be a serious problem with these fixed polarization arrays. (b) Receiver noise level limited by higher sky noise temperature at this frequency. A noise figure of about 2dB is the best that can be expected. The noise picked up by the antenna may swamp the weak eme signal.
432MHz	262dB	750W	20dB 4 × long Yagis 20dB 13ft dish 25dB 8 × long Yagis 25dB 20ft dish	(a) Yagi arrays and dishes seem to be equally popular but with some arrays using up to 24 long Yagis. Losses in phasing harness etc can be high. (b) Possible to achieve a receiver noise level of about 1dB which is a noise temperature of 75°K. This is about the level of sky noise at 432MHz.
1,296MHz	272dB	400W	25dB 6·5ft dish 32dB 13ft dish	(a) Dishes normally used, as 32 or more Yagis needed to get sufficient gain and losses in phasing harness are too high. Circular polarization is standard. (b) More difficult and expensive to construct low noise receivers. However, sky noise temperature lower than at 432MHz.
		100W	35dB 20ft dish	(c) Suckling [27] reports that eme operation can be successful at this output power but antenna needs to have sufficient gain (at very least 6·5ft diameter).

Notes accompanying column headings
(1) The figure is for the isotropic loss; ie, antenna at both stations assumed to be isotropic radiators. See *VHF/UHF Manual* 3rd ed, pp9.13.
(2) The output power stated may be in excess of the UK amateur licence conditions. Home Office approval will need to be sought to run these powers.
(3) One or more stages of low noise preamplification are normally used. These are based on GaAsfets and are preferably situated at the base of the antenna.
(4) To achieve the necessary selectivity and sensitivity, the normal practice is to convert/transvert to hf after the preamplification stage. This is because received noise power is proportional to receiver passband width, and until recently few vhf/uhf receivers had sufficiently narrow filter passbands.

2,000km but, during the summer months, multiple clouds are common and most propagation is via more than one cloud. With the right distribution, distances of up to 4,000km or more are possible over land. This makes it a popular mode of communication for amateurs on the vhf bands, as it calls for no special station equipment, although a reasonable level of operating skill and a good deal of luck are needed.

Earth-moon-earth propagation (eme or moonbounce)

American radio amateurs began experimenting with moonbounce communications in about 1953. This mode of communication uses the surface of the moon as a passive reflector of radio signals, and allows communication on earth between any two stations that can observe the moon at the same time. Thus it is possible to communicate at vhf/uhf between stations at almost opposite sides of the earth. The mode does not rely on freak enhancements to propagation but does require equipment that is a little more sophisticated than the typical amateur vhf/uhf equipment that is commercially available.

The eme path length varies from about 712,000km to a maximum of 814,000km for a round-trip signal. This variation arises because the moon rotates around the earth in a slightly elliptical orbit, with the distance between the two varying on a 28-day cycle. The moon subtends an angle of only 0·5° as viewed from the earth, and reflects only about seven per cent of the vhf/uhf energy that strikes its surface. This, coupled with the long overall signal path, makes it a very marginal mode of communication.

The amateur frequency bands normally used for eme operation, 144, 432, and 1,296MHz, represent a compromise between the overall system noise level, and particularly the receiver noise level, the ability to construct high gain antennas that are not too large, and the ease of generation of sufficient transmitter power. For 144 and 432MHz operation there is a particular problem in the UK, because the output power needed, of the order of 700-800W, requires a special licence from the Home Office for experimental work. This is less of a problem on 1·3GHz because it has been shown that successful communication can be achieved with output powers of only 100W [27]. This is possible because it is practical to build dishes with sufficient gain at this frequency. The essential problems and differences between the three bands when used for eme work are shown in Table 1.

Because of the weak nature of the signal, QSOs tend to be stereotyped and usually consist of an exchange of callsigns, signal reports and "rogers" with many repetitions. Instead of the usual RST report, another system, called TMO, is sometimes used for giving signal reports. These letters are chosen as they consist only of dashes in the morse code and should therefore be more recognizable when signals are down in the noise. As is implied by this, cw is the normal signalling mode although, exceptionally, ssb is possible. Most QSOs are pre-arranged and follow a rigid format that has to be adopted at both ends as in meteor-scatter contacts.

One feature unique to stations with full eme capability is the ability to receive their own "echoes". It takes about 2·5s for the signal to make its way to the moon and back, and this time delay allows the operator to monitor his own test transmissions. This obviously provides a useful check on the satisfactory operation of the equipment.

Because the moon may be moving toward or away from the eme stations at speeds up to 1,500km/h, Doppler shift will change the received frequency. When the moon is rising, doppler effect increases the received frequency; at moonset the frequency is decreased. The amount by which the signal is shifted is linearly dependent on the operating frequency. Thus on 144MHz it is one third of the shift at 432MHz and only one ninth of the shift at 1·3GHz.

In addition to the normal path attenuation, additional problems are caused by *Faraday rotation* of the polarization of the received signal. Because of the reflection of the signal, the polarization sense is reversed on the received signal. A plane-polarized vhf/uhf signal passing through the ionosphere is further rotated, and this happens on both legs of the journey. The net result is a signal arriving at the receiver which may not have the same polarization as the antenna, and this will result in a further signal loss. With antenna systems of fixed polarization such as Yagi arrays, there is nothing that can be done. However, with dish antennas two approaches can be taken to avoid the polarization mismatch; adjust the dish polarization to compensate or use circular polarization at both ends. Where the station at the other end is using fixed polarization, the dish-station operator can rotate the feed horn to adjust the dish polarization to match that of the incoming signal so that maximum signal can be obtained. The higher in frequency eme operation goes, the less is the amount of rotation. Thus the problem is particularly serious on 144MHz operation; the more so since

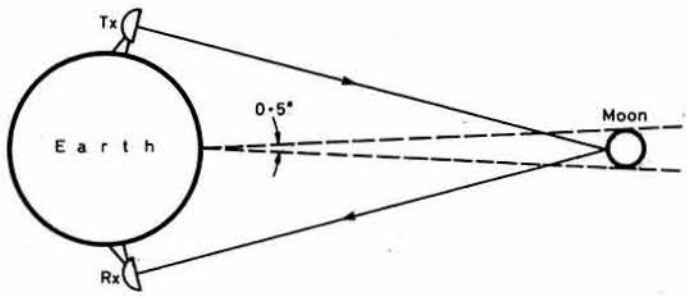


Fig 5. The moon subtends an angle of only 0·5° as viewed from the earth and reflects only about seven per cent of the radio energy that strikes its surface. This, coupled with the long overall signal path, makes it a very marginal mode of communication.

fixed polarization Yagi arrays are generally used for practical reasons. The problem can be overcome with dish systems, since circular polarization can be used and, provided the sense of polarization rotation of the antenna system is that of the received signal, no mismatch and no consequent signal loss occurs. At 1·3GHz, dishes are the most practical antennas and circular polarization is standard.

A third propagation effect on eme communications is that of *libration fading*. This is caused by multiple reflections from the uneven surface of the moon, and also because of the relative movement between the earth and the moon. This gives rise to signal fading due to multipath effects. The depth of this fading can be up to 20dB, and signals are rarely strong enough to be audible in the trough of the fades [27].

A very readable and practical introduction to moonbounce communication can be found in a two-part article by Charles Suckling, G3WDG, starting in the May 1984 issue of *Ham Radio Today*.

References

[1] "Radio transmission at vhf by scattering and other processes in the lower ionosphere", D K Bailey, R Bateman and R C Kirby. *Proc IRE* Vol 43, No 10, October 1955.

[2] *Ionospheric Radio Propagation,* K Davies, 1966. Dover Publications Inc, New York.

[3] "Design concepts for transportable ionoscatter systems and experimental results," P J Bartholomé and I M Vogt. *IEEE Trans on Comm Tech* Vol COM-15, No 6, December 1967.

[4] "A review of scatter communications", A N Ince, I M Vogt and M P Williams. AGARD Conference Proc No 244, 1977, *Aspects of Electromagnetic Wave Scattering in Radio Communications,* pp21.1-21.31.

[5] "Communications via meteor trails," F J Sites. AGARD Conference Proc No 244, 1977, *Aspects of Electromagnetic Wave Scattering in Radio Communications,* pp 25.1-25.11.

[6] "Propagation via meteor trails," G R Sugar. *Proc IRE,* Vol 52, February 1964, pp 116-36.

[7] "Meteor scatter communications in an air-ground environment," P S Cannon and G Richardson. *Proc ICAP-83*, Part 2, April 1983, pp 313-17.

[8] "COMET—A new meteor-burst system incorporating ARQ and diversity reception", P J Bartholomé and I M Vogt. *IEEE Trans on Comm Tech,* Vol COM-16, No 2, April 1968, pp 268-78.

[9] "Snow store in the Rockies", M Griffiths. *Geographical Magazine,* April 1984, pp 184-6.

[10] "An analysis of meteor-burst communications for military applications", J D Oetting. *IEEE Trans on Comm*, Vol COM-28, No 9, April 1980, pp 1591-601.

[11] "Experimental results for the 144MHz transequatorial propagation in the Euro-African sector," C G Fimerelis and N K Uzunoglu. *Proc ICAP-83,* Part 2, April 1983, pp 325-8.

[12] "The West Ford experiment—an introduction to this issue," W E Morrow and T F Rogers. *Proc IEEE,* Vol 52, No 5, May 1964, pp461-8.

[13] "West Ford and the scientist" *Proc IEEE,* Vol 52, No 5, May 1964, pp455-60.

[14] "The West Ford belt as a communications medium", I L Lebow *et al. Proc IEEE,* Vol 52, No 5, May 1964, pp543-63.

[15] "Design of Chaff and Chaff-supported communication systems", A N Vogt and H Gössl. *IEEE Trans on Comm,* Vol COM-24, No (8), August 1976, pp785-803.

[16] "Ionospheric modification theory: past, present, and future", G Meltz. *Radio Science,* Vol 9, No 11, November 1974, pp885-8.

[17] "HF-VHF communications experiment using man-made field-aligned ionospheric scatterers." *Radio Science,* Vol 9, No 11, November 1974, pp1025-32.

[18] "Ionospheric heating by powerful radio waves", G Meltz, L H Holway Jr and N M Tomljanovich. *Radio Science,* Vol 9, No 11, November 1974, pp1049-63.

[19] "The Platteville high power facility", J C Violette and W F Utlaut. *Radio Science,* Vol 9, No 11, November 1974, pp889-95.

[20] *VHF/UHF Manual* (3rd ed), D S Evans, G3RPE, and G R Jessop, G6JP. 1976. Radio Society of Great Britain, pp2.1-2.22.

[21] *Effects of the troposphere on radio communication,* M P M Hall. 1979. IEE Electromagnetic Wave Series 8, Peter Peregrinus Ltd, Stevenage and New York.

[22] *Radio Wave Propagation;* A Picquenard. 1974. The MacMillan Press Ltd, London.

[23] *Tropospheric Radiowave Propagation beyond the Horizon,* F Du Castel. 1966. Pergamon Press, Oxford, New York, Paris and Frankfurt.

[24] *The Wave-guide Mode Theory of Wave Propagation,* K G Budden. 1961. Logos Press Ltd and Academic Press Inc, London.

[25] *Radio Handbook,* W I Orr. 1975. Howard W Sams & Co Inc, Indianapolis, Indiana.

[26] *The ARRL Antenna Book. 1974. The American Radio Relay League Inc, Newington Connecticut.*

[27] "Earth-moon-earth with simple equipment," C Suckling, G3WDG. *Ham Radio Today,* May 1984, pp12-18 (and subsequent instalments).

RECOMMENDED READING

[28] *Sun, Earth and Radio—An introduction to the ionosphere and magnetosphere,* J A Ratcliffe. 1970. World University Library, Weidenfeld and Nicholson, London. □

AN IMPROVED Z-MATCH ASTU

(Continued from page 771)

7MHz (and 10MHz if used) the appropriate tap on L3 is selected by S1b. Should it be desired to use an alternative antenna or antennas, fed with coaxial cable, either direct or via the Z-match, this facility is also provided. There is also provision, by S2, to switch the transmitter output direct to a suitable 50Ω dummy load. Once the unit has been set up on each band in turn, and the capacitor dial readings noted on a calibration chart or card which may be affixed to the front panel, switching and re-setting to any desired frequency within the required band is a matter of seconds. The layout is not critical, but it is advisable to mount the coils L1 and L2 with their axes at right-angles to prevent undesirable intercoupling. Also, all earth leads should be as short as possible and the metal front panel should, of course, be earthed. The coupling capacitor, C2, should be mounted on an insulating sub-panel and its shaft fitted with an insulated shaft coupler to isolate it from the front panel and to prevent hand-capacitance effects. When the photograph accompanying this article was taken, the switch S2 and the coaxial output sockets SK2, SK3 and SK4 had not been incorporated into the experimental model. Also, the twin-gang variable capacitor for C2 is unnecessary; a single 500pF maximum capacitor is adequate. The receiving type variable capacitors used in the experimental model Z-match have adequate plate spacing for cw and ssb (peak) output powers of up to 100W. For higher powers it would be necessary to use a transmitter-type split-stator capacitor (or two ganged single-section capacitors) for C1a, C1b. However, C2 requires only receiver-type vane spacing even for high-power operation. Tests with additional feedpoint taps on both L1 and L2 in the modified Z-match circuit showed no practical advantage. However, the tap on the output coupling coil L3 was found to be essential on 7MHz, and would doubtless be required on 10MHz. The very tight coupling between L1/L3 and L2/L4, due to the method of construction used, tends to reduce the operating Q value of the LC circuits and so render them more "tolerant" of the complex reactive loads presented at the input end of the feeder(s) to the antenna(s) used and, incidentally, of frequency excursions within any given band.

Final modified Z-match astu circuit—components list

C1a-1b	Split-stator variable capacitor 20-500pF per section (1)
C2	500pF single-section variable capacitor (shaft insulated)
L1	10t 4cm id c/w 14swg enam copper wire. Tap T1 4t from earth end
L2	5t 4cm id turns spaced wire dia 14swg enam copper wire. T2 1·5t from centre of coil (virtual earth point)
L3	8t 5cm id c/w enam copper wire over L1. T3 at 5t from "earthy" end
L4	3t 5cm id c/w over L2. 14swg enam copper wire
S1	Ceramic wafer switch. All sections single-pole five positions
S2	Ceramic wafer switch, single-pole three positions
SK1-4	Coaxial sockets
F1, 2	Balanced feeder terminals

Notes.

(1) A suitable 250 + 250pF (split-stator or twin-ganged) variable capacitor can be used since the capacity required to tune L1 to 3,500kHz is approximately 420pF, and for 7,100kHz approximately 90pF. If C1a, C1b (paralleled) has a combined minimum capacitance of not more than 20pF, it should be possible also to tune L1 to 10MHz. Otherwise it may be necessary to reduce L1 to nine turns, leaving T1 at four turns from the "earthy" end of L1. A lower minimum capacitance of C1a, C1b as a split-stator capacitor would also be an advantage for the 28-29·7MHz band.
(2) Taps on L1 and L2 soldered to *inside* of coil turn. Tap on L3 soldered to *outside* of coil turn.

Author's note

In the explanation of the way in which the original Z-match astu circuit works, a convenient simplification has been adopted in describing the input circuit function. I am aware of the fact that a more rigorous, mathematical, treatment of the functioning of the input circuitry is possible. However, the practical advantage of the suggested arrangement of "tapping down" the input to L1 and L2 is clearly proven by experimental results obtained. □

3·5
7
10
14
18

ALL BANDS FOR THE MODERN HF TRANSCEIVER

21
24·5
28
28·5
29

G N FARE, G3OGQ*

(PART 2)

Synthesizer

The synthesizer is built as one double-sided pcb, the track layout being shown in Fig 12, and the top side in Fig 13. Note the break across the groundplane to divorce the vco from the rest of the circuit.

Construction of the main synthesizer board should start with the vco, building one at a time, including its switches and the voltage regulator (TR1318). The tuning coils L1301 to L1305 are 5mm diameter with slugs, and no cans are used. They are mounted in suitable holes drilled in the pcb where shown. The windings should be cemented into place after installation, and the three leads from each coil taken to Veropins. The same precautions should be taken when building the vco as when building a vfo; ie, everything must be firmly fixed using the shortest possible leads to stiffen the mountings. Each vco should be checked by applying 5V to the appropriate switch pin and 12V to the voltage regulator (TR1318). A counter should be used to monitor the output. Grounding TP1 should give a frequency below that required, and applying 12V to TP1 should give a frequency higher than that required.

When all the oscillators are performing satisfactorily, install IC1301, IC1302, IC1303, TR1318, IC1309 and their associated components. Apply power and check the output from pin 12 of IC1303. This should be a square wave of at least 2·4V peak on each band. The output from IC1302 should be checked and should be a sine wave of at least 1·4V peak-to-peak into a 51Ω resistor load. In fact the output on the lower bands will be 2V peak-to-peak or more.

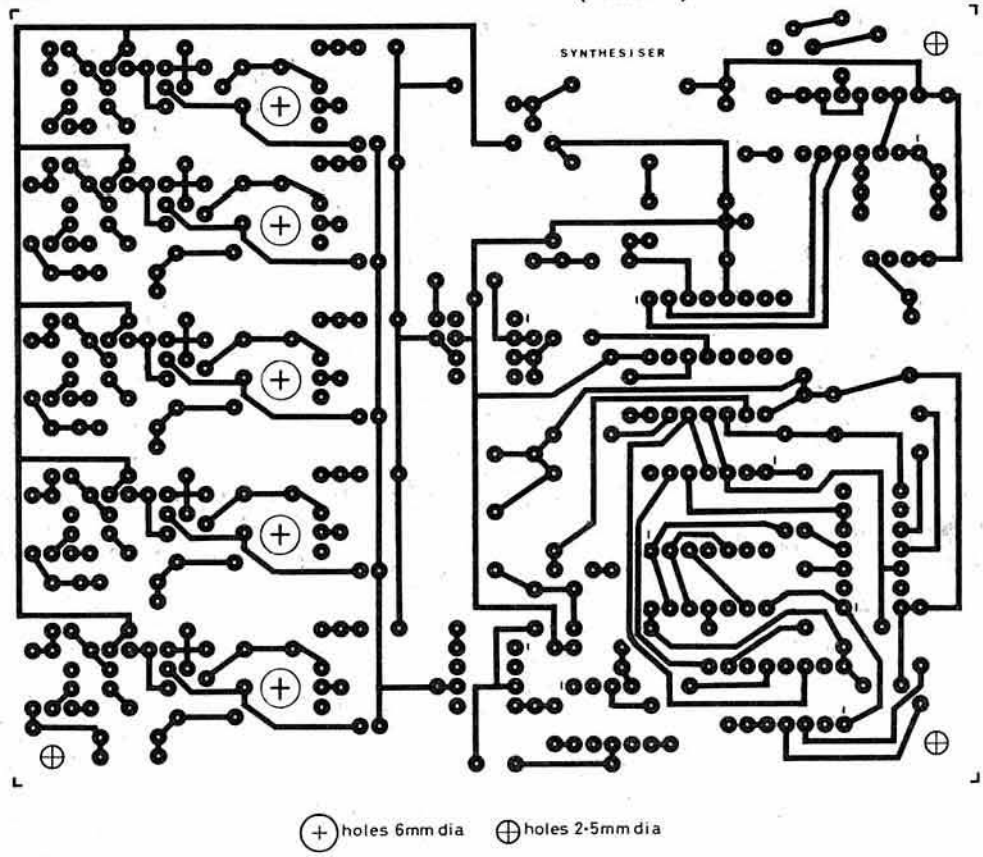


Fig 12. Synthesizer board track layout, double-sided board. Other side groundplane. Enlarge holes in groundplane except where required for grounding

IC1304, IC1305 and IC1306 should then be mounted. Short wires should be soldered to the BCD input pins of IC1304 and IC1305. Select VCO1 by applying 5V to the switch pin and connect the wires from the BCD input pins to 5V or ground as appropriate. IC1305 has pin A connected to ground and B, C to 5V. IC1304 has pins A, B and C connected to 5V and D connected to ground. This will load 67 into the counter.

Apply power and, using a counter with the probe on pin 3 of IC1301, adjust the output of VC01 to exactly 12,500kHz by adjustment of the tuning slug in L1301. Move the counter probe to pin 8 of IC1303, which should give a reading of 500kHz. Adjustment of the slug in L1301 should cause the reading to change to exactly the vco frequency divided by 25.

With the dividers operating satisfactorily, change the loading for each band as shown in Table 1, not forgetting to switch on the appropriate oscillator. The output at pin 8 of IC1303 should always be 500kHz when the vco coil is adjusted to resonate at the lowest frequency in the band.

IC1307 should then be fitted and a length of miniature coaxial cable connected from the reference frequency input (at C1352) to the divider board in the vfo. Using VC01 and a loading of 67 to the dividers, check again that there is a frequency of 500kHz on pin 14. Set the vfo at exactly 500kHz reading on pin 3. Monitor the voltage on pin 13 with a high impedance voltmeter (20,000Ω/V or greater). Adjust the slug in L1301 so that the frequency on pin 14 measures about 495kHz. Note the voltage on pin 13 which should be very low, even as low as 0V. Retune L1301 to a higher frequency. At about 500kHz there should be a sudden change in voltage to about 11·5V. Check by retuning below 500kHz that the voltage drops to its previous value. If all is well, the phase comparator is performing correctly.

The filter, consisting of IC1308 and its associated components, should be

*Cobblestones, 1 Old Hall Close, Walton, Warrington, Cheshire WA4 6SZ.

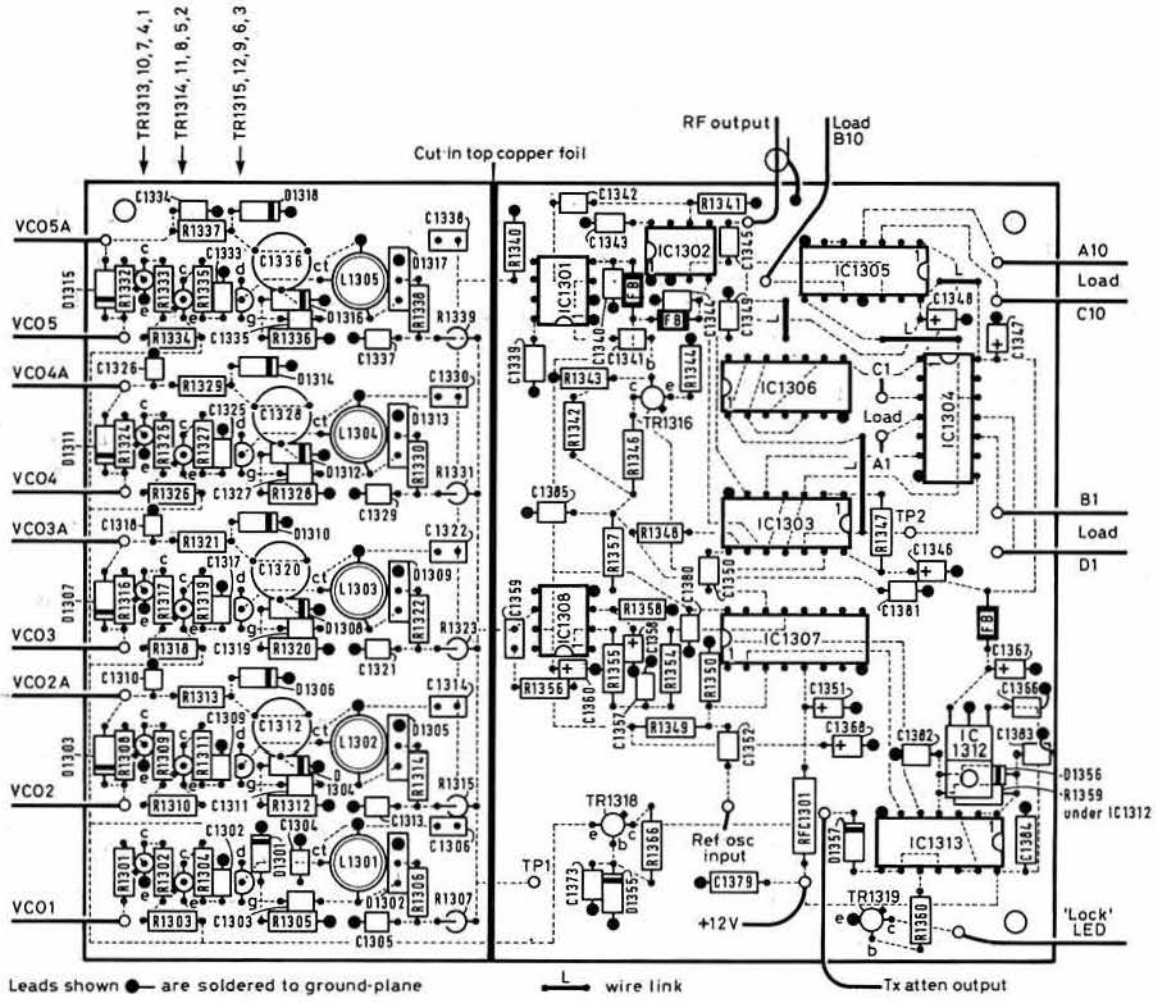


Fig 13. Synthesizer board components layout. Leads marked ● are grounded

fitted, and the operation of the complete synthesizer can now be checked. This is greatly facilitated if the diode input board is now constructed. The track layout is shown in Fig 14 and the component layout in Fig 15. Check the synthesizer operation on 12,500kHz first by applying power to the board and 5V to the appropriate pin on the diode input board.

Monitor the frequency at pin 3 of IC1307 and adjust the vfo to a reference frequency input of exactly 500kHz. Monitor the voltage at TP1 and adjust the slug in L1301 until the frequency measured at pin 3 of IC1302 is 12,500kHz. The loop should lock at this stage, indicated by the fact that rotating the slug in L1301 a turn or two each way should not lead to a change in frequency at the output. The slug should be adjusted until the voltage measured at TP1 is 5·28V. Retuning the vfo should change the output

Fig 14. PCB layout diode switching board, single-sided

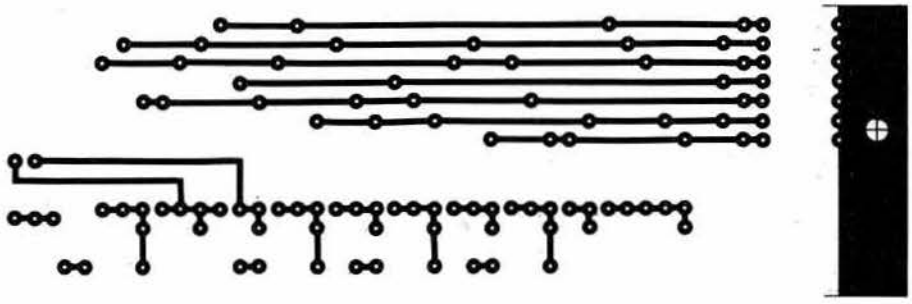


Fig 15. Diode switching board components layout

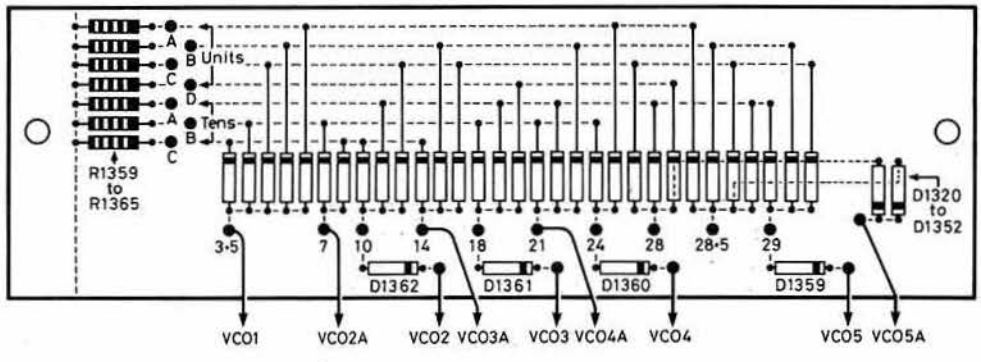


Table 1. Loading details for dividers

Band	MHz	Divisor	Load
3·5	12·5	25	67
7	16·0	32	60
10	19·0	38	54
14	23·0	46	46
18	27·0	54	38
21	30·0	60	32
24·5	33·5	67	25
28	37·0	74	18
28·5	37·5	75	17
29	38·0	76	16

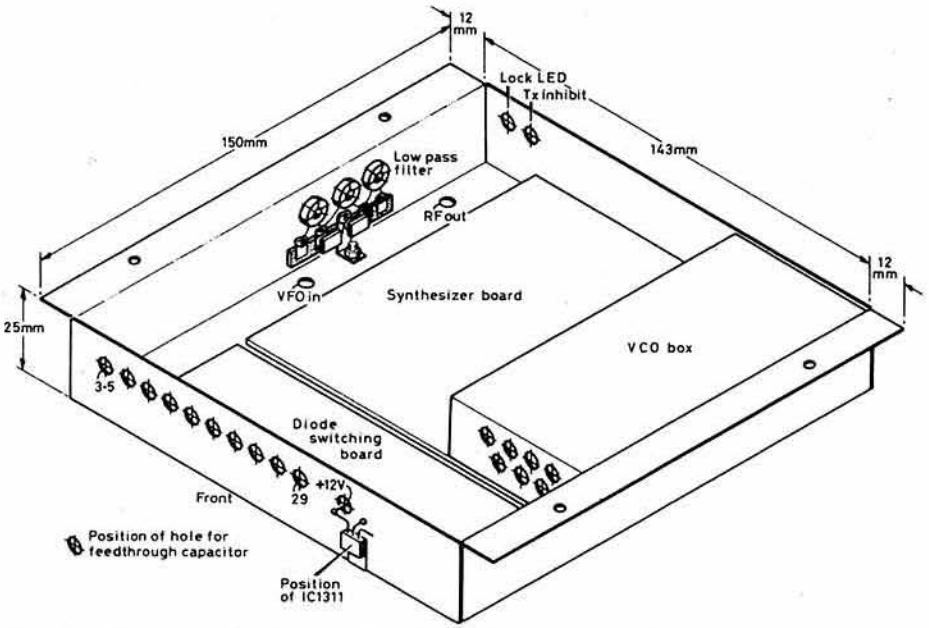


Fig 16. Details of synthesizer box made from tinplate. Dimensions in millimetres

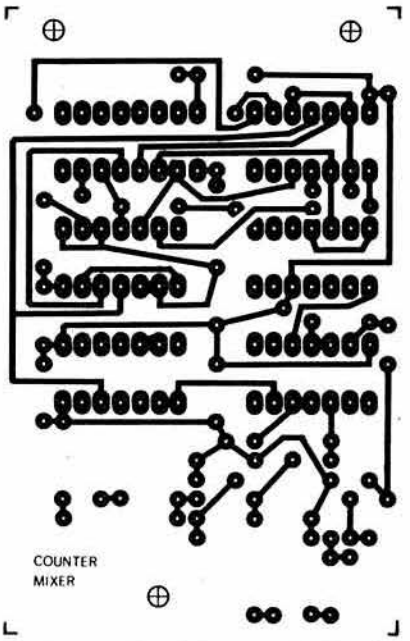


Fig 18. Counter mixer board, double-sided, pcb track layout. Other side groundplane

frequency up to 12,800kHz, when the voltage should be 8·12V. The actual voltages are not particularly critical, provided that the voltage swing is fairly close to the figures given above.

The presence of a locked state can also be monitored at pin 1 of IC1307. When in lock, there should be about 11·3V on this pin, falling to a low level when out of lock. The "out-of-lock" indicator consisting of IC1313 and its associated components can now be fitted, and its operation checked by detuning a vco until the loop unlocks when the attenuator output pin should go high and the L.E.D. should be extinguished.

When satisfied that the synthesizer is working properly on all bands, the shield should be fitted around the vco. This is made of tinplate soldered to the groundplane, about 18mm high and fitted with a lid which is bored with holes to facilitate adjustments of the five coils and four variable capacitors.

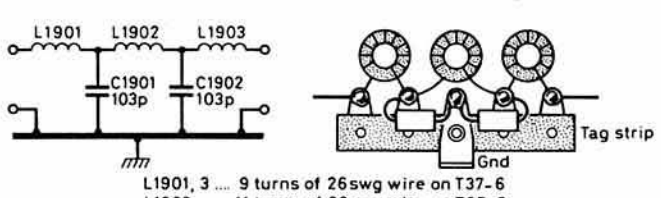
The synthesizer box should now be constructed. This is made of tinplate or other thin metal and is shown in Fig 16. The two pcbs are mounted within the box in the positions shown, making sure that the top of the vco box will not be higher than the top of the synthesizer box. This is accomplished by using pillars or spacers not more than 0·125in (3mm) high and projecting pins and wires should be cut as close to the track as possible.

The box is actually a tray with a flange at two sides, one of which rests on the central screen of the transceiver and the other rests on the aluminium angle fixed to the right-hand side. Holes are bored to permit the lid fixing bolts to pass through. The af filter will have to be moved, and this should be relocated under the main board.

The lowpass filter (Fig 17) should now be constructed. This is fixed inside the synthesizer box on the left-hand side.

The synthesizer can now be checked by operating the transceiver on 3·5 and 14MHz. Disconnect the output of the existing vfo from the mixer and the counter and connect a length of 50Ω miniature coaxial cable from the output of the lowpass filter in the synthesizer box to the mixer, and from the synthesizer output to the counter vfo input. Temporarily connect power supplies to the synthesizer and apply 5V to the 3·5MHz feedthrough capacitor. Switch the transceiver to 3·5MHz, and fit a 50Ω dummy load to the antenna.

Switch everything on and check that there is input to the mixer between 12,500 and 12,800kHz. Tune the vfo across the band. Spurious signals will be heard but should be very low in amplitude, not affecting the S meter. An



L1901, 3 .... 9 turns of 26swg wire on T37-6
L1902 ..... 11 turns of 26swg wire on T37-6
C1901, 2 .... 56pF+47pF each in parallel

Fig 17. Details of lowpass filter on synthesizer output

exception to this is at the extreme bottom edge of each band where harmonics of the reference frequency of 500kHz gives a spurious signal of about S3 in strength. Fitting the cabinet lid should reduce these, as this also forms a top shield to the synthesizer. If desired, a lid can of course be fixed to the synthesizer box, but the existing cabinet lid is satisfactory. The reference frequency harmonics do not appear in the spectrum of the transmitted signal and form a bottom band edge marker.

Fit an antenna and listen to the signals. The injection to the mixer is higher than the original design, and the performance should, if anything, be better than it was before. In particular, tune in cw signals. These should be T9 in quality, and this forms the next best thing to a spectrum analyser for checking the noise performance of the synthesizer. If a cw signal sounds perfect (and it should) there is not much wrong. If not, you have a noise problem. The most likely source of noise is the result of a lack of gain of TR1316.Check the output, which should be at least 2·4V above the zero line, and if necessary, replace TR1316 with a sample with higher gain. Noise from this source can be identified fairly easily, as it will get worse with increasing frequency as the gain of TR1316 reduces. Check the components associated with the loop filter (IC1308) to make sure they are not out of tolerance. Low frequency ripple on the varactor control line from pin 6 of IC1308 can be checked by means of a pair of headphones with a by-passed diode in series. Check the regulated voltage supplies with a sensitive oscilloscope. Ripple should be less than 5mV. If necessary, change the regulators. You will also notice that lsb signals are received on 3·5MHz with the switch in the usb position, and vice-versa. This is due to the fact that we now have the local oscillator higher than the i.f. rather than lower as it was in the original design.

Counter

In order to use as much of the original circuitry as possible, a new small pcb is made which contains the digital mixer. This fits in place over the position occupied by the original mixer, and is connected to the counter by a short piece of wire.

The pcb track layout is given in Fig 18 and the components layout in Fig 19. Some of the components, for example the 74LS90 etc, can be reused from the old board, so it is better first to remove the redundant components to make them available. These are IC401, 402, 403, 404 and 406, C401 to C413, C416 to C418, R401 to R405, R407, D401 and D402, L401 and L402, together with the associated Veropins.

Construction of the new board is quite straightforward and should present no problems. When complete, the two coaxial input leads from the synthesizer output and the local oscillator should be connected and the output connected to pin 28 of IC405. This can be connected to the old pin 12 position of IC404. The 5V supply for the board may be taken from IC407.

With the synthesizer operating at 12,500kHz, apply 5V to the control

COMPONENTS LIST

SYNTHESIZER BOARD AND VFO DIVIDER

CERAMIC CAPACITORS

C1306, 1322, 1330, 1338	15pF
C1304	56pF
C1302, 1303, 1305, 1309, 1311, 1313, 1317, 1319, 1321, 1325, 1327, 1329, 1333, 1335, 1337, 1350, 1352, 1354, 1357, 1381, 1385	0·001μF
C1310, 1318, 1326, 1334, 1347, 1348, 1353, 1359, 1379, 1382, 1383	0·01μF
C1339, 1340, 1342, 1343, 1344, 1345, 1361, 1366, 1379, 1380, 1384	0·1μF
C1341	0·22μF

TANTALUM BEAD CAPACITORS

C1346, 1349, 1351, 1360, 1363	0·22μF, 35V
C1367	1μF, 35V
C1358, 1362, 1368	10μF, 16V

SILVER MICA CAPACITORS

C1355, 1356	470 + 330pF in parallel

FEEDTHROUGH CAPACITORS

C1301, 1307, 1308, 1315, 1316, 1323, 1324, 1331, 1332, 1365, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378	1000pF

TRIMMER CAPACITORS

C1312, 1320, 1328, 1336	2–10pF

RESISTORS, 0·25W

R1314	22Ω
R1304, 1311, 1319, 1327, 1335	100Ω
R1351	220Ω
R1361	330Ω
R1346	470Ω
R1359, 1360, 1361, 1362, 1363, 1364, 1365,	680Ω
R1313, 1321, 1329, 1337, 1347, 1348, 1352	1kΩ
R1343	1·5kΩ
R1360	2·2kΩ
R1307, 1315, 1323, 1331, 1339, 1349, 1350	2·7kΩ
R1356	3·9kΩ
R1306, 1314, 1322, 1330, 1338, 1355	4·7kΩ
R1342	5·6kΩ
R1340, 1341, 1354, 1357, 1358	10kΩ
R1303, 1310, 1318, 1326, 1334	33kΩ
R1353	39kΩ
R1305, 1312, 1320, 1328, 1336	82kΩ
R1359	100kΩ
R1302, 1309, 1317, 1325, 1333	120kΩ
R1301, 1308, 1316, 1324, 1332	470kΩ

TRANSISTORS

TR1301, 1304, 1307, 1310, 1313, 1317, 1319	BC108
TR1302, 1305, 1308, 1311, 1314	2N2907
TR1303, 1306, 1309, 1312, 1315	MPF102
TR1318	2N2222A
TR1316	2N3866

DIODES

D1301, 1303, 1304, 1307, 1308, 1311, 1312, 1315, 1316, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1356, 1357, 1359, 1360, 1361, 1362	1N914
D1306, 1310, 1314, 1318	1N916
D1319	5VI, 400mW zener
D1355	10V, 400mW zener
D1358	LED
D1302, 1305, 1309, 1313, 1317	BB204

INTEGRATED CIRCUITS

IC1301, 1302	SL560C
IC1303	74S11
IC1304	74S196
IC1305	74196
IC1306	74S113
IC1307	4046
IC1308	CA3140
IC1309	74LS90
IC1310, 1312	7805
IC1311	7812
IC1313	4001

INDUCTORS

L1301, 1302	22t 30swg on 5mm dia Denco former 14mm long with slug. Tap 6t from ground end
L1303	13t ditto, tap 4t from ground end
L1304	11t ditto, tap 4t from ground end
L1305	9t ditto, tap 3t from ground end
L1306, 1308	7t 26swg on T37-2 toroid
L1307	9t ditto
RFC1301	220μH
Ferrite beads	Three

COUNTER—DIGITAL MIXER

C1401, 1415	100pF ceramic
C1402, 1406, 1408, 1410, 1411, 1412, 1413, 1414	0·01μF ceramic
C1403, 1404	0·1μF ceramic
C1405	100μF 6V tantalum
R1404, 1410	220Ω
R1405, 1411	560Ω
R1401, 1406, 1407, 1412	1kΩ
R1403, 1409	4·7kΩ
R1402, 1408	1MΩ
All resistors 0·25W	
IC1401	74SO4
IC1402	74196
IC1403	74LS90
IC1404	74LS10
IC1405	74LS74
IC1406	74LS157
TR1401, 1403	MPF102
TR1402	BC109C
TR1404	BC108C

VFO MODIFICATIONS AND RIT

C104(a)	47pF sm
C804	1–10pF Jackson (see text)
C104(b)	10pF NPO ceramic
Resistor	Two-off 10kΩ 0·25W
Potentiometer	2·2kΩ linear
Switches	DPST centre off

SYNTHESIZER LPF

C1901, 1902	56pF plus 47pF each, sm
L1901, 1903	9t 26swg on T37-6 toroid
L1902	11t ditto
Sundries	One five way tag strip

ADDITIONAL LOWPASS FILTERS (SM CAPACITORS)

5–10pF	2–30pF	4–100pF	3–330pF
1–20pF	2–47pF	3–150pF	1–680pF
2–27pF	1–56pF	2–220pF	

10–T50-6 toroid cores (see Fig 8 for winding details)

BANDPASS FILTERS

C1502, 1505	1000pF sm
C1503, 1504	330pF sm
C1506, 1509, 1514, 1519	270pF sm
C1507, 1508	560pF sm
C1510, 1513	56pF sm
C1511, 1512	150pF sm
C1515, 1517	120pF sm
C1516, 1518	22pF sm
C1501	2–22pF preset
RLY1501, 1502, 1503, 1504	5V sub-miniature type SMR5
D1501, 1502	IN4001
L1501	7t–30swg on FT37-43 toroid
L1502, 1504	15t 26swg on T37-2 toroid
L1503	12t ditto
L1505, 1507	16t ditto
L1506	18t ditto
L1508, 1510, 1511, 1513	10t 26swg on T50-10 toroid
L1509	11t ditto
L1511	9t ditto

SYNTHESIZED VFO

C1601	470pF sm
C1602	100pF sm
C1604	50pF sm
C1613	39pF sm
C1603, 1607, 1609, 1611, 1616	0·01μF c
C1606	2200pF c
C1608	0·1μF c
C1610	10pF NPO c
C1612	18pF NPO c
C1614	0·001μF c
C1615	0·22μF c
C1615, 1616	1,000pF feedthrough
C1617	10μF, 16V
C1605	5·5/65pF
R1601	2·2kΩ
R1602, 1603	10kΩ
R1604	22Ω
R1605, 1606, 1607	120kΩ
R1608	27kΩ
R1609	100kΩ
R1610	47Ω
R1611	100Ω
R1613	100 + 1kΩ
R1612	100kΩ log pot (see text)
R1614	2·2kΩ lin pot
D1601	IN914
D1602, 1603	BB109G
D1604	6·2V, 400mW zener
TR1601	2N918
TR1602	MPF102
IC1601	SL1640
IC1602	SL1612
L1601	24t 30swg on 10mm dia slug tuned core
RFC1601	1mH RFC
Crystals	0·5in spacing
X1601	15,800kHz
X1602	15,300kHz (see text)
Ferrite beads	Four-off
DPDT centre off	

VOLTAGE CONTROL BOARD

R1707, 1708, 1709, 1710, 1711, 1712	27kΩ 0·25W
R1701, 1702, 1703, 1704, 1705, 1706	10kΩ preset 10t
D1701, 1702, 1703, 1704, 1705, 1706, 1707	IN914
ICI701, 1702	4016

pin. The display should read 3,500·0 ± 1·5kHz depending on the position of the lsb/usb switch. Grounding the control pin will give a different reading, which is an incorrect one.

If the display indicates the wrong, or no, frequency, check the input at pin 28 of IC405 with a frequency counter. This should be the required reading divided by 10. If there is no reading at pin 28 of IC405, check the inputs and follow the signal through the two prescalers (IC1402 and IC1403). The output should be at ttl levels. With the control pin at 5V, check for the presence of the synthesizer signal (divided by 10) at pin 11 of IC1405 and for the bfo signal (also divided by 10) at pin 12. If the bfo signal is missing, check the operation of IC1406 to make sure that the signal at the Y pins comes from the A or B inputs as the select pin is grounded or elevated to 5V. If not, then IC1406 is defective. If correctly wired, however, there should be no trouble with this part of the project.

The pcb is bolted down to the existing board with a thin insulating sandwich between. Don't mount the board on stand-offs higher than 0·125 in (3mm) as we wish to keep digital noise from the receiver! If you do get a noise problem, which can easily be checked by disconnecting power to the

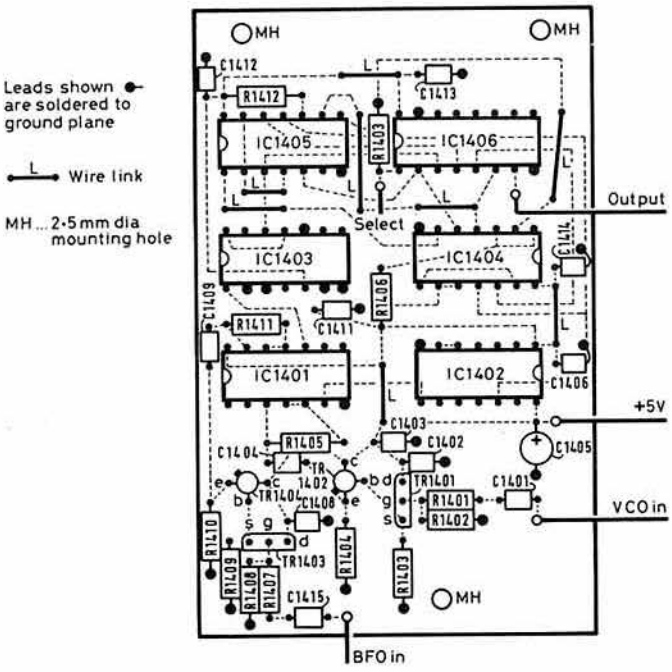


Fig 19. Counter mixer board components layout. All holes enlarged except where required for grounding

mixer board, then you will have to erect a shield. This was not necessary on the prototype.

The operation should be checked on all bands, and you will find that if you have used the display pcb shown in the original article, then connections to segments a and d to g will have to be made to the most significant digit. Segment f is not really necessary. These connections can be made with short pieces of wire to the adjoining digit, and it should not be necessary to take the board out of its position to accomplish this.

Bandpass filters

The additional bandpass filters are included on one board, which is fixed inside the rear wall of the cabinet over the position of the existing filters. The track layout is given in Fig 20 and the parts layout in Fig 21.

Modifications are made to the main board. These include scrapping the existing 14MHz filter, amending the 3·5MHz filter from diode switching to relay switching, and fitting a 9MHz trap. The following components are removed: R202 to R207, C211 to C218, C279, D203 to D206. The board is drilled for the two new relays, and wire connections are made as shown in Fig 22. A short piece of coaxial cable connects the input and output of the filter board to the Veropins.

The 9MHz trap is probably best fitted to the underside of the board to facilitate easy adjustment. The toroid coil being fitted in place of D203, and the trimmer in place of C212, with a grounding wire taken to a convenient point. The best method of tuning the trap is to connect the 9MHz output from the bfo to the input of the filter, which is switched to 7 and 10MHz. Monitor the output at C205 with an oscilloscope or an rf voltmeter and adjust the trap for a null. This should be quite pronounced. Check that the null occurs on both upper and lower sidebands. Afterwards, reinstate the wiring.

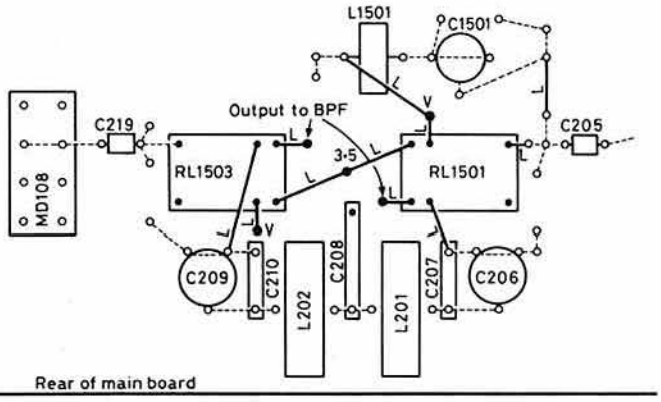


Fig 22. Modifications to existing bandpass filters. Component side shown. Dotted lines indicate existing tracks. V indicates Veropin soldered to ground. Lines marked L are new wires on track side of pcb. See text for redundant components

(TO BE CONCLUDED)

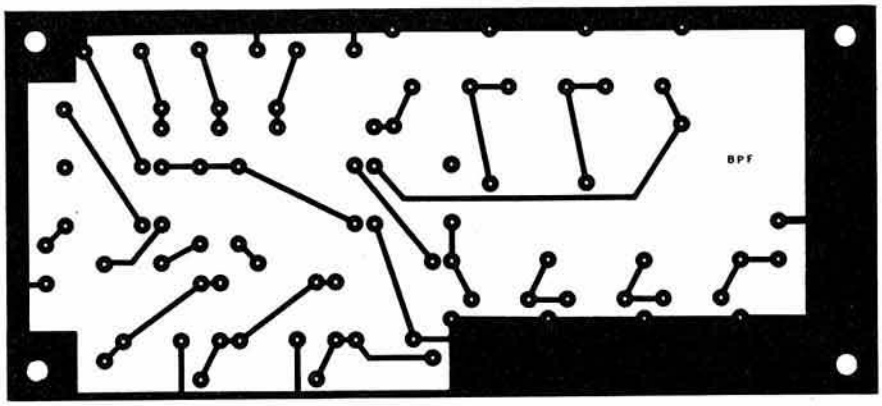


Fig 20. Bandpass filters pcb track layout, single-sided

FIG 4 (b)—amendment
(*Rad Com* September, p695)
Please note that R1349 should be connected to 12V, and not 5V as shown. The pcb is correct.

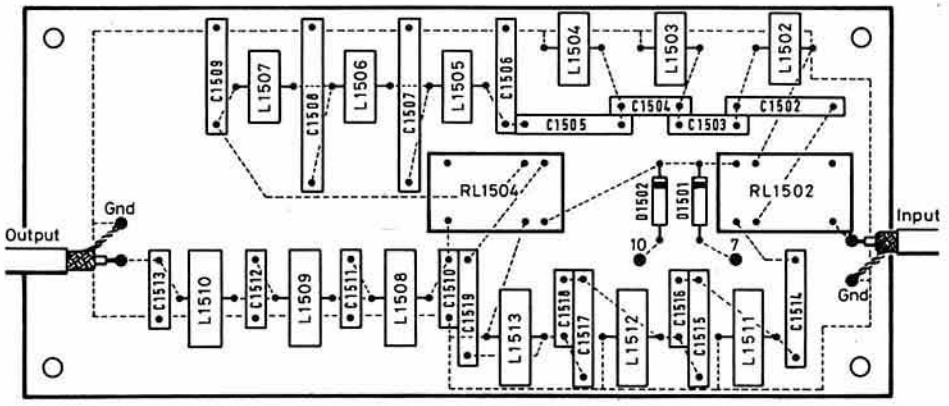


Fig 21. Bandpass filters components layout

Technical Topics by Pat Hawker, G3VA

RECENTLY, in reviewing the circumstances behind the almost universal worry about the apparent diminishing ability of amateur radio to attract and/or retain the interest of youngsters in these days of personal computers and worldwide subscriber-dialling telephones, I wrote in *Electronics & Wireless World*: "While some believe that in order to appeal to younger newcomers it is necessary to stress new technology in the form of packet data, spread spectrum, Oscar satellites and microwaves, others believe that the fundamental attraction lies in the use of relatively simple equipment for speech and manual morse communication."

I quoted 23-year-old Peter Hall, G4ZPT (*TT* June 1985, pp454-5): "With just a handful of components, a morse key, and a wire antenna strung up into a tree, it is possible to converse with fellow human beings miles away. This is, by any reckoning, an extraordinary and wonderful thing—too often forgotten by the many who buy all their gear, plug it in, switch on and talk."

First rigs and the young newcomers

It was therefore interesting to find basically similar views, though concerning teen and pre-teenagers, expressed strongly in the correspondence columns of *QST*, June 1985, p52, by B N Ensanian, KI3U. He wrote: "The average adolescent has grown up surrounded by advanced electronics from cb to computers, vtr machines to wristwatches that do everything but feed the cat. To them, hands-on contact with a very broad variety of electronics is routine.

"Yet many simple old pleasures, such as playing baseball with the gang, aren't declining so drastically in popularity. I think I understand. When I got licensed at the age of 12 in 1960 I was a kid with a strong sensitivity for 'I can do that', 'I can build a radio', 'I can do it all by myself'.

"Some friends of my parents demonstrated cb radio. It was interesting, but seeing them operate commercially-made gear just didn't capture my imagination. . . . What had hooked me on radio was a magazine picture of a young boy wearing a headset connected to a homemade crystal set. I knew I could wind a coil, mount it along with some other parts on a piece of wood, string up a wire to a tree, and then claim 'I did it all myself'.

"When I started as a Novice, there was an unwritten rule that no matter how easily you could afford commercially-made gear, you built your first transmitter and, perhaps, even a simple receiver. Only after having made contacts with your own homemade rig were you considered to be truly initiated into the fraternity as a 'real' radioman.

"I don't advocate reversing the progress in commercially-made rigs. I've operated my share of appliances and will continue to . . . but as for selling the appeal that making contacts with such rigs is somehow irresistibly challenging and exciting to today's teenage computer veterans, I doubt it.

"We need to reintroduce the ethic of building your first rig—of rising to the challenge of creating your first signal by your own hands. We need to revive the beauty and wonder of radios constructed from a few simple old parts and much ingenuity. And we need to let the youngsters know we are proud of them for having done it all on their own."

It was an unfortunate, entirely unforeseen and unintended effect of the UK Class B licence that it has meant that so many amateurs here *start* on 144MHz where it is so much more difficult to build the type of first rig that KI3U has in mind. It is on the 1·8, 3·5 and 7MHz bands that a simple, crystal-controlled, one or two-stage, 5-20W cw transmitter with a tree or chimney-stack-supported wire antenna can still keep alive a practical and enjoyable do-it-yourself concept, aided perhaps by the rest of us taking more trouble to search ±5 or 10kHz after making a CQ call rather than assuming that answering stations can always net exactly on frequency. The proposed "intermediate licence" may help, but is surely not a complete answer since it still implies that the first steps, after taking the RAE and getting a Class B licence, will be to acquire a factory-built vhf rig.

KI3U is surely right in believing that a strong element of "I can do it myself" is an essential prerequisite to attracting and retaining the long-term interest of youngsters.

Frank Hughes, VE3DQB, recently drew my attention to a letter in *The Canadian Amateur* from Harry Gloster, VE3IT, who had just finished building and erecting a new quad antenna, and who has never purchased a commercial antenna. Not bad going for someone who has been an amateur for *77 years* and built his first transmitter and receiver from an article published in 1907 in the *Boys Own Paper* when he was 10 years old. Clearly that spark rig hooked him for life!

While it may be argued that commercially-made and ex-Service equipment was widely used in the UK for "first rigs" throughout much of the past 35 years, this still involved (until recently) a good deal of auxiliary equipment and the ability to assemble the various separate items into a working radio station. The modern transceiver is a very different kettle of fish: plug it into the mains and the cable from a factory-built antenna into it—and, hey presto, that's often all there is to it, except talking and listening; or at least that's how it must appear to many youngsters! As surface-mounted components become the norm, even home modification or home maintenance will become impracticable.

Yet without a significant element of do-it-yourself, we are all in danger of becoming merely the ageing caretakers of a once great and unique hobby. I wish it were possible to be more optimistic!

Curing rfi without the RIS

The decision of the DTI to switch the diminished resources of the Radio Investigation Service towards "enforcement" while carrying out a "phased withdrawal from the time-consuming effort put into dealing with domestic tv and radio reception problems" is understandable, but will be regretted by many amateurs who have been able to rely not only on the specialized technical skills of the RIS teams but also the diplomatic way they handle the vexed social problems.

Indeed over the years RIS built up what must be unique expertise in identifying, tracing and suggesting cures for tvi and bci. It is unlikely that this can be readily replaced, even where viewers and listeners are prepared to pay the trade to carry out such work. The promise that manufacturers will be legally obliged to build sets with better immunity to strong local signals, at least to the standards suggested in BS905 Part 2, is indeed welcome news. But even here a word of warning is in order. A check with BS905 shows that this specifies immunity measurements only between 26 and 30MHz and is clearly directed primarily at achieving immunity to legal, low-power cb 27MHz fm signals. While immunity to such signals should help in cases where transmissions are on amateur hf bands, it will not cover such problems as the wideband vhf/uhf amplifiers, widely used in pre-amplifiers, vcr machines etc, that can so easily be overloaded by 144 or 430MHz signals. Nor should we expect BS905 to provide the degree of immunity required to cope always with a legal-limit amateur radio transmitter next door.

Having had an opportunity to read in draft the text of the new DTI booklet *How to improve television and radio reception* (which should be

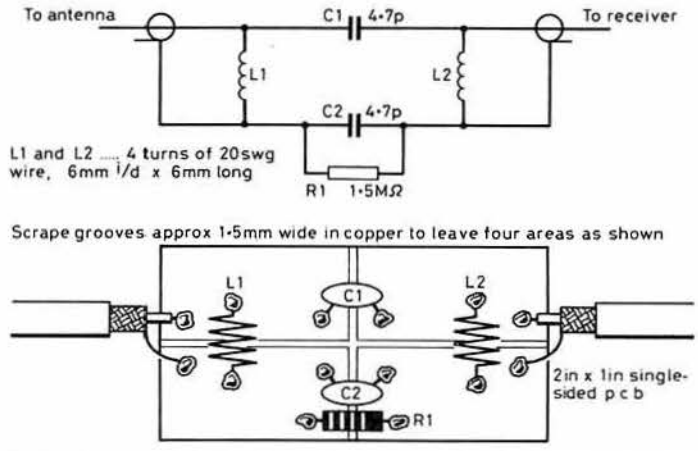


Fig 1. Combined braid-breaker and high-pass filter as included in the DTI booklet *How to improve television and radio reception*. This is intended to prevent hf signals from flowing down either the inner or outer of a coaxial cable feeder. R1 provides a static discharge path. This filter uses single-sided printed circuit board

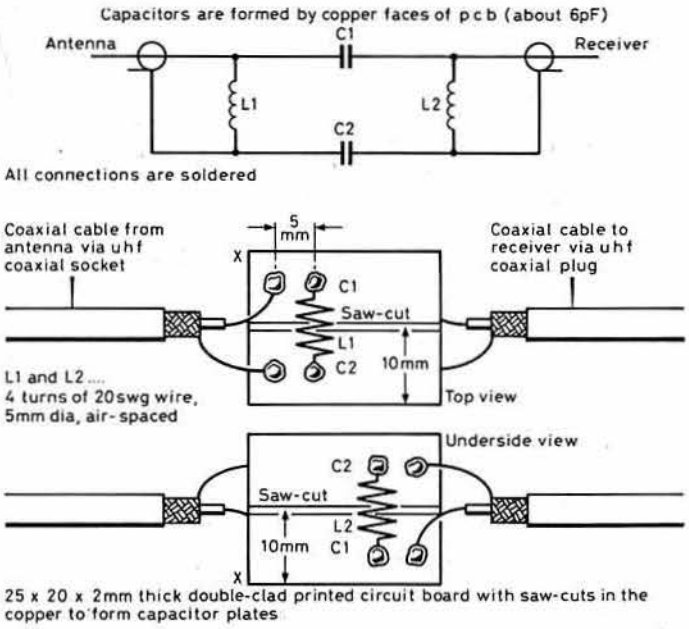


Fig 2. An alternative design by G8YOM as published some years ago in *TT*. This uses double-sided copper pcb with the capacitors formed by the copper faces (about 6pF). Note that it would be advisable to add a static discharge resistor as in the DTI design

available free-of-charge from main Post Offices by about October/November) I would strongly urge all British amateurs to obtain a copy. The DTI admits that this useful booklet has been modelled on a similar FCC booklet first published in 1977 at the height of the American cb boom. The DTI points out that American viewers have never had a free interference investigation service on which to draw. The booklet is divided into two parts. Part 1 is intended for householders and very firmly emphasizes that the vast majority of reception problems are due to the receiving installation; it also provides check lists, illustrations of some common tv reception problems, including weak signal reception, "ghosting" (multipath), reception of distant co-channel signals at times of tropo propagation, as well as various forms of electrical interference such as vacuum cleaners and thermostats. This section includes notes on possible simple remedies and on "how to fit a filter". On audio equipment, which these days is often more of a problem to radio amateurs than uhf television, it says simply: "Audio equipment which does *not* incorporate a radio tuner is designed to reproduce music and not to receive radio signals and is therefore outside the scope of this booklet. If you are suffering interference a modification to the equipment will be necessary. Please consult your dealer."

Part 2, "For the tv and radio dealer", provides an excellent, though necessarily summarized, guide to interference mechanisms, with check charts outlining procedures to follow in determining interference mechanisms for pick-up on the receiving antenna and feeders, as well as

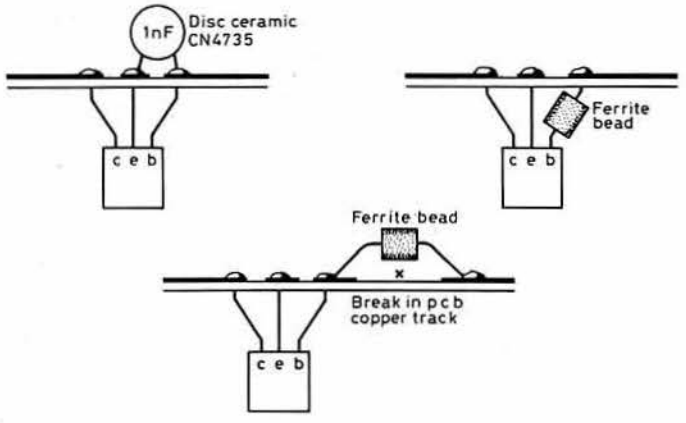


Fig 3. Another illustration from the DTI booklet to show how to fit ferrite beads and rf bypass capacitors. The capacitors should be disc ceramic and fitted with the shortest possible leads. Ferrite beads should preferably be fitted directly on the base lead of the transistor, but where this is not possible it should be fitted across a broken lead on the board as shown

direct pick-up in the receiver. There are also 10 appendices, including information on toroidal choke filters, braid-breaker and high-pass filters (Fig 1), the fitting of ferrite beads and rf bypass capacitors (Fig 3), as well as listing a selection of available commercially-manufactured filters, manufacturers' addresses, regulations affecting reception problems and relevant British Standards. There is also a form for viewers to seek RIS help for those prepared to send £21 in advance.

Most amateurs will note with relief that nowhere in the sections on "radio transmitter interference" is there any suggestion that interference is the fault of the transmitter—indeed neither the householder nor the dealer is given much guidance, apart from a mere mention or two, of the possibility of harmonics other than a note to Appendix 1 which lists amateur radio frequency allocations and states: "It should be noted that most of the frequencies used by amateur radio operators are often obtained by using oscillators at other frequencies and the final frequency then obtained by a mixing process; hence there can be low-level radiation of the fundamental oscillators or any of their harmonics or mixing products."

The DTI is thus shifting responsibility for dealing with rfi problems pretty firmly on to viewers, retailers and manufacturers, though if it steps up "enforcement" it would clearly be inadvisable for amateurs to shrug off or show an unhelpful attitude towards complaints of rfi, but rather to do whatever possible to help overcome the problem and keep the neighbours happy. Few viewers willingly blame their own equipment for rfi problems, and unfortunately many do whatever possible to put the amateur/cb operator off the air by putting pressure on local authorities etc. Many of the restrictive planning ordinances in the USA have resulted not from environmental considerations but more from tvi and bci problems.

In other words, British amateurs are going to have to learn to live without the active assistance of the RIS, and the first step, I suggest, will be to obtain and study the new booklet. It's worth queueing for at your nearest main Post Office!

Window-pane 144MHz antenna

Many broadcast engineers responsible for advising viewers on the reception of uhf television seem to be besotted with the idea that outdoor antennas are *always* essential in order to obtain good quality pictures. While I recognize that for very many viewers this is indeed the case, on occasions I find myself in disagreement with my colleagues since I remain convinced that, in some circumstances, perfectly good pictures, free of multipath "ghosting" and the effects of local movement *can* be achieved with window-pane loop antennas—provided of course that the window is looking roughly in the right direction and the local signal is reasonably strong and clean of multipath.

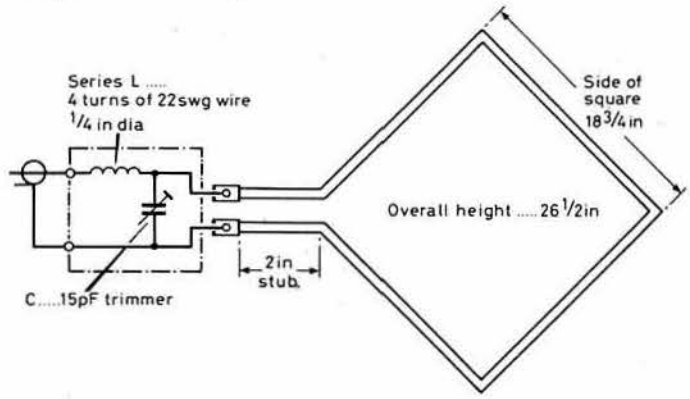


Fig 4. The aluminium-tape 144MHz "window pane" antenna used by G4WEA/A. This can be fed either side of the loop, as convenient, providing vertical polarization. For horizontal polarization feed at bottom corner. Mark the window with a felt-tip pen and then stick down the tape. The spacing of the stub was governed by the "burglar alarm" connectors which came as a pair, about an inch apart between centres

I was reminded of this ongoing debate by a note from John Wells, G4WEA, who has for several years used very successfully a 144MHz "quad loop" antenna formed from self-adhesive aluminium foil tape (see G3DQL's notes in the August *TT*) while operating /A with about 1·5W from an IC2E at the Medical Physics and Clinical Engineering laboratories of Barnsley District General Hospital. His antenna (Fig 4) uses burglar-alarm tape (readily obtainable from RS Components, Farnell etc) stuck on to the metal-framed laboratory window. A 2in (5cm) stub at one corner is fed with 50Ω coaxial cable via a simple matching network mounted on plain Veroboard, which is fastened to the tape's connectors with 4BA solder tags.

G4WEA acknowledges that the idea came from G6IDL, and reports that

performance has been excellent—including even a contact with Holland under "lift" conditions. He points out that an added advantage is that, even at work, it does not have to be put away after every session, as it takes up virtually no room space!

Adjusting hf stubs and antennas

Bill McLeod, VK3MI, was interested in the report by G3SEK (*TT* June, p455) of the technique used for the accurate adjustment of vhf phasing lines using an swr meter as the device to indicate resonance, since he has been using a basically similar arrangement at hf for several years not only to facilitate accurate cutting of coaxial line sections but also to adjust the two halves of dipole antennas. VK3MI writes: "For full versatility and protection the arrangement (Fig 5) needs a 6dB pad between the QRP transmitter or exciter and the swr meter in order to protect against short- and open-circuit mishaps and to allow the reflected wave to indicate the low-Z dip from half-wave lines in parallel on a T-connector with the load.

"The system works with single wires and also the outer shield of quarter-wave coaxial cables used as radiating elements! For convenience, these antenna sections are fixed about 8ft above ground on a temporary wooden support (eg a reach off a packing case) then stretched to the test bench at 3ft for a thin wire to subtend, say, 600Ω and a coaxial outer 50 to 75Ω for 3·5MHz. The elements should initially be cut about one per cent longer than required to allow for the change in earth capacitance when the element is raised to operating height.

"Then, start about 10 per cent too long, find the 'dip' frequency and calculate the percentage error. Snip off 66 per cent only of this error length and at the third try the accuracy should be close to one per cent without any change of overshoot. When required a further stage can be used with an accurate frequency read-out from the rf generator.

"The swr meter needs to be a sensitive, toroid-transformer type, capable of full-scale deflection on about 0·75W, suitable for use with 3–12W of rf power, but the scarcity of power film resistors for the 6dB pad can be a difficulty. Mine are elderly 6W tin-oxide resistors but the 2·5W type PR52 resistors in parallel are satisfactory, as shown in Fig 5.

"This arrangement can safely dissipate 9W and pass 3W to the load. Such a pad is very useful for low-power antenna tests as well as forming a resistive load for transmitter adjustments when terminated with the 50Ω load. The transmitter sees only a change from 30 to 80Ω when the antenna side of the pad varies from short- to open-circuit conditions all too familiar during text work. Even in normal transmission, the 6dB pad can be pressed into service as a 'lie detector' if the distant station claims that your 5 and 9 signal disappears into noise when the pad is inserted!"

Spreaders for open-wire feeders

The question posed by G3WW in the August *TT* about the rf properties of disposable syringes prompted a number of useful comments, although nobody actually came up with the required information. Perhaps more important was a warning given by Ken Ruiz, G4SGF (ex-ZB2MD), on syringes used for medical purposes. He writes: "G3WW is indeed correct in stating that hospitals use many disposable (single-use) syringes, but in fact these are not thrown out. All the hospitals in and around Sheffield incinerate their syringes, often within the hospital grounds. Once used for blood sampling or injection they are coated internally with either potentially infectious material or with dangerous substances, and are therefore disposed of in this way."—(**Note:** this warning has since been made even more strongly by Dr K R Johnston, GW4BCB, and Dave Lankshear, G3TJP, who both stressed that contaminated blood traces can prove fatal, and **never** worth risking for the price of a feeder spreader.)

G4SGF continues: "It is, however, possible to purchase unused syringes from your local pharmacist, many of whom sell insulin to diabetic patients (prescription only) and the syringes can be purchased 'over the counter'. Pharmacists may, for fairly obvious reasons, be reluctant to sell large numbers to strangers unless convinced that they are to be used as spreaders, or you have your GP on your side."

G4SGF sent along syringes of various sizes: 0·5, 2, 5, 10 and 20ml. There is also a 1ml size about twice the length of the 0·5ml size and of similar small diameter. It was, in fact, the small 0·5ml size (about 8cm in length) that G3WW had in mind, and the bigger-diameter sizes would prove very unwieldy as spreaders as they would tend to catch the wind. As G4SGF puts it: "The barrel of the larger syringes would present a fairly high wind resistance when you have, say, 128ft of feeder with a spreader every 2ft or so, unless you use the readily-available 1ml size. If the cylinder is used, to prevent the entry of water or whistling in the wind the hole at both ends should be sealed, the small needle end perhaps by just glueing and the larger by glueing the rubber 'piston head' into it. The head can be very easily prized off the 'cam rod'. The rod itself might prove more useful as a spreader, lighter than the cylinder in most cases and, apart from the 0·5 and 1ml sizes, perhaps easier to secure to the feeder wire. It might also be possible to obtain just the rods from hospitals since these have not been in contact with the contents.

"All my syringes were manufactured by Becton Dickinson in Ireland, but no information is given as to the material and it is anybody's guess how they would stand up to the elements and rf. As I am thinking of making up some feeders in this way I would appreciate any further information."

My present feeling is that buying syringes for this purpose is hardly likely to prove economical, particularly in view of suggestions that have come in from other readers.

Spreaders, plastics and the environment

Arising out of the notes on suitable materials for the spreaders of open-wire feeders by G3WW (*TT* August) and G3TDZ (*TT* May), John Stebbings, G4BTV comments as follows:

"My own 6mm diameter polystyrene rod spreaders became corroded and brittle after only five years and began to drop off. The brittleness is presumably due to ultra-violet light.

"Unable to find more polystyrene, I obtained some polythene strips 50 by 3 by 340mm. These were easily cut into spreaders 50 by 10 by 3mm and, by the use of a steel jig, notched and drilled as described in the various amateur radio handbooks. The total cost was under £3, and I still have enough material left to provide another complete replacement.

"The source of the material was K R Whiston, New Mills, Stockport, Cheshire SK12 4YA. For those who are interested in electrical, mechanical and other surplus 'goodies' a large stamped-addressed envelope will bring his catalogue."

A S Hussey, G4KUN, of Viola Plastics, 36 Croft Rd, Hastings, points out that G3WW or others need look no longer for cheap spreaders. His company manufacture neat-looking spreaders at 18p each, about 75mm spacing. He adds that as a broad guide to choosing plastics for outdoor use it is advisable to pick a dark colour, black or grey for example.

Norman Sedgwick, G8WV, with many years of experience of using open-wire feeders for professional hf communications, mentions that he has become cynical about the quality of spreaders, for all of them soon become sooty and are often soaking wet! It is better, he believes, to have long spans kept taut by tension, without spreaders. He adds that personally he would not use open-wire line for the short distances involved with amateur radio antennas: "Coaxial cable or twin 75Ω cable matched to the load by a toroidal transformer is much easier to install and maintain. They can also be run in plastic pipes under the ground." (This is true of matched lines but a major attraction of open-wire line is the multiband facility given to dipole elements etc where the line forms part of the resonant system and may have a very high swr—*G3VA*).

But G8WV's main plea is to make the point that it is a simple matter for anyone worrying about losses on transmission lines to check using non-inductive resistive loads and an rf voltmeter. He writes:

"Unfortunately, the rf voltmeter seems to be out of fashion, although it is such a useful instrument for a large variety of test measurements that I would have expected it to be regarded as an essential instrument in every shack. Recently, when, in an article, I called for one to be used for testing

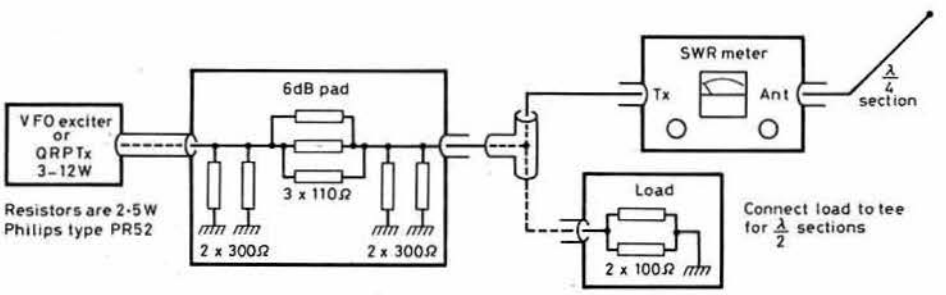


Fig 5. VK3MI's arrangement for testing and adjustment of quarter-wave and half-wave cable and element sections

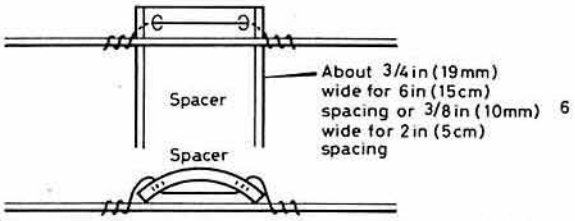


Fig 6. Simple and inexpensive method of constructing 600Ω open-wire transmission lines, as recommended by G6XN. Plastics piping of 2-3in (5-8cm) diameter is cut into short lengths and then sawn lengthwise into strips, a pair of small holes being drilled near each end of each strip. Spacing may be 2-6in (5-15cm) with spreaders at intervals of some 12-15 times the line spacing. With wide spacing, losses are reduced and construction is quicker but symmetry is more easily upset. Note that the spacers are slightly curved and this helps to prevent slippage (from *HF antennas for all locations*)

toroidal transformers, one of the 'reviewers' commented, 'We don't all own rf voltmeters!'.

"In general, one can find out what one needs to know using the transmitter power turned well down. Provided the measurement is made across a correctly loaded circuit of reasonably low impedance, the diode in a conventional rf probe should be safe enough. Voltage at 10W in a 600Ω line is only 77·5V, and across a loaded 50Ω line only 22·4V. These figures make it reasonable to use a point-contact diode probe having a piv of about 115V or so.

"If G3WW terminates his line with 600Ω non-inductive resistance and measures voltage at the input and output, he can soon see if he is losing power in the line, and by simple calculation determine roughly the actual power loss. The rf voltmeter does seem a necessity for an amateur wishing to check easily the matching, balance and loss in transmission lines."

Allan Taylor, G3JMO, was tempted to use flexible polythene tubing held tight by the 18-gauge feeder wires but this proved very inefficient. Over a few months the plastics attracted dirt on the outside which did not completely wash off in rain. But the major trouble was inside the hollow tube. He writes:

"The internal diameter is perhaps 0·125in or so, and here on the northeast coast we get misty, sometimes foggy, weather, often decidedly damp for a day or two. At these times the resistance across the feedline would fall to about 100kΩ, but as soon as the sun broke through it would return to infinity. The problem was condensation.

"It may well be that G3WW's ballpoint pen cases fare no better. Plastic hair curlers are usually recommended and would probably be satisfactory. They are usually perforated and of generous diameter. It seems to me that any tubing used for spreaders needs to be of adequate diameter to permit a breeze to blow through. The form of spreaders recommended by Les Moxon, G6XN, in his *HF antennas for all locations* avoid this difficulty although they might suffer from external condensation; however, this would disperse more quickly. My advice is to keep off small-gauge tubing of any sort for spreaders!"

G6XN's technique, referred to above, is shown in Fig 6 and consists of spacers made of sections cut from plastic piping (diameter 2 to 3in, 5 to 8cm). For those worrying unduly about relatively small losses arising from finite insulation, it is perhaps worth pointing out that G6XN stresses that, "very considerable liberties can be taken without adverse effect . . . the usual labour-intensive instructions for the construction of a 600Ω line are best ignored, and for most purposes can be substituted by the rule that 'anything goes' . . . for long straight runs in an accessible position a spacing of 6in (15cm) is recommended with very few insulators . . . an average of about 8 to 10 spacers per 100ft (30m). A spacing of 2in (60cm) with spacers about every 2ft (60cm) is recommended where a feeder has to be run close to a mast, trees or other 'lossy' objects."

PSU with hexfet pass transistor

Robin Greenwood, G3LBA/PA3ACQ, noted with interest the use of a 723 regulator ic in the Australian "experimenters" power supply (*TT* August 1985 p630). He has a soft spot for this low-cost, docile and flexible ic regulator, using about half-a-dozen of them in various pieces of equipment in the shack. One such item is a 13·4V psu capable of providing a regulated output at up to 20A (continuous output about 9A) for use with an hf rig. He writes:

"This psu uses a 723 and a single IRF150 hexfet to provide a regulated 13·4V at 20A with only two active devices in the regulator circuit proper. Fig 7 shows just how simple such a psu can be, with just a single hexfet instead of the usual parallel power transistors and two-transistor driver stage. The high input impedance of the hexfet eliminates the need for any drivers, while a single IRF150 hexfet can pass 28A at its maximum current rating.

"The essential thing to note about the hexfet is that to drive it to 20A the gate voltage must be 6-8V above the source voltage. However, the drain voltage; can be as little as 2V above the required regulated output voltage; a considerable advantage when device dissipation (and hence heatsink requirements) and value of the storage capacitor are considered.

"In my unit the transformer is a 300VA toroid with a 15V secondary winding, and I have hand-wound a tertiary winding to provide the 9V for the regulator ic. (The number of turns per volt can be established with a test winding.) A 24V zener stabilized voltage is provided for the regulator; this enables it to drive the fet gate to a sufficiently high voltage to permit the device to pass 20A.

"The gate-to-source voltage limit of the hexfet is 20V, and another zener diode is used to protect the hexfet at switch-on when the source is at earth potential; this also serves to protect the device in the event of the output of the psu being short-circuited.

"The regulator and hexfet arrangement shown in Fig 7 can provide a continuous 9A with an 'adequate' heatsink, and will supply 20A with the duty cycle encountered with ssb with adequately low output variation (300mV, 0-18A). My version 'remotes' the voltage divider with two sense wires to bring the point of regulation to the connector at the rear of the rig. This is conventional and not shown in the circuit diagram, and is not really essential. The overvoltage protection senses the terminal voltage of the supply; if the output exceeds 14·8V the crowbar thyristor fires and blows the 20A fuse. The crowbar and fuse are placed before the pass transistor to ensure that the charge in the main storage capacitor is not absorbed by the hexfet during overvoltage firing or overcurrent conditions. The capacitor on the MC3423 device prevents spurious firing. This feature is essential and should never be omitted in any psu to which expensive equipment is connected! No rf decoupling is shown, but I recommend that the unit be totally screened and an IEC mains filter fitted. Each output lead is decoupled to case by a 0·1μF ceramic disc capacitor.

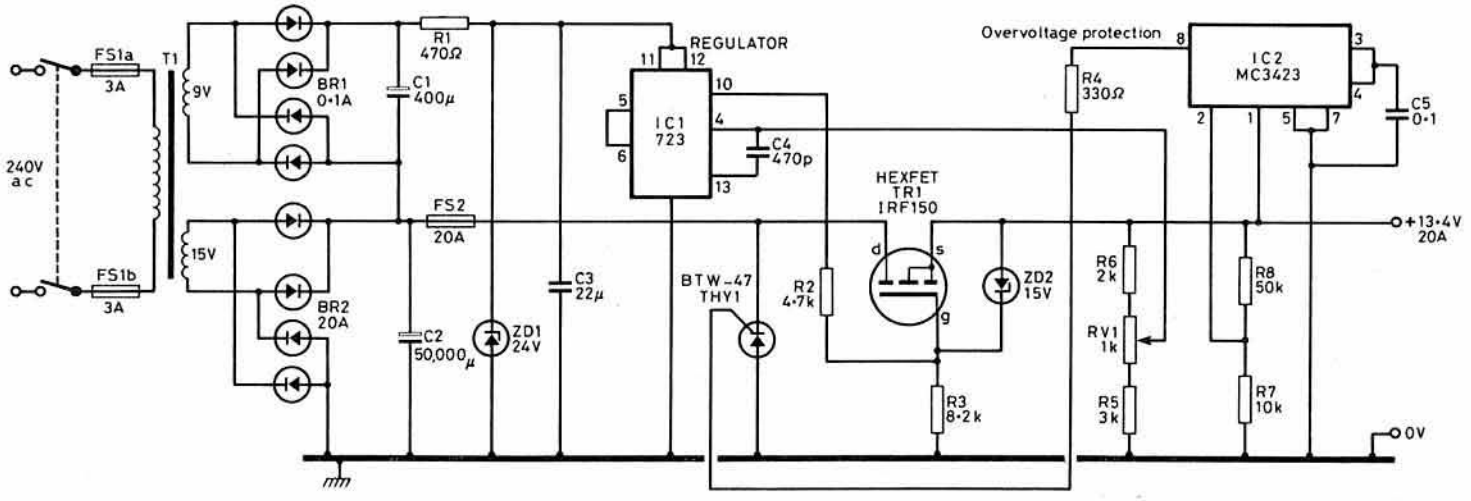


Fig 7. High-current psu providing 13·4V at up to 20A (peak) used by G3LBA/PA3 showing the simplicity made possible by the use of a hexfet (six power fets in a single package) pass device

"The IRF150 hexfet is an International Rectifier product (available through distributors) and is not cheap, but is well worth considering in view of the reduced metalworking required to reach a given current. Lower cost plastic versions are available rated at 15A, and two in parallel could be used; in this case source ballast resistors must be fitted and the gate-to-ground resistor duplicated and returned to each source."

The Danish "telephone-directory" clandestine radio

In the April *TT*, I paid a long-overdue tribute to the clandestine inland radio service run by a mixture of Dutch amateur and professional radio operators and engineers during the period from September 1944 to May 1945. I mentioned that I recalled only one station (that at Alkmaar with PA0ZY as one of the two operators) surviving throughout the period, although I did stress that my personal recollections covered only one of the two control stations located at Eindhoven.

As a result of that item I have been relieved to discover that at least one, and possibly two other stations in the inland network—plus also quite a few of the Anglo-Dutch clandestine links direct with the Special Communications control station near Stony Stratford—survived the many German raids. It is now clear that following the tragic loss of a number of transmitters in Amsterdam in December 1944, the copious traffic from there was handled by the inland stations at Alkmaar, Haarlem and Hilversum. Operators at Haarlem included Ko de Lee and Evert Kaleveld, PA0XE/DJ0XJ, both of whom survived. Following the raids and closures of January and February 1945 all three stations in this group were told to lay low for a period and the Amsterdam traffic was diverted to the UK links. Later they were reactivated, although I still believe most of my contacts from Eindhoven were with the Alkmaar operators. Both the Alkmaar and Haarlem operators had many narrow escapes in a highly dangerous situation.

The Dutch (and Poles) were not the only people in occupied countries to design and produce some of their own equipment. In the Danish journal *OZ* (May and June 1985), Erik Gørlyk, OZ1HJV, describes the remarkably successful work by Danish amateurs, led by L A Duus Hansen, OZ7DU, an engineer with Bang & Olufsen. In 1943 OZ7DU became dissatisfied with the suitcase-sets and hastily trained operators infiltrated into Denmark by SOE (who had assumed responsibility for much of the intelligence work as well as sabotage in that country). The group decided they could develop and operate sets more suitable for use in the less restrictive conditions that still existed (although soon to vanish) in Denmark. OZ7DU with the help of Svend Bagge, OZ7SB, and Steen Hasselbalch, OZ7T, designed and built some 60 "Telefonbogen" (telephone book) transmitter-receivers to a size and weight that allowed them to be disguised within the covers of the Copenhagen telephone directory (21 by 14 by 7cm, weight only 1·5kg).

The secret to building a 10W transmitter weighing less than 1·5kg was the adoption of ac/dc "transformerless" techniques, using seven 0·1A series-heater valves whose combined heater voltage added up to the 220V Danish mains supply. The superhet receiver used three UCH21 valves. The two-stage transmitter comprised a UF21 crystal oscillator and two parallel UBL21 valves, plus the UY1N half-wave rectifier which supplied 250V to the transmitter and 200V to the receiver. Signal plans and crystals were sent out from the UK and the stations were operated by a number of Danish amateurs including, apparently, Bo Brøndum-Nielsen, OZ7BO, who became very well known to British amateurs after the war, not only for his superb operating but also for the design of an electronic keyer published in the *RSGB Bulletin*. The group also introduced the use of high-speed keying on clandestine circuits, using a GNT auto-sender, and had 300MHz vhf r/t links, operated among others by Edith Bonnesen, OZ7DU's secretary.

The Danish story has a happier ending than the Dutch. Very few, if any, of the Danish amateurs involved in this work appear to have lost their lives, although some saw the inside of Gestapo prisons.

Incidentally for those who feel that any mention of "valves" now belongs only to history, I wonder if they could produce today a *complete* mains-operated hf transmitter-receiver providing 10W output yet weighing only about 1·5kg? To have done so in 1943 using only standard consumer-type components in an occupied country surely deserves to be remembered!

Not that Danish clandestine operators always endeared themselves to the British control stations. I recall a message out of Copenhagen during 1943 that complained that afternoon calls often went unanswered and suggested that the British operators were taking time off for tea! Since the only tea-making facilities at that station comprised a temperamental primus stove and water from a village pump—later condemned as unfit for human consumption—and as the actual problem was the crude receiving antennas (later much improved) and the variable propagation conditions of the UK/Denmark path on about 7MHz during summer afternoons, this message did not go down too well!

An example of the Telefonbogen set was on display recently at the "Resistance in Europe" exhibition at the Imperial War Museum; also to be seen was an early, crude home-made transmitter used by the Belgian "Clarence" intelligence network organized by Walthère Dawé, Belgian director of posts and telegraphs (later killed while resisting arrest).

The Danish articles were kindly brought to my attention by Dick Rollema, PA0SE, and Colin Turner, G3VTT. Evert Kaleveld, PA0XE, has recently provided a detailed account of the Haarlem clandestine operation. □

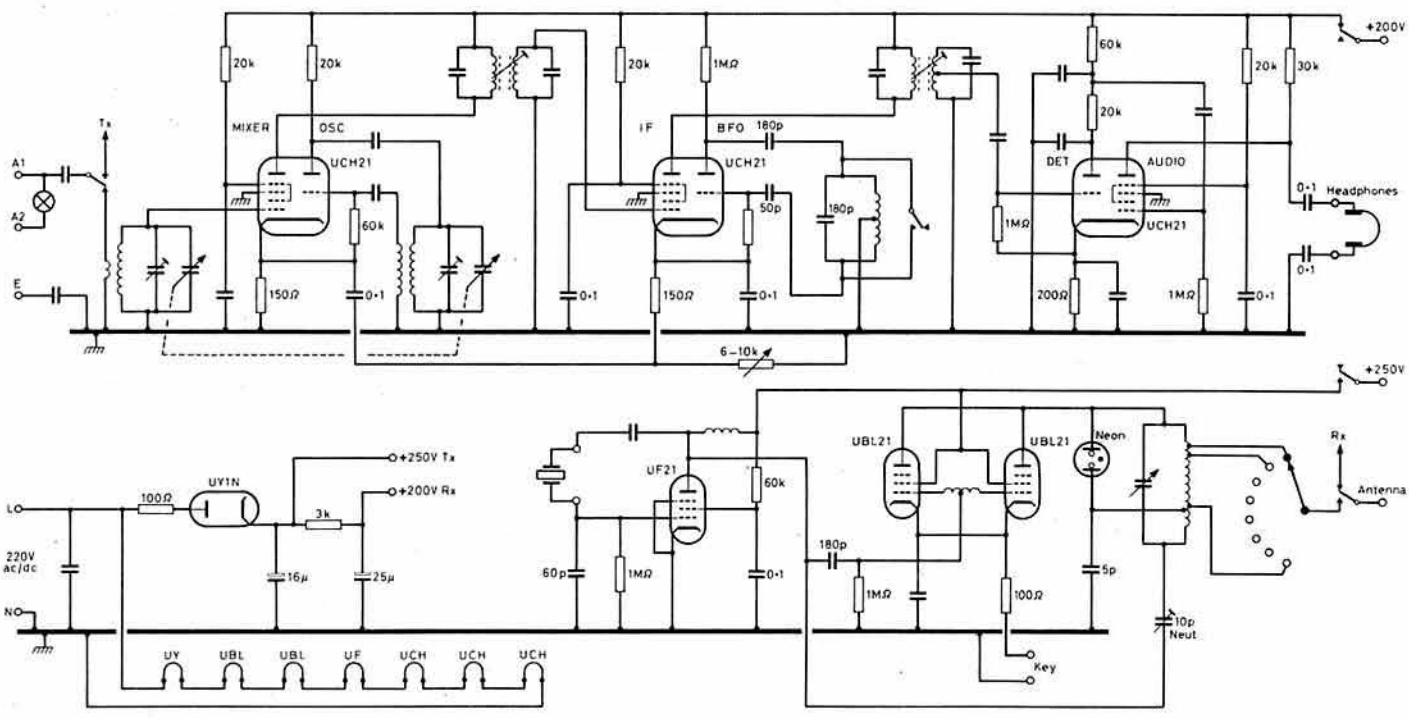


Fig 8. Circuit diagram of the Danish "Telephone Book" transmitter/receiver designed and manufactured in Denmark in 1943 by OZ7DU, OZ7SB and OZ7T. Note that "live chassis" transformerless construction is not recommended for amateur equipment for reasons of electrical safety, but in its intended application resulted in a total weight of only about 1·5kg. It is believed that about 60 such units were built. The antenna tuning lamp was switched out in operation to prevent chirp

4-2-70

*by Ken Willis, G8VR**

Foula Island, site of the recent expeditions which have provided a new square for many stations. Try getting a full high-power vhf installation ashore on that coastline!

Flashback

With reference to the ill-fated West Kent ARS transatlantic 144MHz tests which had to be abandoned because of atrocious weather conditions, I am indebted to Gus Taylor, G8PG, for the following reference which seems to lend support to the theory that there is nothing new under the sun. Quoting from the *RSGB Bulletin* August 1953, a mere 22 years ago, the Irish 2m Transatlantic Tests sponsored by the International VHF Society took place from Kilkee, Co Clare, between 4 and 12 July when signals were transmitted by two transmitters on 144·18MHz (cw) and 144·196MHz (a.m.), one phone and two cw transmissions being made each hour. On the far side, Ed Tilton, W1HDQ, ARRL vhf editor, organized the USA operation. On 7 July and again on 8 July weak and unidentified cw signals were received, but the "real thrill" came at 0118gmt on 11 July when GI5HV read a cw signal signing "de W4" on 145·300MHz.

Micros in vhf applications

Trevor Tugwell, G8KMV, reports that the Amateur Radio and Computer Club (AMRAC) was formed in South Hampshire a few months ago to promote the use of computers in amateur radio and to encourage communication using digital techniques. The club currently has 31 members, all of whom are active using data communication on the 144MHz band. With such a high level of activity, the data frequency (144·675MHz) became overcrowded, so the club decided to use 144·675MHz for calling, and 144·550 and 144·525MHz as the primary QSY frequencies. These were selected after a careful study of the band plan in order to avoid frequencies used by other groups (or other modes such as fax, sstv, horizontal fm etc). The club is studying the possibility of establishing data repeaters in the South Hants area, and current thoughts include two 430MHz repeaters, one a single frequency system using AX25 packet radio protocol, the other a conventional duplex rtty installation for 45 baud Baudot and 1,200 baud Ascii. The club's first newsletter and further information on membership can be obtained by sending an sae to Trevor Tugwell, 50 Mayridge, Fareham, Hants PO14 4QP, or by telephoning 04895 81032.

Expedition results

Dave Gray, G8YYB, operated from the Isles of Scilly between 4 and 16 July on 144MHz. His 4CX250 linear developed a fault on the second day, but he had wisely brought along a spare solid state amplifier. (Expeditions have been lost for far less important items than these, abundant spares being good insurance when hard-earned money has been spent in getting a team plus equipment to a remote site only to find there is no spare ic for the keyer or a replacement for a faulty microphone!) Dave made 702 contacts in 13 countries and 48 squares in what he termed "spasmodic operation", and was unlucky in that the only Es opening occurred during the biggest thunderstorm in years over the Scillies on 13 July at 2000gmt when Spanish stations in XW square were being worked by mainland operators. With a nearby hilltop (QTH of G0AEA) being repeatedly struck by lightning, it was decided that it was best to watch the display rather than to operate the radio. In good tropo on 12 and 13 July, Dave worked many stations in eastern UK and Holland, some using QRP to indoor antennas; best dx was DL5BAC in JO43LG (EN). Having experienced this operation from a westerly location, Dave asks operators to beam that way much more frequently, since he found many stations hearing and calling him off the back of their beams. He says that there is a large contingent of well-equipped stations in the southwest, west, GI and EI which face a dead band with few stations beaming their way. Dave plans to return to the Scillies next summer with 430MHz equipment as well as 144MHz "by popular request".

The Foula team (*4-2-70* August 1985) were much in evidence via meteor scatter during the Perseids, providing a rare square to those fortunate enough to work them. Reflections were quite short except right at the peak of the shower, but the use of 1,000 lpm on cw made contacts possible. The sheer feat of getting all that equipment to this really remote site commands admiration.

Telford & District ARS made a trip to Islay (IO65UO) between 7 July and 3 August, team members being G3UKV, G8UGL, G4AUY and G8VZT. They operated the hf bands plus 70, 144 and 430MHz, with 50MHz crossband facilities from a site known as "The Oa" on the island. They experienced atrocious weather conditions but had an enjoyable time summed up as: **144MHz**—hard work but over 200 contacts in flat conditions; best dx was into Kent and Isle of Wight; used 14-element MET antenna; biggest problem was QSB, signals going from S7 to zero during contact. **70MHz**—really hard going despite use of an eight-element Yagi "carted 400 miles up there"; worked 22 stations including G5DQA, Welling, Kent and G3TCT in Dorking, Surrey; long deep (10min) fading was the norm. **430MHz**—the hardest of the lot; only a handful of complete QSOs, and hardly anything heard even during the QRP contest of 27 July, but when stations were persuaded to turn their beams north "lo and behold QSOs were more often than not completed"; and as for the station in Berkshire who said "We heard you on 70cm last night but didn't call", words failed them! On 50MHz crossband they worked nine stations, and found that on this band, as well as on 70MHz, 1min transmit/receive periods were very useful so that a mixture of ms and tropo enabled the contact to be made. A simple 50MHz dipole was used into a IC505.

Repeater news

The Mid-Cornwall Beacon & Repeater Group reports that GB3NC and GB3HB are to have a new mast, antennas and outbuildings adjacent to the present installations. The site is on the St Austell English China Clay Laboratories property which is somewhat exposed to weather, but nevertheless the installation survived the 10 years since GB3NC first became operational. The new mast seems sturdy enough to survive for quite a time. The group members are G4XGF, G4NTX, G6CEP, G8GOR, G3VVB, G3XFL, G3GHS (secretary), G3WKC (chairman) and G3YJX (treasurer).

The South Coast RTTY Repeater Group, formed in the summer of 1984, is working to get an rtty repeater running on 430MHz from a site in Sussex. While the immediate plan is for rtty, in the longer term the group wishes to expand into the use of Ascii, packet radio, and message forwarding (Mailbox), though they believe that packet radio may require 1·3GHz facilities. The group is small at present and needs further support so that equipment and site rental costs can be met. Discounted prices for its members are being negotiated on rtty software for some of the more commonly-used micros. Further details can be obtained from P Morgan, G6VKM, PO Box 161, Portslade BN4 1LW.

The Cambridgeshire Repeater Group Newsletter No 8 is to hand, and it contains its usual wealth of repeater, technical and general-interest information. One of the features is a proposal from G4IIQ for a repeater, GB3MI, to cover parts of the M1 which currently are reported to be badly served. Specifically this is the section of the motorway between exits 6 and 16, some 40 miles in all. G4IIQ makes the point that although repeaters GB3SL, GB3NL, GB3VA, GB3PI and GB3CF all provide coverage in part of the motorway, it is inconvenient to have to switch between repeaters when driving, so a single installation tailored to fit the specific purpose would be an advantage. We have had correspondence on this situation in the past, but not everyone agrees that the need exists for further coverage. Other news from Cambridgeshire is that GB3PI has its new transmitter installed, while a new receiver is under construction. This will include an over-deviation meter with facilities for audio to be shut off and a morse "D" transmitted when over-deviation is detected on an incoming signal. Despite these innovations the group wishes to acknowledge that the present receiver tuned and modified by Chris, G3VEH, is still going strong and dates from the very earliest days of GB3PI.

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Rosemarkie beacon

GB3RMK (IO77UO) in Rosemarkie is now operational on 50·060MHz, and has been reported as an excellent signal by several stations. G3UKV hears it by courtesy of meteor reflections at times, and it should be an excellent auroral warning signal for stations to the south. With the probability that 50MHz will loom large in the future, the investment in a converter which will tune to this frequency seems a sound one, as well as providing a means of monitoring European tv for *Es* openings.

Roy Gasken, G4RXD (Cheshire), can copy GB3RMK most days via meteor reflections, sometimes receiving the entire call in a single burst.

In their *2 metre News Sheet,* SM6EOC/SM6AFH say that the Icelandic beacon TF3VHF will start up soon and the frequency will be 144·937MHz, beaming to the southeast.

Some 50MHz USA beacons to listen for are K1NFE (Connecticut) on 50·440MHz and KS2T (50m south of NYC) on 50·070MHz, the latter running 10W to a quarter-wave groundplane, heard during the 2 July opening by (among others) G4GLT.

Syledis

The VHF Committee has been active this year in promoting the use of the 430MHz band, one of the reasons being that if any part of the amateur allocation is seen to be under-utilized, then in these days of increasing demand for spectrum space, we may lose it. Already we amateurs share the 430MHz band with Syledis, which causes many problems for operators in certain parts of the country. Shaun Cline, G4MDZ, Hawkinge, Kent, has written a most informative letter entitled "A future for 70cm?" in which he comments on a number of issues, and in particular refers to an article in the Dutch amateur radio journal *Veron* sent to him by Frank, PE1EWR. Shaun says that for a number of years he has been vocal concerning the Syledis interference encountered on the south coast and which (he says) prevents contacts to the east and southeast. He had hoped that with the advent of satellite navigational systems the use of Syledis would decrease, but on the contrary its popularity seems to be increasing, with the result that on the 430MHz band in some parts of the south, operators have to contend with S9 plus 40dB signals over a 4·4MHz band, well outside specifications originally set down for the use of this system.

Some newcomers to the hobby may not know what Syledis is all about, so here is a very potted version of it. It is a radio-positioning system, developed by Sercel, which became immensely important when the need arose to position oil-rigs in sea locations to an accuracy of ± 5m some 200 miles from land. Existing navigational aids such as Decca were initially used, but these larger fixed installations were intended to cover specific areas, and were not always available when needed, nor did they provide the necessary accuracy—or so say the French proponents of Syledis.

Operating in the band 430 to 434MHz, a Syledis transmission consists of long coded pulses, long in this context being 2·6ms. The power is quite low, about 20W, so the equipments are small and can be set up on small land-based or shipborne locations, making the system attractive to surveying companies offering services for positioning offshore systems. However, the spectral distribution of the radiation is such that numerous tweets or "birdies" are produced across the band, pulsating in a very characteristic manner, and easily identified as a Syledis transmission. Depending on where you live in relation to Syledis "chains", these birdies can either be an indication that the band is open or they can be a permanent problem such as described by G4MDZ. Certainly it is wise to try to find gaps between the pulses when using the band, because even if the signal is weak to you it may be very strong at the station you are attempting to work.

New mast installation at GB3NC/GB3HB at St Austell, Cornwall.
Photo: **G3GHS**

Syledis typically achieves ranges in excess of line of sight, say up to about 100km over a sea path. The minimum requirement for a measuring system is one mobile transmitter/receiver (usually shipborne) and one beacon station which will normally be land based. However, the two stations are interchangeable, since the system is very flexible. Without going into too much detail, because the pulses transmitted are coded, it is possible to measure the time taken for transmitted pulse to arrive at the receiver, thus giving a range measurement. Obviously more than one such measurement is needed (triangulation) if a true positional fix is to be achieved, so this "range mode" is expanded when three or more stations operate together to provide a series of range readings along curves which intersect to again provide a unique positional fix. This is the "hyperbolic mode".

Commercial interest has meant that the use of Syledis has expanded rapidly, with consequent demands on frequencies to accommodate the many chains which have built up around specific sea-platform projects and other requirements which now fill both sides of the North Sea and the Atlantic Coast off France and Spain right round to the Mediterranean. The French are among the most enthusiastic users of the system, and their frequency allocation list occupying several close-typed pages makes sinister reading for the 430MHz enthusiast. Next time you hear these tweeting sounds on the band they will be coming from some innocuous-looking black box on a ship or on land using an antenna which is usually four vertical folded dipoles, sometimes a single dipole. Don't make yourself and the amateur movement unpopular by purposefully jamming one of the tweeting frequencies; chances are it won't have the slightest effect on what is going on in that sphere, so pick spots between the tweets whenever possible. Later, when space permits, I will mention some of the other points in the *Veron* article dealing with what is happening to the 430MHz band, but the moral must surely be "Use it or lose it". Maybe one of those incredibly successful east coast 430MHz operators who work into the USSR and other exotic places on that frequency will write in to tell us if they are bothered by Syledis, and if so how they go about combating it. As a quite unrelated topic, I would like to know what is the level of tvi experienced by regular users of this band compared with 144MHz.

Meteor scatter

My correspondence suggests that the Perseids shower this year was not exceptional; certainly most of the reflections were quite short on either side of the peak. Several stations complained that the operators at the other end of a sked made on the 14MHz vhf net did not turn up; we have mentioned this before, and especially with newcomers to meteor scatter there is a tendency to make too many skeds and fail to leave enough time for sleep. Philip Murphy, GI4OMK (Belfast), had a total of 40 skeds with about a 25 per cent success rate. He felt that the shower was "a disaster up to 2300gmt on 11 August, after which it improved quite a bit". He reckons that the peak occured between 0000 and 0200 on 12 August. Tom Melvin, GM8MJV, also found conditions poor on 10 and 11 August, and was another who suffered from operators not appearing for his skeds. He needed three attempts to work I6DQE/6, even though he heard that station every time. Tom tried 430MHz ssb ms for the first time using 400W and two 21-element Tonnas. He heard nothing from LA1K on this band, but was not discouraged and will try again.

It would be good if more stations would attempt something new, such as using higher frequency bands, rather than to keep on working the same regions on 144MHz, even if the chances of success are small. Remember that the early pioneers in ms spent countless hours listening to white noise in bringing the techniques used today to their present level. GM8MJV's list of skeds suggests that the Perseids peak occurred in the 24h period between 0330 12 August and 0030 13 August, since he had five complete contacts in that period, a 100 per cent success rate.

John Palfrey, G4XEN, is a regular ms operator and finds the north-south path to Spain very easy between 0400 and 0700gmt. He was yet another to have operators missing skeds, some of them at the peak of the shower. John uses an MM transverter and 100W linear into a 14-element parabeam, another indication that very high erp is not needed for consistent ms work provided one is patient. Dave Dibley, G4RGK, reported having "a moderate number of completed contacts but quite a lot of failures", and contrary to what I have just said about power levels, Dave feels that his 70W is a limiting factor; however he says that these days he is trying to work the long distances. He has worked over 1,800km but finds it hard going due to "difficulty in making myself heard'.

The Foula expedition were heard plugging away before, during and after the shower peak. At G8VR a sked nearly failed because they had a keying problem which made their signals unreadable at times, but just as I was looking up the Q code for "You have a keying problem" I got a single long burst with both calls and a roger-report which enabled the contact to be completed. Later they were heard with clean keying characteristics. Imagine

trying to sort out a problem in the keyer or the rig during a dark night on Foula! We owe a great deal to these hardened types who brave the remote areas to give us new squares.

Paul Kerslake, G4NDG (Tiverton), is now running a 4CX250B and finds it makes life easier for him. He completed all his skeds in July and was most pleased with a random contact with YU2DA. It is a pity that more operators do not monitor the random channels and put out calls, since this would certainly encourage more ms operation. Ian Parker, G4YUZ, who is one of the many operators introduced to meteor scatter working by Paul, G4IJE, paid a visit to Italy and at the home of I3LGP sat in on a sked between the Italian station and G4IJE which he said was very interesting. Ian, back home, received a 63s burst from I3LGP and 20db over S9, and this on sporadic meteors.

The Orionids shower is due to peak on 20 October at about 1100gmt.

Sporadic-E

From a general lack of input to *4-2-70* on this topic, it seems that the 1985 Es season on 144MHz was not outstanding. Only two or three openings of any real significance were reported in the south, on 2 June between 1530 and 1640gmt, and on 5 June from 1200 to 1330gmt. The latter was the most interesting, since several Greek stations were worked, as well as LZ. Dave Dibley, G4RGK, heard EB7NK briefly on 6 June, and said that on that day CN8 was worked by London stations but was not audible at his QTH. There was another opening on 11 June in the late afternoon which favoured stations to the west, when YO, YU, HG and SP were worked by many operators. This opening was preceded by a short event between 1120 and 1155gmt when G4RGK heard UR2RO (KO) and worked SK7JD (IR). So that we can publish the dates next year, information on any openings other than those mentioned would be much appreciated.

To compensate for the relatively poor Es on 144MHz there was of course much excitement from this mode on the 50MHz band, reported under that heading, and this augurs well for the future. With several hundred operators standing equipped for this band when it is released for general use, the mayhem which will ensue if the band opens to North America should be an experience—to say the least!

Conventions

The RSGB Midlands VHF Convention will be held on Saturday 12 October at Maveley Court Centre, Telford, Shropshire. Details are given on p766.

The 1986 RSGB VHF Convention is scheduled to be held at Sandown Park on Sunday 16 March 1986. The change to a Sunday arose from difficulty in booking the Sandown Park complex. Andy, GM4IPK, and Nick, G4KUX, both attended the Nordic VHF/UHF Convention in June and had such a great time that they wished to express their thanks through this column to their Scandinavian hosts at what they describe as "a fantastic event". Quite copious quantities of local brew were apparently consumed by a multi-national group from OZ, SM, LA, W, DL, OH and G to name a few, and they recommend others to consider making the trip next year —those thinking of taking a holiday in that area might keep June in mind for next year—final dates not yet announced.

50MHz

In a year of generally poor vhf conditions, perhaps the most significant event has been the opening of 50MHz late at night (UK time) for transatlantic contacts over wide areas on both sides of the ocean. UK stations have worked into VE, VO, W1, 2, 3, 4 and 8, with W5 heard and beacon GB3NHQ copied as far west as Washington State, an enormous distance for what is assumed to be sporadic-E propagation. Swedish stations have also heard the USA east coast signals.

Although USA 50MHz operators had said that there would be a good chance of contacts across the ocean on this band during the early part of July, I remained sceptical about anything more than a marginal contact or two, so the opening of the flood gates between the USA and UK came as a great surprise, though a pleasant one. Instead of having to wait for the next sunspot maximum for F2 propagation, it seems that there are opportunities for transatlantic contacts by another mode, generally assumed to be "multiple-hop sporadic-E" but there is much we need to know about this band which makes the prospect of an allocation in this part of the spectrum in the near future all the more exciting. If you have not already done so, read Pat Hawker's excellent survey of this band in *Technical Topics* September 1985.

To summarize events, there was a short opening on 25/26 June after tv hours when G3COJ worked K8EFS, and beacons GB3NHQ and GB3SIX were heard by several USA operators, including the copy of GB3NHQ by K7KV in Washington State. On 2 July what W3XO (*The World Above 50MHz*) described as "the most widespread and longest lasting of any transatlantic Es propagation yet experienced" occurred when stations as far south as Washington DC worked into the UK, including Eire. Students of propagation might be interested to know that G4GLT monitors 28MHz for things like beacon VE3TEN and the W1AW (ARRL official station) routine transmissions including slow morse which are publicized from time to time in *QST*, thus indicating that the path is open at least up to this frequency, and this may occur some hours prior to 50MHz event. Of interest also is the fact that just 28 days elapsed before things again went berserk, and the band went wide open once more between the UK and North America.

It is pleasant on this occasion to be able to quote from Bill Tynan, W3XO, who writes the equivalent of *4-2-70* in *QST*. He says: "The July 30 Es transatlantic opening was great, probably my greatest thrill in 37 years on 6 meters. I worked GJ3YHU, G3MCS, G3OBD, G3OSS, GW4BCD, G3COJ, G4ASR, G3UUT, G3TCU and G4UPS. Some others did even better". G4ASR was using less than 10W at the time. G4GLT reported that "this opening was very widespread, with propagation as far north as VE1YX and as far south as KA4DVH, a distance of about 1,400miles". Incidentally, KA4DVH uses 1kW to two seven-element KLM antennas at 140ft, quite an increase in erp from what G4ASR was running at the time! G4RXD (Cheshire), who worked three stations, thought the event favoured the south. He heard KA4DVH calling LA6HL, but it is not known whether they made a contact two-way on 50MHz.

Angus, G3OSS, received a phone call from Brian, G3COJ, at 2200 saying that there were USA signals on 28MHz and an opening on 50MHz was possible. Angus subsequently worked 16 states-side stations. His comments provide interesting information. He used 110W p.e.p. into a five-element Tonna at 40ft. All contacts were on ssb. He said that "propagation peaked in waves of activity interspersed with a totally dead band. He said "I noted that band noise did rise when signals came through, but the noise was much lower by many decibels than is usual with F propagation. I assume it was sporadic-E, but perhaps there was a small element of F2 at the end as they (USA) were in daylight—I just don't know." Maureen, GW8ZCP, said it was the "best Es opening on 50 heard so far". Not having a permit she listened for beacons but heard only some on 28MHz. She also heard many USA stations working into the UK.

Roger Thomas, GW4BCD, worked three USA stations in W3 and W4. The band closed with him at 0040gmt. He runs a 4CX250 into a five-element at 40ft.

Let Dave, G4GLT, sum it all up. He remarks: "I think that when 50MHz is generally available, operators in the UK will become hooked on this band of mystery and surprises". May it be soon.

From here and there

Can anyone identify the manufacturer of a 144–148MHz fm transceiver purchased by Tom Ferguson, G1OST? It has dual outputs 5W and 25W and the only clue in the manual is "HC1400" and "NDI 2 meter transceiver with 3 channel memory".

Corrections, with apologies, to text in *4-2-70* August; the chairman of the South Powys Repeater Group, GB3BB, is GW6SML, and the secretary is GW3FKO.

Several European operators have written to me requesting ms schedules with AK square. Anyone active in this mode from that location might contact me for further details.

As a result of my recent move to a new QTH, the phone number for *4-2-70* information is 0843-601845.

The VHF Committee has been considering several letters on the subject of calling frequencies for Class B morse, and suggests that 144·155MHz is a good choice for the 144MHz band. With the many demands on spectrum space for cw, ssb, atv, rtty etc, it is not easy to identify a channel specifically for this purpose, but 144·155MHz lying between the accepted cw and ssb parts of the band, would seem to be a good compromise. It was not felt necessary to attempt any recommendations for the 430MHz band since most operators call on 432·2MHz whether on cw or ssb, and experience to date has not shown very much cw activity by Class B licensees on the higher frequency band.

Do you find writing out QSL cards boring? Then spare a thought for Geoff Brown, GJ4ICD, who in the past seven years has sent out more than 55,000 cards in respect of contacts on 144 and 430MHz and 1·3GHz, many of them in contest operation. This incredible activity resulted in Geoff achieving 22 "firsts" between GJ and other countries, 13 on 144MHz, eight on 430MHz and one on 1·3GHz.

G4DHF will be in WQ square (Isle of Skye) from 27 October to 1 November signing GM4DHF/P and GM4YHF/P. □

Microwaves

*by Mike Dixon, G3PFR**

Fundamentals (9)

The singularly poor summer weather this year has brought back to mind the fact that the "seasoned" portable operator should be fully aware of the dangers of operating from high and exposed sites. Such operation is fraught with potential dangers to both operator and equipment, and while the true "mountain-topper" operator is at highest risk from the dangers of the mountains and the fickle, unpredictable nature of the weather in such regions, the casual operator at lesser altitudes may also be at some risk from exposure to the elements. Portable operation may often involve standing around for considerable periods, sometimes in the rain and usually in the wind.

Exposure is a term often heard and equally often misunderstood. Basically the physiological effects of being exposed to wind, rain and other adverse conditions revolve around the loss of body heat which, if not recognized and controlled, can lead to rapid loss of co-ordination, followed by loss of consciousness and ultimately death. It is important, therefore, that the portable operator be aware of this possibility and to take adequate precautions to avoid the risk.

The main points concerning mountain safety were ably summed-up by G3PHO (who is a keen "mountain-topper" and also a practised hill-walker) in a recent issue of the *Microwave Newsletter*; this information, together with a few additional comments, is well worth reproducing here, and I make no apology for offering a non-technical contribution to the "Fundamentals" spot! Here, then, are Peter's hints:

1. Build up to the occasion by eating heartily before the event. Some 5,000 calories per day are required when mountain walking, even in summer conditions, whereas the average semi-sedentary person may only require 1,500 to 2,500 calories per day.

2. Carry no more than 35lb (16kg) in the rucksack. More than this (and certainly more than one third of the body weight) only serves to rapidly use the store of bodily energy. Spread the load among companions, *who should be with you in such conditions.*

3. Acquire suitable clothing for the job, ie strong walking boots, a warm brushed cotton shirt, one or two thin woollen jumpers and a thicker, heavier outer garment so that the body temperature can be regulated; do not have an "all or nothing" arrangement with one thick sweater. Also included in the clothing list should be a windproof and waterproof cagoule or anorak, together with waterproof overtrousers. *Strong winds are more dangerous than rain* as they rapidly lower the skin temperature to a dangerous level if not guarded against.

4. Carry a survival bag (large polythene type available at camping and mountaineering shops) and also a first-aid kit. Carry a whistle for emergency calls—this might seem superfluous when the operator is carrying radio equipment, but the likelihood of a distress call being picked up on an amateur frequency may be small, whereas members of a rescue team are accustomed to listening for whistle signals while searching for missing or injured persons.

5. Have ample food and hot drinks for the day plus *emergency rations* such as chocolate, dried fruit or mint-cake (you might have to stay the night!)

6. Inform someone where you are going and stick to the route. Inform them of the expected time of return.

7. Be equipped with good maps of the mountains (1/25,000 scale is the best in the UK), carry a good compass (for instance Silva or Suunto) and *know how to use both in dense fog and darkness.*

8. Learn to spot the first signs of mountain hypothermia, otherwise popularly known as "exposure" (irrational behaviour, shivering, slow response to conversation, loss of coherence in speech and movement) and what to do if a member of the party shows them.

This might seem a rather gloomy list of precautions, and the operator who has recourse to the shelter of a car may feel immune from the dangers of hypothermia. However, standing around or even sitting around under cold, wet and windy conditions can soon lower the individual's resistance to the elements, and it is still a good idea for the "car-portable" operator to heed the warning about the availability of additional clothing, food and hot (non-alcoholic) drinks. There is an excellent little booklet called *Safety on Mountains* published by the British Mountaineering Council and available very cheaply from any outdoor pursuits or good camping shops. Safe operating!

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

Operating news

The weather seems to have given rise to singularly ordinary conditions, and none of the regular correspondents has reported anything out of the ordinary. Frederick, G6FK, reported on 1·3 and 2·3GHz activities as "seen" from his Midlands QTH. During the months of June and July he listed some 30 callsigns heard/worked on 1·3GHz, and also sent some detail of developing 2·3GHz activity. On 1·3GHz the Telford Club is reported to be using a 10ft dish for portable operation, while on 2·3GHz Frederick reported G6VKA as using an 8ft sectoral dish, G3KFD and G8GDZ with 25W (the latter to a 6ft dish), and G1DOX, GW8FKB, G3APY, G6ADE and G3BPY as "making moves towards 13cm". Encouraging news indeed; what about some more beacons on this band?

Ken, G8VR, forwarded a letter from Martyn, G8XUF, concerning construction of a lightweight 6ft (plywood and chicken-mesh) dish which he has been using for /P operation on 1·3GHz—his most notable dx, PA0 with 300mW. Martyn has a computer program (in Basic) which "sorts out the maths" for a suitable dish profile and is willing to supply a listing on receipt of an sae (QTHR).

Dave, G6LEU, gave a little more detail of the two Spanish mainland contacts which he had on 29 June; both were into the town of La Coruna, and were with EA1BLA and EA1LQ respectively. It seems that EA1BLA considers this to be a G-EA1 first—are there any other contenders to this claim?

Jack, G5UM, (Microwave awards manager) reported on a recent "batch" of awards as follows: GJ4ICD—20 Squares on 1·3GHz; GM3ZBE—20 Squares on 1·3GHz plus claims for 70MHz and the 144MHz "Senior"; G8ATK—Supreme Award (No 60); G4VCJ—Supreme Award (No 61). The latter two claims were made up from 144MHz and 432MHz "Senior" awards plus the "Standard" 1·3GHz award. Jack commented that GJ4ICD's claim included a GJ-GM "first", a contact worked with GM4DMA running a mere 1W to a 23-el beam "hand-held at 4ft above ground!" Jack also remarked that at the time of writing, two G1 stations had earned themselves squares awards (G1DOX and G1HGJ) but that none had yet claimed the three countries and 20 counties "FMD" award which is still available. He said "There should be a special endorsement for the first one to do so!"

At the very end of July two further remarkable 1·3GHz claims came forward. The first, from GW3XYW (Swansea) for a 15 Squares award, was unusual in that it was via eme and included cards for contacts into no less than 11 countries, all on cw using his 20ft dish and full legal power. The second claim, this time for the FMD "Senior" award, was from Dave, G3PBV (Devon), and was followed up in quick fashion by Dave's claim for 30 squares (sticker No 11). Jack's comment was that Dave seems to be "in close and friendly pursuit of his neighbour, G4MAW, who reached 35 squares confirmed earlier this year".

From here and there

From Frederick, G6FK: GW8FKB is now running regular 1·3GHz tests with Lou, GM4YPZ, (Edzell, near Brechin, Angus): GI4CXH is regularly heard /P from a site 30 miles west of Belfast using 8W to a 4ft dish: G3KFD is attempting to set up 2·3GHz skeds with the south and south-east in addition to the regular tests with G4CBW and GI4CXH/P: G8JHL has a good 2·3GHz path to G6VKA and G8TFI.

An interesting letter was received from John, ZR5JF/G8FPH (formerly of Liverpool, now of Durban, RSA). When he went to the RSA he took with him his "full system on 23cm—150W, 96 elements etc". He said that unfortunately 1·3GHz activity is confined mainly to Division 6 (the area around Johannesburg) and that the national terrestrial record stands at 58km. Attempts at longer paths have so far failed. He is presently building a six metre dish and hopes to get hold of a UPX4 cavity soon—supplies of suitable components are difficult in the RSA, it appears. John "applauds the recent announcement about Class B licences and the use of cw"; his licence is "restricted class", but this allows him use of cw on all bands 50MHz upwards, and he said that "this is certainly very useful in weeding out the weak ones on long tropo paths—I hope to be ZS5JF very soon".

My apologies to anyone who sent in news which has not appeared in this issue, due to holidays and limited space. I have done my best to distil the mail down into the smallest possible amount and laid the pen down somewhat earlier than usual in order to accommodate both deadlines and holidays! □

Computing

*by John Morris, GM4ANB**

Locators to distance

Several readers have asked for a program to convert from Maidenhead locators to distance. Program 1 is a version for the Spectrum. It also gives the points scored in the 50km radial ring system used for RSGB vhf/uhf contests.

To modify it for other computers change the string slicing to use MID$, and the CODE function to ASC. Thus "CODE I$(j)" in line 110 becomes "ASC(MID$(L$,J,1))", and similarly for the two subscripted expressions in line 130. In addition it may be necessary to add brackets round the function arguments.

```
 10 DIM t(6): LET r=6367: REM Earth radius
 20 INPUT "Home locator? ";l$
 30 GO SUB 100: IF er>0 THEN  PRINT "Wrong!": GO TO 20
 40 PRINT "Home locator ";l$: LET hn=n: LET he=e
 50 INPUT "DX locator? ";l$: PRINT : PRINT l$;" - ";
 60 GO SUB 100: IF er>0 THEN  PRINT "Wrong!": GO TO 50
 70 LET dx=r*ACS (COS (he-e)*COS hn*COS n+SIN hn*SIN n)
 80 PRINT INT (dx+0.5);" km, ";2*INT (dx/50)+1;" points"
 90 GO TO 50
100 LET er=0: IF LEN l$<>6 THEN  LET er=1: RETURN
110 FOR j=1 TO 6: LET t=CODE l$(j)
120 IF l$(j)<="z" AND l$(j)>="a" THEN  LET t=t-32
130 LET l=CODE "AA00AA"(j): LET h=CODE "RR99XX"(j)
140 IF t<l OR t>h THEN  LET er=1
150 LET t(j)=t-l: NEXT j
160 LET e=PI/4320*(t(1)*480+t(3)*48+t(5)*2-4319)
170 LET n=PI/8640*(t(2)*480+t(4)*48+t(6)*2-4319)
180 RETURN
```

Program 1

Callsign generator

Program 2 (for the BBC) is based on an idea from Dave Coomber, G8UYZ. It is a random callsign generator, designed to help in the testing of duplicate checking programs.

The subroutine at line 1000 is the initialization section, which should be called once at the start of the program. The DATA statements (lines 1200-1210) contain the prefixes of the callsign to be generated, followed by their relative abundances. Thus the first few entries say that for every 40 "G" prefix stations worked, there would be, on average, about 60 "GM" prefixes, 15 "GI", three "GW" and so on. Modify this list to suit your own location and experience. The number of entries is limited to the size of the arrays declared in line 1000.

The subroutine at line 1100 generates a random callsign, and should be called instead of the normal "INPUT" statement in the duplicate checker.

```
  5 GOSUB 1000
  .
  .
 40 IF CN<1000 THEN GOSUB 1100: GOTO 60
 45 PRINT "Call for QSO ";CN;: INPUT T$
  .
  .
1000 DIM P$(50), PC(50): NP=0: F=0
1010 NP=NP+1: READ P$(NP), PC(NP)
1020 IF PC(NP)>0 THEN F=F+PC(NP): GOTO 1010
1030 NP=NP-1: PC(1)=PC(1)/F
1040 FOR J=2 TO NP: PC(J)=PC(J)/F+PC(J-1): NEXT J
1050 RETURN
1100 T=RND(-ABS(TIME*TIME)/1E3): T=RND(1): P=1
1110 IF T>PC(P) THEN P=P+1: GOTO 1110
1120 T$=P$(P)+FNA(10,"0")+FNA(26,"A")+FNA(26,"A")
1130 IF RND(1)<0.9 THEN T$=T$+FNA(26,"A")
1140 RETURN
1200 DATA G,40,GM,60,GI,15,GW,3,LA,5
1210 DATA SM,2,PA,3,PE,1,DL,2,XX,-1
1220 DEF FNA(X,Y$)=CHR$(ASC(Y$)+INT(X*RND(1)))
```

Program 2

The prefix is selected by comparing a random number, in the range 0 to 1, with the normalized list of probabilities of each possibility. A random digit and two random letters are added. In nine out of ten cases a third random letter is added.

The resulting callsign is returned in T$. The callsigns are all structurally correct, even though some, or even most, of them may not actually exist (such as "GM7XNP"). They do serve to test the callsign generator, however.

The use of TIME to reinitialize the BBC's random number generator in line 1100 is necessary for testing programs that use RND to generate a hashing function. Without it the program can get stuck, continuously churning out the same callsign. The particular initialization expression used was found empirically. On computers other than the BBC you will have to experiment to find a suitable alternative that gives a good spread of callsigns.

Lines 5, 40 and 45 show how the generator would be plumbed into the BBC duplicate checker given in *Computing*, June 1985. The original INPUT statement is replaced by a subroutine call for the first 1,000 callsigns, after which operation reverts to normal. The verification section (lines 180/190) would also be by-passed while testing.

Preferred values

Several correspondents, including G4MSV and G4JUO, have suggested a program to find the appropriate series/parallel combination of components to give a required value that does not happen to be in the junk box.

Program 3 is a Microsoft version. For each input value it prints out all series and parallel combinations of two components that give the required value, within two per cent. Values are printed with a "+" to indicate a series connection and "&" for parallel. These notations are for components that combine in the same way as resistors. For capacitors etc their meanings are of course reversed.

```
 10 DATA 12 : REM Number of preferred values
 20 DATA 2  : REM Maximum % error
 30 DATA 10,12,15,18,22,27,33,39,47,56,68,82
 40 READ NV: NP=NV*3+1: DIM PV(NP)
 50 READ ER: ER=ER/100
 60 FOR J=1 TO NV: READ PV(J)
 70 FOR K=1 TO 2: PV(K*NV+J) = PV(J)*10^K
 80 NEXT K,J
 90 PV(NP)=PV(NP-NV)*10
100 PRINT: INPUT "REQUIRED VALUE";V
110 DC=10^(INT(LOG(V)/LOG(10))-2): V=V/DC
120 FOR J=1 TO NP
130 IF PV(J)<=V THEN M=J
140 NEXT J
150 FOR J=M-NV TO M: R1=PV(J)
160 FOR K=J TO M: X=R1 + PV(K)
170 IF ABS(X-V)/V < ER GOTO 190
180 PRINT R1*DC;" + ";PV(K)*DC;" = ";DC*INT(X+.5)
190 NEXT K,J
200 FOR J=M+1 TO M+NV+1: R1=PV(J)
210 FOR K=J TO M+NV+1: R2=PV(K)
220 X=R1*R2/(R1+R2)
230 IF ABS(X-V)/V < ER GOTO 250
240 PRINT R1*DC;" & ";R2*DC;" = ";DC*INT(X+.5)
250 NEXT K,J
260 GOTO 100
```

Program 3

The value DC calculated in line 10 is the power of 10 needed to reduce the input value to the range 100 to 999. The rest of the program then works with values only in the range 10 to 10,000, but everything is multiplied by DC before printing, so giving the right results on the screen.

To speed up the program it only considers as candidates for series connection those components with values greater than about one tenth of that required, and for parallel connection those with values less than about 10 times the required value. In the series case there is no point in considering values greater than that required, while for parallel we can similarly forget smaller values. Lines 120 to 140 and the DO loop start and end values ensure that the searches are restricted to these ranges.

Lines 150 to 190 search through the possible series combinations, printing out any that give a result within two per cent of the desired value. Lines 200 to 250 do the same for components in parallel.

The program can be customized by changing the DATA statements in lines 10 to 30. In line 10 the number of preferred values in the list (or the junk box) is given. Line 20 specifies the maximum percentage difference allowed between the required and calculated values. Line 30 contains the list of preferred values. These should all be in the range 10 to 99·9. Their decades will be included automatically.

Note the use of the LOG function in line 110. This may appear as LN on some computers. The program is written in such a way that it does not matter whether LOG/LN returns the log base 10 or the natural log. □

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SWL News

*by Bob Treacher, BRS 32525**

Midsummer Contest and SLP results

Dave Whitaker, BRS25429, was pleased that 10 entries were received for this event. Conditions were generally poor, but 14MHz provided over 100 countries. It was interesting to note from the logs the different stations which entrants were hearing on 14 and 21MHz, even when not far from each other they were hearing different stations. Much was heard from South America and southern Europe on 21MHz, while some JAs and Africans livened up the 14MHz logs. The 28MHz band only produced stations in central and southern Europe, but one ZC4 and one YK were heard. The event was worthwhile and gave a fairly good assessment of band conditions at this time of the sunspot cycle.

The disappointment, if there was one, was that no entries were received for the 10-18-24MHz slp. Does this mean that no listeners have an interest in these new bands, or does it just mean that those who are interested were otherwise engaged during the slp? It is hoped to make the event a regular feature of the activities organized for listeners. Congraulations to Jean-Jacques Yergamain, ONL383, for his high points tally, and to Don Piccirillo BRS52868, the top British Isles entrant.

Third HF Challenge 1985

In view of the success of the HF Challenge held last year, I am repeating the idea to again coincide with ssb and cw legs of the CQ WW DX contests. The ssb leg will therefore take place from 0000 26 October to 2359 27 October, while the cw leg will be from 0000 23 November to 2359 24 November. The idea is still to log as many different countries as possible. Only one station from each DXCC country can be logged on each of the six bands—this caused some confusion last year. The full rules are as follows:

(1) Entries may be either single-band or multi-band.
(2) Each different country heard on each band will count for points:
(a) Countries in the swl's own continent will count one point on 28, 21 and 14MHz, two points on 7 and 3·5MHz, and three points on 1·8MHz.
(b) Countries outside the swl's own continent will count three points on 28, 21 and 14MHz, five points on 7 and 3·5MHz, and 10 points on 1·8MHz.
(3) The final score should be computed as follows:
(a) Single-band entries. The total points should be added together and multiplied by the number of DXCC countries heard (eg 120 points × 65 countries = 7,800).
(b) Multi-band entries. The total points gained on each band should be added together and multiplied by the total number of DXCC countries heard on each band.
(4) Entries must be accompanied by a multiplier check list.
(5) Entries showing the full callsign, time and signal strength of the stations heard, should be sent to me at the address at the foot of this page, to arrive no later than 25 November for ssb and 23 December for cw.

Meteor scatter

The August Perseids provided the best reflections for several years, and several of our vhf reporters managed varying successes. Martin Parry, BRS52543, copied good bursts from I3LGP, I4VOS, I4YOW, OE30BC and YU2DG. OK3LQ had the best signals, Martin copying a 1min burst from him. Dave Whitaker, BRS25429, had a frustrating time, copying good bursts from only one or two stations.

I fared far better, managing to copy good bursts from nearly 40 stations. The event got off to a good start on 10 August, when the activity period provided good bursts from F1BLL, IV3HWT, HG6KNB, Y41YL and YU2JL. A 28s burst was also copied from GB2XJ. The period 2130 11 August–0130 12 August gave bursts of up to 10s from DL9MCC, DL7AFE, HG1S, HG8ET, YU2DG, OK3LQ, OZ1BVW, YU4WEU and IW4AUC. From 2130 12 August to 0150 13 August much was heard; EA3AIR, I4BXN, OK3LQ, YU2RQQ and I1ANP were good signals, but far the best reflections were reserved for 25s at 0012 when OZ1BVW, I3MCX, OK2KZR, SP9EWO and OK2VP were heard. After that a 20s burst from TK4DL and a 12s burst from DK400 were the best. From 0820 to 0930 13 August, EA1KV, OE3OBC and OE3OKS were heard in up to 8s bursts. The real fun is calculating the squares after the event, and getting the QSLs back. After missing all the Es this year, a successful Perseids went some way to alleviating that disappointment.

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1985 HF COUNTRIES TABLE
No starting score, new entries and updates only

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS8841	221	41	124	202	135	146	40	688
BRS52543	194	50	95	152	122	134	61	614
BRS1066	151	36	79	131	98	72	53	469
BRS31976	142	7	9	64	11	115	44	250
FE8957	—	19	67	58	42	56	0	242
BRS20249	102	8	34	75	32	49	8	206
BRS44984	—	19	27	66	35	51	0	198
BRS44083	103	22	21	89	10	49	4	195
BRS85124	74	8	10	41	13	38	15	125

1985 UHF/VHF TABLE

Station	QTH loc	70MHz Squares	70MHz DXCC	144MHz Squares	144MHz DXCC	432MHz Squares	432MHz DXCC	Total
BRS52543	IO83	19	5	58	20	22	9	133
BRS25429	IO93	0	0	58	19	36	9	122
BRS32525	JO01	0	0	81	24	13	4	122
BRS31976	JO01	7	2	56	19	0	0	84
FE8957	JN15	0	0	35	10	0	0	45
BRS62088	JO01	0	0	17	8	2	1	28
BRS85124	IO91	0	0	6	3	1	1	11
G6WDK/P	IN69	0	0	5	4	0	0	9

Newcomers

John Abbott, BRS85677, has been interested in listening for some time and has now extended his field to the amateur bands, for which he is looking for an amateur band receiver. He finds some of the jargon used in this column difficult to interpret, so I will try to come up with a workable balance in future.

A C Molloy, BRS87383, joined the Society in March. He has a Sony ICF2001, together with a Maplin 3·5MHz receiver and audio processor, a Cirkit active cw filter, and a ZX81 and morse decoder program. His future plans include sitting the RAE in December and building a converter for 144MHz.

Finale

News, views and table scores for the December issue should reach me no later than 21 October, with late copy by 28 October. Hopefully, problems will have resolved themselves and I will have moved QTH by the time this is read. □

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

HAVING JUST SUFFERED a change of QTH, activity has been somewhat curtailed in recent weeks. However, while the erection of antennas is not the number one priority, all should be back to normal by the time this issue is delivered. In spite of my own imposed silence, I have continued to receive letters on various topics for which I am most thankful and apologise for any delays in replying. Now back to business.

Oscar 10

The revised operating schedule to see the satellite through the autumn eclipse season was introduced on 5 August, but with the Mode B transponder on period increased by 10 counts (MA 207-039). Trials with the previously unused 145MHz omni antenna during July proved to be quite successful, and so this antenna was brought into regular operation for times when the satellite orientation was inappropriate for using the high gain antenna. The schedule to be introduced after the eclipse period is not available at the time of writing.

One of the letters received recently was from G5TU, in Cornwall, who made some interesting observations on the format of the monthly satellite availability chart. G5TU noted that the rigid use of 0000gmt as the baseline for the diagram tended to provide a rather confusing view of the number of orbits actually available. The suggested alternative can be seen in Fig 1, which uses a baseline chosen so that orbits are not divided before and after midnight. The other request was to include an indication of the status of the satellite when in view. This is fairly straightforward to accomplish from a

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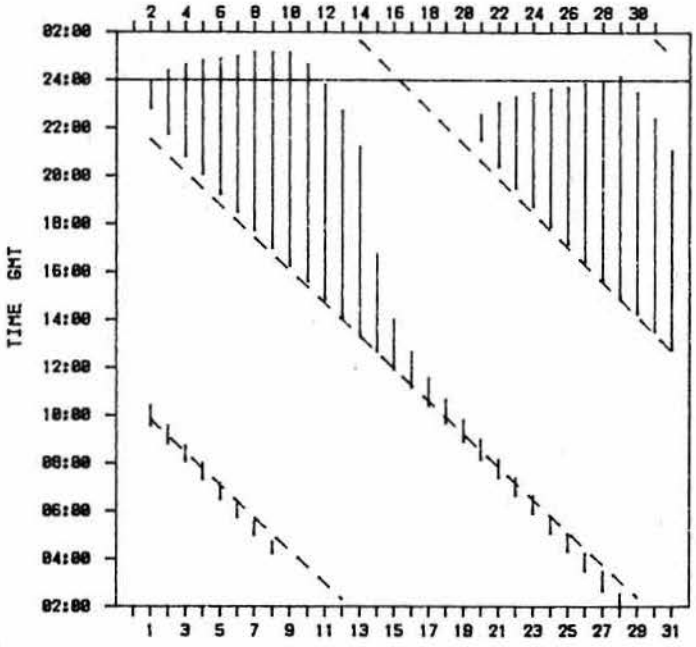

Fig 1 OSCAR 10 VISIBILITY (London area) - OCTOBER 1985

technical point of view, but it does of course rely on a knowledge of the operating schedule which, as is the case this month, is not always available. So for the time being the best I can do is to include the times of the perigee (MA = 0).

For those that regularly update the Keplerian elements for orbit tracking programs, you may have noticed a change in the orbit numbers for the satellite from around the beginning of July. I have not been able to ascertain the reason for this change, but the effect is that orbit numbers are increased by two. Reference values for 1 October are as follows:

Orbit No	Perigee (UTC)	Argument of perigee
1733	0951	48·9°

Uosat

It hardly seems possible but Uosat Oscar 9 celebrates its fourth anniversary on 6 October and, barring a few operational patches, is functioning as well now as the day it was launched. It is interesting to reflect on two of the stated objectives of the mission: first, to stimulate a greater degree of interest in space science in schools, colleges and universities by ensuring that data are transmitted so as to allow reception by simple, low-cost ground stations; and second, to examine and demonstrate the feasibility of small inexpensive spacecraft capable of making significant contributions in various spheres of activity. These objectives have been admirably achieved and surpassed due to the efforts of a very dedicated group of people at the University of Surrey, both amateur and non-amateur.

On several occasions I have referred to the various methods of receiving and decoding signals from the Uosat satellites. A recent offering from MM Microwave Ltd of North Yorkshire provides a simple but effective solution for unattended reception and recording of transmissions from both satellites. The automatic satellite telemetry receiver and information decoder, Astrid, includes a dipole antenna, feeder and a fixed frequency receiver for 145·825MHz. A novel feature of the unit is that when the received signal is above the squelch threshold a relay is operated which can be used to switch on an external tape recorder, thus avoiding the need for time-switches, or indeed any knowledge of the times of the satellite passes. At a convenient time the recorded signals can be played back into the decoder then fed into a computer such as the BBC micro for display of the information. Real time operation is also possible provided your computer is adequately rf suppressed. Perhaps a little late for the market but it's nice to see some home-grown products for a change.

Other news

The latest news on the rumoured Iskra 4 is that it is now unlikely to be launched until early next year. Unlike earlier flights, this version will not carry a communications transponder, but will have one or more beacon transmitters; the frequency(ies) have yet to be confirmed. The Iskra (Russian for "spark") satellites are constructed by students at the Moscow Aviation Institute. □

The Month on The Air

*by John Allaway, G3FKM**

ERIC SUMPTION, G3DQL, managed to get on the air as C56/G3DQL earlier in the year and made some 368 contacts. He was somewhat taken back when a letter arrived with a QSL from a southern European amateur. It said simply "I had no contact with you notwithstanding my calls to you. My QTH is bad for contacting W Africa. Is possible your QSL? It is for my award DXCC, your QSL is No 100. Honestly, it is not regular but I should be pleased . . .".

A plea from a reader who is still short of a South Sandwich QSL—does anyone have information concerning the present whereabouts of the VP8HF/VP8 logs from the 1964 operation? The operator was G3RFH and at the time QSLs were handled by W2GHK. Any clues to your scribe please.

Help with an address for a more recent VP8 is needed by G4MZS who received his QSL back from an address given for VP8BAI with "gone away" written on it.

Around and about

G4AFF recently visited Tristan da Cunha and has sent along some useful information. Andy Swain, ZD9BV, is now active daily as follows: 0730—on 3,785 or 7,080kHz; 1700—on 21,265kHz; and 1800 on 14,220kHz. He has recently had antenna problems but these are resolved. Gillian Repetto, ZD9CA, is active but does not follow a regular operating pattern; she has a TS120 and has occasional access to a large inverted-V which is directed towards the UK. It seems that there are two operators on Gough Is but only one spends any time on the air with the TS130S and W3DZZ at ZD9GI.

G2BUJ was in Gibraltar in June and had great co-operation with the issuing of his reciprocal licence. He had sent photocopies of the first page of his licence and validation certificate to the Wireless Officer, Postal HQ, 104 Main St, Gibraltar, a month before leaving the UK, and had an immediate response saying that his licence would be ready to collect on arrival and free of charge. Percy reports that the radio club meets on Tuesday, 8pm, at Hargreaves Ramp, and that there is a ZB2 activity night on Thursday at 1900 on 14,280kHz—a certificate is available for working five ZB2s and details may be obtained from a net member. ZB2FK

Ernie Stagnetto, ZB2FK

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A photograph taken during the visit to the Vatican by G4UCB and G4WFZ. L to r: Lars (of HV3SJ), Domenico (of HV1CN), Phil G4WFZ, Edmund (of HV2VO), Dennis G4UCB, and Pino (also of HV2VO)

will be on 1·8MHz again this winter probably in the 1,845–1,850kHz slot with ssb changing to cw if no QSOs result. He has a TS520 and λ/4 sloper directed northeast. The latter is at an angle of 60°, and the steel frame of the support building is used as a reflector/ground system. Operating times are irregular. QSL direct for 1·8MHz QSOs please.

QSLs for the VP2MW expedition QSOs made last autumn have been printed at last and are on their way via the bureaux and should be received soon.

G4UCB and G4WFZ visited Father Benedetti, HV2VO, during July. Their operation from HV2VO was limited but they did make some 300 QSOs. They attended the inauguration of the new HV1CN station—a new TS930, Henry 3K and TH6DX beam—a gift from the Knights of Columbus in the USA. The US ambassador to the Vatican was present (K6ARO) and made the first QSO (he is also I0WW)—with G4XMK. Dennis and Philip wish to thank everyone for the help and courtesy extended to them during their visit.

Ramesh Dhami, G4PNQ, will be grateful if any Indian stations would give him a call between 1500 and 1530 on 14,175kHz at weekends. He would particularly like to contact Mr Gandhi—as would many other readers!

A rather surprising request has arrived from CE0ZIG via GM3AWW. It seems that QSLs from the UK are not being received, and at the time of CE0ZIG's letter he was waiting for cards from GD4BEG, G3KMA, G2HPF, G3MEA, G3ZFS, G4RMV, G4HQH and G4ODI. In the writer's experience quite the reverse of the normal state of affairs!

Tony Selmes, ZS1D/G4KLF/H5AFU, has written to point out that OZ2UT/A who claimed to be in Mozambique was not authorized. The Danish society has confirmed that he was a pirate.

Graham Smith, GM3SNO, is now 9V1WL. He will be active mostly on 14MHz with his TS120D and G5RV antenna. He reminds readers of the SE Asia Net (SEANET) which meets daily at 1200 on 14,320kHz, and points out that the BBC relay station in Singapore on 11·75MHz can be used in the UK as an indicator of conditions.

Northern California DX Foundation

The summer issue of the *NCDXF Newsletter* consists of over 30 pages of interesting information concerning current and past dx, and general hf band news. There are usually two newsletters each year and the foundation's system of beacons on 14,100kHz is another service it provides. Anyone interested in joining NCDXF is invited to send US $10 or equivalent to PO Box 2368, Stanford, Cal, 94305, USA.

Welcome

To the following new members from overseas who joined the Society during July: EI8GB, EI9BMB, K9RHY, LA2ACA, LU2DL, SK7OA, SM4YN, SM5ERJ, VK2BPC, VU2ADY, W6CF, ZR6AMK and 9M2TR. New members without licences include L Lau (VS6), O Olanubi (5N), D Maguire (EA), J Moore (EI), I Tzavaras (SV), P Dekerle (F) and R Strataten (PA).

Monaco

The secretary of ARM has written to say that 3A2TO is a pirate and that he appears to be someone calling himself Luis and claiming to be EA5FDO with a valid licence for May and June 1985. ARM believes that he was operating from Spain as he was very weak in Monaco. ARRL, URE and the Spanish Administration have been notified. The most recent Monaco licences are in the L series—3A2LF, LK and LP. First-class licences (vhf) use 3A1, and general class 3A2. Visitors use their own calls/3A—pre-January 1978 3A0 licences are no longer valid. There are a few special calls —3A3WPX, 3A3EE, 3A3LF, 3A4E, 3A4F, 3A5E, 3A5F and 3A8EE; all others are pirates. 3A2LF also confirms the point made by G4VHB (who originally wrote to *MOTA*) that in fact there is no reciprocal licensing agreement between Monaco and Spain.

DX news

Luis, HI8LC, who frequently operates HI0A, QSLs on receipt only. He asks for cards via his QSL manager, W2KF.

DX News Sheet reports that the DXAC has voted to amend Country Criteria Rule 5b as follows: "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 UN agencies and related organizations, nor other intergovernmental organizations, diplomatic missions etc". If accepted by the Awards Committee this would seem to mean that 4U1VIC will not be accorded "country" status.

Those looking for Christmas Is will be interested to know that VK9XZ is often near 14,200kHz around 1300. From Macquarie Is VK0GC and VK0YL are active once more. They check into the P29JS net on 14,220kHz from 0400, and VK0YL has also been heard on 14,332kHz around 1200. KB6DAW/KH9 and NY6M/KH9 hope to be on the air from Wake Is from 22 October to 4 November on all bands and to take part in the CQWWDX phone contest. They are going to try to work DXCC, WAS and WAZ and make 15,000 QSOs. The other Christmas Is has further activity by T32AB, who has returned and will be there for at least another year.

Warwick, ZK1WL (who used to be ZL8AFH), is on the North Cook Is until December when he will return to ZL for four months before retiring to ZK1. Jim, VR6JR, expects to be on Pitcairn until the middle of November. Last month's *MOTA* reported that ZL7OY will be ZL8OY by now—he will in fact use the callsign ZM8OY until the end of 1985.

5T5SR will remain in Mauritania until the end of this month and until then seems to be on the air frequently at 1800 on 14,295kHz. A station with the callsign 9G2ER has been on 14MHz ssb and QSLs are said to have been received from 9G1HT; however, as far as is known, amateur radio is still not permitted in Ghana.

G4CAQ was due to go to Sharjah for a tour of duty lasting several years. He may be there already and will be trying to get a licence.

VS6CT has asked for it to be emphasized that he QSLs only via his managers (G5VS for Europe and the USA, and JA4ENL for others) and does not reply to cards sent direct or via the bureaux.

DJ6QT has logs and QSLs available for C5AAN, C5ABH, DJ6QT/CT3, DJ6QT/LX, DJ6QT/4X, DJ6QT/5T5, DJ6QT/5U7, LX3QT, TZ2AB, TZ2AC, TY9ARC, TY0ABD, XT2AB, XT2AC, ZD3N, ZD3P, 3V8AS, 3B8RS (1979–80), 3B9RS (1979), 5V8WS, 8Q7BP and 8Q7CC. Apply direct or via the bureau.

John Muzyka, G4RCG (standing) visited Peter Carrbut, 9V1TL, *en route* from Australia where he had had a most successful visit and operated as VK4FFB

QTH CORNER

C30BAN	via F6BII, Maxine Imbaud, Place de la Republique F-63230, Pontgibaux, France.
GU0/PA2FAS	DAGOE Foundation, PO Box 356, 3300 AJ Dordrecht, Netherlands.
HC8E	PO Box 289, Quito, Ecuador.
G4JVG/OH0	PO Box 183, Reading, Berks, RG4 0YA.
T42CL	Box 20020, Havana, Cuba.
TZ6FS TZ6WC	via DL4BC, K. Breitfeld, Mertzigerstr.37, D-2800 Bremer 44, FR Germany.
V2ACW	via WB4OSN, 1485 NW 66th Av, Margate, Fla, 33063, USA.
V44KAC	via WB2LCH, PO Box 64, Gloucester, NJ, USA, 08030.
VP8AQT	via G6KFR, D. T. Jones, 19 Park End, Croughton, Brackley, Northants NN13 5LX.
VR6JR	via G3OKQ, J. Russell, "Greenfingers", 136 Oyster Lane, Byfleet, Surrey KT14 7JO.
ZD8KM	via G3IFB, F. Bliss, "Coppalex", North Rd, The Reddings, Cheltenham GL51 6RE.
ZK1WL	ZL3AFH, 168 MacKenzie Av, Opawa, Christchurch 2, New Zealand.
5H3QM	VE7QM, F. Giles, 2724 Forbes St, Victoria, BC, V8R 4C3, Canada.
9V1WL	Graham Smith, 11 Swiss Chalet Rd, Singapore 1128.

	10MHz		28MHz TABLE	
	All-time	1985		1985
G3IGW	93	65	G3XQU-98	G4OBK-43
G4UZN	68	45	G3VOF-78	GW4TEJ-35
G4VDX	30	29	G4JBR-77	G4NXG/M-35
G4OBK	8	26	G4RAB-75(ssb)	G4YWG-28
5B4DN	31	22	G4XAH-73	G0AGP-25
G4YWG	5	5	G4MUW-63	G2FQR-23(ssb)
G5LP	46	—	5B4DN-55	G4FVK-12
G4UYR	33	—	G4VPD-49	G4RWP-5
G4RWP	4	—	G4DXW-47	

CE0ZIG is frequently on 7MHz cw in the early morning. *DX-NL* reports that Aruba may become politically independent from the Netherlands later this year, with the possibility that it may achieve separate DXCC status.

DX News Sheet reports a letter from DL7FT which says that Feng, who was formerly XW8BP, is now BV2DA. Other new calls in Taiwan include BV2FA, BV2GA (in Taipei), BV5HA (Taizhong), BV6IA (Changhua), and BV7JA, BV7KA and BV7LA (Kaoshung). All may operate on 7 to 28MHz only and are not allowed to work into the USSR.

The same news source mentions 6W1HB/7O who is said to have made a contact with PY2PE on 1 August. Operator Alain said he would be in Yemen for some time and would receive a proper 7O call in due course and would also be building a log-periodic antenna.

C9MGB, SM0CQE/C9, SM7DZZ/C9 and AB4Y/C9 have all made appearances on 14MHz recently. Your scribe has been in correspondence with AB4Y (re licensing in Mozambique) recently and is somewhat surprised if the attitude of the government has changed.

Stations in Jordan will use the JY50 prefix during November to celebrate the 50th birthday of HM King Hussein, JY1.

A group of W8s is planning an expedition to Galapagos for the CQWW SSB Contest. They will use the call HC8X for this, but will operate before and afterwards using their own calls/HC8.

Contests

The CQ WW DX Contest

0000 26 October to 2400 27 October (phone)
0000 23 November to 2400 24 November (cw)
1·8 to 28MHz. Exchange RS/T plus CQ zone number (UK is 14). QSOs with own continent count one point (but with own country nil—however, this may be worked for multiplier credit) and with others three points. The multipliers are one for each different zone on each band and one for each DXCC country on each band. There are single- and multi-operator sections and a multi-operator multi-transmitter category as well as a QRP (not more than 5W output). Photocopies of rules and sample log sheets are available from G3FKM (sae please). Entries go to *CQ* Magazine, 76 North Broadway, Hicksville, NY, 11801, USA, postmarked no later than 1 December 1985 for the phone section or 15 January 1986 for the cw section.

ON Contest

0700–1100 29 September (3·5MHz cw)
0700–1100 6 October (3·5MHz ssb)
Only QSOs with ON and DA (Belgian Forces in Germany) allowed. Exchange RS/T plus serial number (from 001). ON and DA stations will give their club code, eg 59006 MCL. Each QSO counts three points and each club is a multiplier. Top score in each country receives an award, and listeners may also enter. Send logs no later than three weeks after the contest to: W Leon, ON5WL, Borgstraat 80, B 2880 Beerzel, Belgium.

AGCW-DL Hand Key Party

1300–1600 5 October (7,010–7,040kHz only)
Straight keys only. Call "CQ HTF". Exchange RST, class, name, and age (YLs = XX). Class A 3W, Class B 10W, Class C maximum output. Class A with A or B QSO worth nine points, with C seven. Class B with B four and with C five. Class C with C two. Logs by 31 October to DF1OY, Vor dem Steinter 3, D-3017 Pattensen 1, FR of Germany.

International Police Ass'n RC Contest

2–3 November.
0600–1000 and 1400–1800 Saturday (A1A) and same times Sunday (J3E). Copies of rules from G4TRE (sae please).

YL Anniversary Party

1800 16 October to 1800 17 October (cw)
1800 30 October to 1800 31 October (ssb)
Lady operators only. Copies of rules from G3FKM (sase please)

JOTA SWL Contest

This is being run in conjunction with the JOTA weekend activity on 19 and 20 October. Listeners should log date, time, callsign of station heard and name of Scout organization operating it. One point is gained by logging a station in own country and two for all others. All entrants receive certificates, the top two plaques. UK entrants must enclose two, and others four, ircs with entries which should be sent to WFF Contest, 1 Jersey St, Hafod, Swansea SA1 2HF, before 1 December. This contest is organized by the White Fang Fellowship, GB2WFF. Note that duplicate loggings will incur a penalty of five points, and that transmitting amateurs may also enter and log QSOs made. At least one irc for each entry will be donated to The Feed The World Campaign.

Awards

Details of the ORARI awards programme have been received:

Jakarta Award

Available to all licensed amateurs and listeners for contacts/confirmed reports since 9 July 1968 with 20 different stations in Jakarta (YB0) including at least one club station (YB0Z plus two more suffix letters). It is available for all cw, phone, ssb, rtty, or mixed modes using 3·5, 7, 14, 21 or 28MHz. Send certified list of QSLs (by awards manager of national society or two other amateurs) plus US $8 or 16 ircs to M S Lumbam Gaol, YB0WR, PO Box 96, Jakarta 10002, Indonesia.

Worked All Indonesia Award

As for Jakarta Award but requirement is two contacts with each of the 10 Indonesian call areas—a total of 20. Apply as above but to M Maruto, YB0TK, PO Box 96, Jakarta 10002, Indonesia.

Worked the Equator Award

As above but Class 3 requires QSOs with eight countries, Class 2 with 12 countries, and Class 1 with 15 countries from the following: C2, HC, HC8, HK, KH1/KB6, PY, PY0 (St Peter), S9, T30, T31, T32, TN, TR, YB5, YB7, YB8, 5X, 5Z, 6O, 8Q, 9Q. Note that YB5, YB7, and YB8 must be included. Applications go to Ben Samsu, YC0EBS, PO Box 96, Jakarta 10002, Indonesia.

Varese—Province of Seven Lakes Award

Licensed amateurs and listeners. CW, ssb or rtty endorsements. 1·8 to 144MHz. Stations in the Varese branch of ARI will give a progressive number. European applicants need 15 QSOs, plus five more with stations located on the lake shore (all since 1 January 1985). A station may be contacted more than once if mode and date are changed. Send application with 10 ircs to ARI Varese, PO Box 26, 21100 Varese, Italy.

Around the bands

G8KG, in delivering his propagation summary, comments that it contains a few words of hope but that there isn't much happening at the moment. He continues: "The recovery in solar activity seen in April and May continued into June and July with the provisional monthly sunspot number for July reaching 30·8, though the rise in the 2800MHz solar flux was more modest. The shorter term averages up to and including the quarterly means now all show a sharp upward swing in activity rather than a reversal of the downward trend.

"On present form it is difficult to predict when the cycle will reach its minimum. This is because the shape of Cycle 21 differs significantly from the average solar cycle. A typical cycle reaches its maximum in about the fourth year, after which activity falls in a roughly exponential fashion—ie, the further it falls the slower the fall becomes. Cycle 21, however, had a prolonged maximum occupying most of 1979–81 and then fell steeply and more or less linearly at about 35 smoothed sunspot units per year; a rate which if it continues will bring the smoothed sunspot number to zero during the second half of 1985—which is just about now! The recent upsurge will cause a minor "flattening out" of the curve but it will need a substantial "Indian summer" in solar activity such as occurred in 1971–2 to prevent the early onset of minimum conditions."

The following very kindly supplied logs from which the next section has been compiled: G3YY, G5JL, G5LP, G3s KSH, YRM, G4s DJY, EHQ, FVK, GW4KGR, G4s LRS, NXG/M, OBK, RFE, UOL, UYR, VDX, XAH, XRR, and RSs 10906 and 84869.

Stations listed in italics were using A1A, the rest J3E.

1·8MHz 0100 *RL8PYL.* **0200** ZB2FK. **0300** *IT9GQE, K1TU, K1ZM,* K1ZFE, LU2DKT, WA3EWL. **0500** *OA4ZV.* **2300** *UA9FKW.*

3·5MHz 0300 HC8E. **0400** J6LPT, *OA4JR.* **0500** *CX8BBH.* **2200** UH8EA, *UI9AWX, UM8MBA.* **2300** *VO1KO,* YB0JH.

7MHz 0000 *UM8MIZ.* **0100** *CE3IAP,* VU2DVP. **0400** *CE0ZIG, T42CI, W6-7, XE1FFY, ZL.* **0500** *HC8E, V2ACW, V3CQ, N6GC/VE7,* VR6JR, *ZL1, ZL3, ZL0AGV.* **0600** *FM5WU,* HC8E, *HK1APN,* VK2, 3, 5, 7, *W6-7, ZL3BJ,* 9L1YL. **0700** *OA4BJU.* **1800** *OH0BJ/OY, VU2RPS.* **1900** UL8LWO. **2100** *JA6CXX, JY9MG, UH8EA.* **2200** *FG4DI, LU8BQ.*

10MHz 0000 *TR8DR.* **0100** *CT2FN.* **0600** *C30BAN, VE7VC, VK2, 3, 7, W7.* **0800** *OY7M.* **1700** *ZS6BMS.* **1800** *HB0/DJ2CS, JA6HW, OY1R.* **2100** *CT2FN, EA8AGF, KP4DJ, J28EI, VE2ALH, DL2GG/YV5.* **2200** *FG5XC, J28EI, KP2A, TR8DR, ZB2HA.* **2300** *KP4DJ.*

14MHz 0400 *W6-7.* **0500** KL7H, *UA0SY.* **0600** AH6FL, *KL7XD.* **0700** *BY1PK, NL7G,* T32AB, K1TCK/TU, VE8RCS, 3B8CA, 5B25MD. **0800** *BY1SD,* FO8FO, FW8AF, KX6BE, UA1OL, *VE7.* **0900** YI1BGD, ZD7AL, ZL, 3B6BD. **1000** FT8XB,

JY8GW. **1100** 5X5GK, 9N1RNK. **1300** DU9RG, *EN0AOU* (Obl.085), TZ6FS. **1400** BV2B, JA, *VU2BK*, 9L1JW. **1500** BY1QH, *HS0A*, JT0APE, 9M2AP. **1600** HL4HP, 9M2ST. **1700** *HL9TX*, *YB4FN*, *4S7LH*. **1800** J5WAD, *KH6IJ*, AL7BL/P, ST5ALR, *ZD7AL*, *ZD8KM*. **1900** *AP2SQ*, HC8E, JA, DL5KL/ST2, VP2EZ, VP8QP, XT2BR. **2000** J5UGI, J88BK, V85MK/OD5, S92LB, TA1E, VP8's BGA, LP, 3X0HAB. **2100** A71AD, HC8E, HH2CL, VY1CW, ZL4BC. **2200** D68WB, VK (LP), VK0GC, ZD8LIK, ZL (LP). **2300** TZ6FE, VK3BUI, XQ1COW.

18MHz 0900 *ZS6AVM*. **1600** *J28EI*. **2100** *I0KHP*.

21MHz 0700 *UD7DWZ*. **0800** J4IUM. **1000** *A4XZG*, DL5KL/ST2, OE3HGB/YK, 5X5GK. **1200** YC4HA, *5H3QM*. **1300** *8A0PPI*. **1400** *EA9CE*. **1800** PY, 5B4OK, 5Z4ET. **1900** CX, LU, PY, ZP. **2000** HK, KV4AD/PJ6. **2100** CE, EA8, LU, PY. **2200** HC1EA.

24MHz 0800 *C30BAN*.

28MHz 0800 CT, EA, SM, *TK/DJ6SI*, 4X6IF. **1000** CT2DG. **1100** HV1CN, 4U1ITU. **1600** PY5EG. **1700** EL2AK. **1800** A71AD, EA6, HC, LU, DF8PJ/OY, PY. **1900** *CE3DNP*, OH0MA, T77C, LU, PY. **2000** LU7HJM, PY2ZJ, TZ6WC, ZP5RG. **2100** CX1NH, W1-W4. **2200** IS0XRI, *SM3MGB*.

Thanks go to the authors of the following for information: *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), The *Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3XN), the *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY) and *DXNL* (DL3RK).

Please send all contributions for **December** issue to reach G3FKM by **31 October.** □

HF F-layer propagation predictions for October 1985

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie ⅛ = 0000, ⅛ = 0200, ¼ = 0400 etc.

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. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in BLACK, lower probability in RED and lowest probability in GREEN type.

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow	...	...	...	...	...	.34	431	...	...	478	787	3..	1..	666	567	841	765	433	335	788	††	3..	.25	††
Malta	...	...	...	...	...	44	443	...	...	487	788	71.	231	765	567	972	897	533	235	898	†††	2..	.25	††
Gibraltar	...	...	...	...	...	13	212	...	...	78	778	71.	.2.	476	667	971	685	753	335	797	†††	52.	.24	††
Iceland	...	...	...	...	...	...	11.	...	...	16	776	4..	...	67	678	85.	441	354	445	786	†††	52.	.24	††
ASIA																								
Osaka	...	...	...	...	...	11	...	...	...	165	321	...	...	243	334	51.	...	21	13	661	...	...	...	34.
Hong Kong	...	...	...	...	...	34	3..	...	...	266	531	1..	...	33	335	62.	...	11	13	673	...	...	...	312
Bangkok	...	.1	...	...	...	145	4..	...	...	246	64.	...	...	13	332	24.	2..	.1	13	684	...	...	...	314
Singapore	...	11	...	...	...	155	541	...	...	246	666	3..	1..	13	336	74.	1..	.1	13	684	...	...	...	313
New Delhi	...	11	...	...	...	255	53.	...	...	345	663	...	211	112	335	543	62.	...	13	688	3..	...	...	31†
Teheran	...	11	11.	...	...	355	552	...	...	544	567	3..	423	211	335	754	862	...	13	688	†3.	...	...	31†
Colombo	...	11	11.	...	...	255	551	...	...	234	567	2..	.1.	.1	335	754	31.	...	13	688	2..	...	...	31†
Bahrain	...	11	11.	...	...	355	562	...	...	433	567	31.	533	1.1	235	765	862	...	13	688	†3.	...	...	31†
Cyprus	...	22	22.	...	...	377	775	1..	111	766	678	831	765	533	456	886	985	211	124	789	††2	...	...	41†
Aden	...	22	221	...	...	366	675	...	1..	422	468	71.	613	1..	135	875	852	...	13	688	†3.	...	...	31†
OCEANIA																								
Suva (S)	...	...	...	...	...	...	1..	...	...	24	55.	1..	...	143	333	41.	...	321	113	3..	...	...	...	...
Suva (L)	...	...	...	...	...	1.	...	...	...	464	2..	34.	.11	643	22.	52.	...	31.	.1	3..	...	...	...	...
Wellington (S)	...	...	...	...	...	.1	1..	...	...	55	551	...	...	343	334	4..	...	221	113	31.	...	...	...	...
Wellington (L)	...	...	...	...	...	...	...	...	.1.	22.	...	13.	.12	441	...	431	...	22.	.1	31.	...	...	...	...
Sydney (S)	...	...	...	...	...	44	21.	...	...	476	554	1..	...	343	335	61.	...	11	13	62.	...	...	...	3..
Sydney (L)	...	...	...	...	...	...	...	...	...	51	...	4.	..1	53	1..	152	...	121	.1	42.	...	...	...	2..
Perth	...	11	...	...	...	266	41.	...	...	356	555	2..	1..	123	335	752	1..	...	13	673	...	...	...	35.
Honolulu	...	...	...	...	...	...	...	...	...	...	2	31.	...	22	215	31.	..1	321	112	1..	...	2..	...	...
AFRICA																								
Seychelles	...	12	231	...	...	355	675	...	1..	222	568	71.	642	...	235	875	84.	...	13	688	†..	...	...	35†
Mauritius	...	22	231	...	...	366	786	1..	...	322	567	72.	642	...	235	875	83.	...	12	688	5..	...	...	31†
Nairobi	...	33	342	...	...	266	687	2..	...	422	367	82.	653	1..	35	885	872	...	2	688	†4.	...	...	31†
Harare	...	23	454	...	...	266	788	3..	1.	522	357	93.	563	2..	35	885	873	...	2	688	†4.	...	...	31†
Capetown	...	2	465	1..	...	146	789	5..	...	543	357	95.	453	31.	24	895	884	1..	2	588	†5.	...	...	25†
Lagos	...	34	566	1..	...	77	778	7..	.2.	552	236	96.	482	52.	3	795	797	2..	1	588	5†5	...	...	25†
Ascension Is	...	23	336	2..	...	77	668	7..	.2.	63	334	77.	486	331	1	586	888	51.	...	279	†††	2..	...	.4†
Dakar	...	14	435	3..	...	57	768	81.	.21	174	334	78.	376	641	1	586	788	51.	...	269	5††	2..	...	.4†
Las Palmas	...	3	212	1..	...	47	767	6..	.1.	187	667	871	476	764	335	797	899	632	112	589	†††	3..	...	25†
S AMERICA																								
South Shetland	...	...	12	1..	...	...	3	556	61.	.11	155	555	55.	366	643	222	233	466	52.	...	12	234	2..	...	...
Falkland Is	...	.1	234	3..	...	...	6	777	71.	.11	156	543	451	376	543	211	134	688	521	...	13	4††	2..	...	...
Rio de Janeiro	...	.3	112	3..	...	...	7	556	71.	.11	.46	333	561	376	443	1..	255	898	521	...	26	†††	2..	...	.3
Buenos Aires	...	.2	323	2..	...	...	6	767	61.	.11	.46	533	451	376	443	2..	134	798	521	...	4	5††	2..	...	...
Lima	...	...	1.1	1..	...	...	...	645	51.	...	.1	532	231	254	112	2..	13	688	421	...	2	4††	2..	...	...
Bogota	...	...	1.1	1..	...	...	...	544	41.	...	.3	532	241	243	.33	3..	14	787	321	...	2	5†5	2..	...	...
N AMERICA																								
Barbados	...	...	1.1	1..	...	...	3	645	51.	...	.6	532	351	254	.33	2..	35	887	421	...	15	††5	2..	...	..2
Jamaica	...	...	...	...	...	...	434	31.	...	.1	543	341	232	.13	31.	24	787	221	...	2	4†5	2..	...	...
Bermuda	...	...	...	...	...	...	434	41.	...	.4	544	551	231	..3	311	235	887	221	...	15	†††	2..	...	..2
New York	...	...	...	...	...	...	233	2..	...	.1	555	54.	22.	..3	322	234	786	111	...	14	5††	2..	...	...
Mexico	...	...	...	...	...	...	33	2..	...	...	363	22.	12.	.2.	331	..2	376	121	...	...	.††	2..	...	...
Montreal	...	...	...	...	...	...	233	2..	...	.1	555	54.	22.	..3	332	344	785	111	...	14	5††	2..	...	...
Denver	...	...	...	...	...	...	1	1..	...	...	45	42.	11.	...	233	221	364	11.	.1	.1	.5†	2..	...	...
Los Angeles	...	...	...	...	...	...	1	1..	...	...	25	42.	11.	...	33	211	254	12.	.11	...	.3†	2..	...	...
Vancouver	...	...	...	...	...	...	...	...	...	...	14	42.	...	...	24	321	243	211	.12	1.1	.2†	2..	...	...
Fairbanks	...	...	...	...	...	...	...	...	...	...	2	31.	...	12	224	531	121	321	112	211	..2	2..	...	...

The provisional mean sunspot number for July 1985 issued by the Sunspot Index Data Centre, Brussels, was 30·8. The maximum daily sunspot number was 85 on 9 July, and the minimum was 8 on 15 July. The predicted smoothed sunspot numbers for October, November, December and January are, respectively: (classical method) 9, 8, 7 and 6; (SIDC adjusted values) 1, 0, 0 and 0.

Contest News

1985 VHF NATIONAL FIELD DAY RESULTS

After two years of above-average conditions, VHF NFD was blessed with average propagation this year, which reduced scores and limited the best dx distances. The weather was also rather mixed, but generally reasonably good over most of the country. Sporadic-E produced high QRM levels on 70MHz, but did not lead to any real openings on 144MHz.

This year there were 136 valid entries, compared with 133 last year, but with a more even distribution between the two sections. For the first time RSGB regional representatives were involved in station inspections, and 58 groups were visited over the whole country. No rule infringements were found. Site access instructions are still poor in many cases, and gave the inspectors some problems. One group was disqualified for not providing adequate information, and another sent in check-logs after being told that the inspector had fruitlessly gone to their registered site.

A number of isolated bad-signal complaints were received, but none were independently confirmed. Receiver overload is still an important factor, but many groups would be well advised to check the equipment under field conditions before the event.

With the impending release of 50MHz in the UK, and growing 2·3GHz activity, the VHF Contests Committee is considering how VHF NFD might be extended to include these bands. Operation on six bands with large systems will be beyond the capabilities of most groups, and it has been suggested that VHF NFD should return to its original format with an emphasis on setting up efficient stations using moderate power under field conditions. This might involve the dropping of the present Open section, the introduction of an overall 25W limit, and a scoring scheme which allows four bands out of six to count. Your comments are invited on how you would like to see VHF NFD evolve. Since next year's rules are set in February, please send your comments by the end of this year.

The HADRABS & Addiscombe Contest Group will receive the Surrey Trophy; the Warrington Radio Club takes the Arthur Watts Trophy; the South of Scotland VHF/UHF Contest Group retains its hold on the Tartan Trophy for yet another year; and the GI4GDV Memorial Trophy presented by Lagan Valley ARS goes to Queens University Belfast Radio Club. Leading swl from a reduced entry this year is once again Martin Parry, BRS52543. Certificates go to all the winners and runners-up.

G3XDY

	OPEN SECTION	RESTRICTED SECTION
Winner	HADRABS & Addiscombe CG	Warrington RC
Runner-up	Sheppey Combined CG	East Kent RS
Band Leaders		
70MHz	S of Scotland VHF/UHF CG	Westmorland VHF Group
144MHz	HADRABS & Addiscombe CG	Warrington RC
432MHz	Sheppey Combined CG	Warrington RC
1·3GHz	Sheppey Combined CG	East Kent RS
Leading GI	NW of Ireland ARS	Queens Univ Belfast RC
Leading GM	S of Scotland VHF/UHF CG	West of Scotland ARS
Leading GU	No entry	Guernsey Rockhopper CG
Leading GW	Blackwood & District ARS	Wirral & District RC
Leading SWL	Martin Parry, BRS52543	

70MHz

Once again, the feeling was expressed in the logs that this was the "best band on field day" and that operating was "gentlemanly". Despite this, there were three complaints of bad signals, directed at different stations, the nature of which tends to indicate that more checks should be made to ensure that equipment combinations that are used, perhaps only once a year, do not produce key clicks or splatter.

Conditions were generally reported as average, and many references were made to sporadic-E causing QRM during the early part of the contest. GM3WOJ reports that his station was heard in HB and regrets that circumstances were not right for a crossband QSO.

Concern was expressed in many logs that the operating standard in the cw section was poor. Certainly a little thought prior to the event could save possible loss of points caused by missed characters or wrongly joined words. With inexperienced operators it is often quicker to spell out the direction and, in these days of auto-keying, high-speed sending seldom means that high-speed receiving is possible. It was suggested that the use of high speed might deter many fixed stations from operating in this section.

The adjudicator thanks those groups which tabulated the cw and ssb section scores separately, thus saving considerable work, and he gratefully acknowledges check logs from G2DHV and G3VLT/P.

G3LCH

144MHz

Most of the stations in both the Open and Restricted sections of the contest described the propagation conditions as "flat", although to judge by some of the best dx, there was some sporadic-E. The weather throughout most of the country was sunny and warm. Continental activity appeared to be lower than usual with a significantly higher proportion being worked by the QRO stations. Those in the restricted section experienced much difficulty in holding their frequency and in penetrating the solid wall of QRM to the southeast of the country. The increased level of GM activity was most welcome, and several Scottish stations returned very creditable scores in the individual band tables.

Several competitors complained of wide signals from local high powered stations, but none was substantiated; all were ultimately attributed to receiver deficiencies. The operating manners of some stations leave a lot to be desired, and logging standards reflected the inexperience of many operators—innumerable points were lost on both sides through their inability to copy or send their callsigns correctly.

G5ZG commented on this with a plea for the wider use of phonetics; G4CFG and G8KQW thought that operating manners had reached a new low; G4ARN disliked the 1400 start; GI3CFH welcomed inspections in Northern Ireland; G3WQK complained of exceptionally strong signals from F/PA0ERA, and G6HH found that the excessive number of local stations seriously diminished the station's coefficient.

G2HIF

432MHz

One word was prominent in nearly every comment made by 432MHz operators, and that was "flat". Several leading stations commented that they had never known conditions so bad. Certainly scores were generally well down on 1984, but about 30 per cent of stations in both sections worked at least one HB9, usually with 5 and 9 reports. Only one bad signal report was received (unsubstantiated), and from the limited information available the problem was most likely due to receiver overload. Many stations lost a lot of points through careless logging of station callsigns and Rule 11a (unmarked duplicates), but the new locator system clearly causes few problems.

The equipment used is fairly standard on 432MHz. Open section stations use either 8874 or 2 × 4CX250 amplifiers, and all leading stations use GaAsfet preamps and one or more long Yagi antennas. However, it is pleasing to report the use of a number of homebuilt transverters. There are signs that receiver overload is becoming a problem on 432MHz and a new generation of front-ends is clearly required.

Congratulations to G8TFI/P, G4JAR/P, G4RNL/P, G8ULU/P and BRS52543, who all receive certificates. Special mention should be made of the impressive victory of G4RNL/P, who beat G8ULU/P by a large margin and achieved a score that would have placed them 11th in the Open Section; again disproving the alleged automatic superiority of high power and an East Coast location and showing the importance of selecting the right site, optimizing equipment and operating it efficiently.

G4JLG

1,296MHz

The total entry was 47 in the Open section and 33 in the Restricted section compared with 48 in the Open section and a significant increase from 20 in the Restricted section last year. The weather was good but conditions were average or even below average for most contestants. The well-known "dawn lift" did not occur except for one or two South-Coast stations, and the best but patchy conditions were during the night. Activity was good in parts of the Continent where PA0s and especially PA0EZ gave welcome points. HB9s were also in evidence. However, there was none of the exceptional dx experienced last year, with no Scandinavian or Spanish contacts.

Operating and log-keeping standards were high. There were two isolated reports of poor-quality signals, one of excessive spread and the other the over-enthusiastic use of a speech processor. No disqualifications resulted. Most of the logs submitted were a pleasure to read. To assist checking it would be very helpful if computer print-outs contained the station locator on each page as on the Form LSVHF log sheet. Only one very poor pencil-written log was received. This was admittedly legible but it had scruffy handwriting and was coffee(?) stained.

EQUIPMENT USED BY LEADING STATIONS ON 1,296MHz

	Transmitter	Receiver	Antenna
OPEN SECTION			
G4NXO/P	FT225 + MM transverter + linear 2 × 7289 150 p.e.p. out	MGF1412 rf amp (masthead)	8 × 23el Yagi at 24ft agl
G3GRO/P	Homebrew transverter + FT902 DM + linear 2 × 2C39WA 100 p.e.p. out	Bi-polar pre-amp (masthead)	4 × 15 over 15 Jaybeam Yagi at 40ft agl
G4ANT/P	Homebrew converter + linear 2 × 2C39A 175 p.e.p. out	2 × GAT4 rf amp (masthead)	4 × 26el quad loop Yagi at 40ft agl
RESTRICTED SECTION			
G8FEZ/P	IC271 + MM transverter + linear 2 × 7289 25 p.e.p. out	MM transverter	6ft dish at 25ft agl
G3NNG/P	1 × 2C39A 25 p.e.p. out	2SK 274 rf amp Ring mixer	23el Tonna Yagi at 20ft agl
G3CKR/P	IC251E + SSB Electronics transverter + 2C39A linear 20W p.e.p. out	GaAsFet	23el F9FT Yagi at 30ft agl

Equipment used was very similar to that of last year. A Microwave Modules transverter plus linear amplifier with some Yagi variant is typical. However, it was good to see some home-brew transverters and other equipment in use. There were no complaints about the rules, although some interesting suggestions were made about antennas for use in the Restricted section.

These will be considered for the future. Only one entrant complained about the locator system. Interestingly the error rate in exchanging locators was extremely small, even with weak signals.

Overall, in spite of disappointing conditions, this band again proved to be a very successful part of VHF NFD. Activity was high but some stations found long periods without a contact, probably due to the variability of the hood conditions in which from time to time bursts of enhancement occurred. No listener or check logs were received.

G3FZL

OVERALL RESULTS

OPEN SECTION

Posn	Group name	Band positions 70	144	432	1·3	Overall score
1	HADRABS & Addiscombe CG	2	1	2	5	3,480
2	Sheppey Combined CG	9	6	1	1	3,339
3	Parallel Lines CG	8	2	5	6	3,027
4	The Hillbillies	16	3	6	4	2,926
5	Norfolk VHF/UHF CG	5	5	9	3	2,926
6	S Scotland VHF/UHF CG	1	4	13	16	2,708
7	Crawley & Reigate	20	12	8	2	2,627
8	Flight Refuelling ARS	6	16	4	17	2,193
9	Edinburgh Dist VHF Gp	13	11	10	12	2,155
10	The RS of Harrow	44	10	3	20	2,100
11	Horsham ARC	22	9	23	11	1,925
12	Wolds CG	12	43	14	7	1,876
13	Victory CG	10	7	22	26	1,853
14	Newbury & D ARS	19	26	31	9	1,783
15	S Manchester RC	14	31	21	10	1,739
16	Hastings E & RC	26	8	7	—	1,721
17	PACT	23	27	15	19	1,665
18	Blackwood & D ARS	21	14	17	23	1,635
19	Scunthorpe VHF CG	41	36	27	8	1,596
20	Clifton ARS	33	24	18	14	1,595
21	CARS Highbrows CG	7	17	11	32	1,593
22	Telford & D ARS	15	29	33	15	1,583
23	Dunstable Downs ARC	30	18	29	18	1,577
24	Exmoor RC	18	30	19	25	1,470
25	Reading & D ARC	29	32	41	13	1,424
26	Plymouth RC	4	19	37	41	1,360
27	Southdown ARS	37	15	12	40	1,328
28	Norfolk ARC	42	23	24	24	1,290
29	N Cornwall CG	11	20	47	—	1,153
30	Ayr ARG	17	13	64	47	1,097
31	Preston ARS	3	46	38	—	1,081
32	Farnborough & D ARS	39	41	30	28	1,068
33	Salop ARS	27	—	20	27	981
34	Colchester RA	43	28	25	—	958
35	Glamorgan CG	28	25	62	42	924
36	Martlet CG	35	—	35	21	915
37	Northern Heights ARS	34	37	54	35	887
38	Newark & D ARC	24	56	42	37	857
39	Sutton & Cheam RS	31	—	26	29	843
40	Mid Cheshire ARS	25	54	52	38	809
41	Leicester Poly CG	50	22	40	—	748
42	Hillingdon ARC	—	44	51	22	731
43	Hornsea ARC	32	49	60	39	724
44	Pembroke & D ARC	—	21	32	—	719
45	Vale of White Horse ARS	—	35	16	—	710
46	Harlow & D ARS	46	42	49	—	696
47	Saffron Walden & D ARC	38	48	46	—	679
48	Southgate RC	36	66	58	30	669
49	RWCG	—	33	28	—	627
50	The ARC of Nottingham	47	47	48	—	615
51	West Kent ARS	52	34	50	46	603
52	White Rose ARS	45	59	53	44	597
53	Basildon Marconi/SE Essex	49	62	55	33	537
54	Anglesey CG	—	40	36	—	519
55	Fareham & D ARC	51	51	59	34	512
56	Mid Sussex ARS	—	39	43	—	478
57	Grafton RS	—	50	39	43	435
58	NW of Ireland ARS	40	63	69	—	432
59	Easington ARS	48	61	63	45	427
60	Yeovil ARC	—	58	34	—	392
61	Sutton Coldfield RS	53	57	57	—	381
62	Bridgend & D ARC	—	38	67	—	345
63	Aylesbury Vale RS	—	52	45	—	345
64	Alternative Bolton CG	—	55	44	—	331
65	Bury St Edmunds RS CG	—	53	—	31	318
66	Borders ARS	—	45	61	—	302
67	Cheshunt & D ARC	—	60	65	36	271
68	Coventry Technical Coll ARS	—	65	56	—	213
69	Chester & D RS	—	64	66	—	117
70	Magherafelt ARS	—	67	68	—	72

RESTRICTED SECTION

Posn	Group name	Band positions 70	144	432	1·3	Overall score
1	Warrington RC	38	1	1	3	3,231
2	East Kent RS	14	5	2	1	3,043
3	Guernsey Rockhopper CG	5	2	5	18	2,795
4	Wirral & D RC	2	3	4	19	2,785
5	Bracknell ARC	4	14	8	6	2,733
6	Harwell RS	19	8	7	2	2,693
7	Westmorland VHF Group	1	28	3	13	2,659
8	Flowerpot Men	25	4	18	5	2,659
9	S Birmingham RS	12	22	9	4	2,540
10	Five Bells Group	17	13	13	8	2,389
11	Surrey Radio Contact C	13	10	11	11	2,359
12	Albright & Wilson ARS	3	12	12	16	2,352
13	Crimson Kipper CG	6	18	26	14	2,258
14	E Suffolk Wireless CG	22	25	6	10	2,226
15	Univ of Surrey EARS	18	19	19	12	2,104
16	Cheltenham ARA	10	7	15	30	1,913
17	Torbay ARS	8	21	47	17	1,848
18	N Beds Gentlemens CG	27	40	35	9	1,820
19	Basingstoke ARC	16	24	10	24	1,762
20	Maidenhead & D ARC	24	45	—	7	1,624
21	N Kent ARS	21	23	17	25	1,621
22	Shirehampton ARC	7	27	20	—	1,604
23	Bury RS	9	17	23	—	1,597
24	W of Scotland ARS	11	26	22	29	1,565
25	Kidderminster & D ARC	20	38	14	—	1,395
26	Edgware & D RC	31	29	27	27	1,385
27	Queens Univ Belfast RC	34	11	28	—	1,366
28	Guildford & D RS	33	41	24	22	1,358
29	Chiltern ARC	26	56	52	15	1,357
30	Shefford & D ARS	28	36	34	—	1,180
31	South Lakeland ARS	32	34	30	—	1,137
32	Selray CG	15	57	57	26	1,122
33	Bolsover ARS	23	35	53	—	1,060
34	Cambridge & D ARC	42	39	50	23	1,040
35	Grimsby ARS	40	64	37	21	999
36	Doncaster Students ARS	37	61	21	—	972
37	Great Lumley ARS	44	31	38	28	966
38	Goole R & ES	—	20	16	—	937
39	BBB CG/Worcester MB S	—	16	25	—	896
40	Nunsfield House ARG	—	58	29	20	883
41	Lincoln SWC	39	46	45	—	871
42	RAFARS	—	15	31	—	867
43	East Lancs ARC	30	55	59	—	854
44	Plessey (Beeston) RC	—	9	48	—	814
45	Stirling & D ARS	41	32	61	33	764
46	Aberdeen ARS	29	—	44	31	757
47	Bishop's Stortford ARS	35	60	56	—	754
48	Beckside DX Assocn	—	6	64	—	751
49	Ellesmere Port & D ARS	36	44	—	—	736
50	South Bristol ARC	—	30	33	—	718
51	Mexborough & D ARS	46	43	41	32	637
52	Bourne ARS	45	54	49	—	625
53	Edenbridge ARS	—	50	32	—	610
54	Solihull CG	—	33	51	—	548
55	North Bristol ARC	—	51	39	—	525
56	Thornton Cleveleys ARS	—	49	42	—	517
57	Tamworth ARS	—	48	46	—	514
58	Grtr Peterborough ARC	—	53	40	—	512
59	GM3TAL	43	65	43	—	509
60	Beacon Hill CG (Essex)	—	62	36	—	481
61	Nene Valley RC	—	47	54	—	460
62	Darwen ARC	—	42	58	—	441
63	Coulsdon ATS	—	52	55	—	413
64	Mid Argyll ARS	—	37	63	—	392
65	Halifax & D ARS	—	59	60	—	322
66	Kelso ARS	—	63	62	—	221

SWL SECTION

Posn	Station	Band positions 70	144	432	Overall score
1	BRS52543	1	3	1	2,912
2	BRS25429		2	2	1,811
3	BRS32525		1	3	1,800
4	BRS46296		4		506
5	BRS28198	2	5		392

Disqualified: Ealing & District ARS—VHF NFD Rule 9;
South Belfast VHF CG/Sunspots Radio Club—VHF NFD Rule 10a.

70MHz BAND RESULTS

OPEN SECTION

Posn	Callsign/P	Points	Loc	CW section Points	CW section QSOs	SSB section Points	SSB section QSOs	Antenna
1	GM3WOJ	3,370	IO74NP	1,283	91	2,087	148	14EY
2	G4ALE	2,381	IO80BO	934	85	1,447	134	6/6EY
3	G3SYA	2,207	IO84SA	921	97	1,286	139	4/4EY
4	G3ZYY	2,090	IO80AQ	933	87	1,157	102	4/4EY
5	G3MPN	1,970	JO02QV	741	80	1,229	124	4×6EY
6	G3PFM	1,880	IO80WP	619	79	1,261	135	12EY
7	G2ASF	1,857	IO81JC	702	82	1,155	124	6/6EY
8	G4HNS	1,831	JO03CE	697	89	1,134	135	8EY
9	G4BVY	1,824	JO01KK	747	87	1,077	121	7EY
10	G4ZYA	1,821	IO90JO	580	72	1,241	133	12EY
11	G4ADV	1,820	IO70PP	561	47	1,259	104	4/4/4/4EY
12	G3AMW	1,708	IO93RS	771	91	937	109	8EY
13	GM3RFQ	1,668	IO85DJ	671	51	997	75	4EY
14	G4HON	1,606	IO93BF	621	89	985	135	5EY
15	G3UKV	1,588	IO82RQ	673	97	915	133	8EY
16	G3ZTZ	1,570	IO94TK	387	45	1,183	117	8EQ
17	GM3ZAS	1,566	IO74UU	551	39	1,015	84	6EY
18	G4DGU	1,543	IO81CC	570	61	973	101	6EY
19	G3UAX	1,539	IO91GI	517	79	1,022	128	8EY
20	G4MEL	1,531	JO01OC	627	73	905	101	6EY
21	GW4EAI	1,513	IO81NV	360	52	1,117	104	5EY
22	G3SWC	1,501	IO90SV	610	84	891	122	5EY
23	G4ZVA	1,493	IO93FI	612	87	881	122	6EY
24	G3TBK	1,452	IO93RA	580	84	872	119	6EY
25	G4CAX	1,419	IO83PF	420	57	999	126	4EY
26	G3YYF	1,418	JO00HU	610	76	808	100	6EY
27	G3NSY	1,394	IO82QL	625	91	769	107	4EY
28	GW4VRV	1,319	IO81FR	415	57	904	100	9EY
29	G3WGV	1,317	IO91IH	542	81	775	113	8EY
30	G4ARD	1,296	IO91RU	484	75	818	115	6EY
31	G3DCZ	1,267	IO93AC	457	63	810	116	5EY
32	G4IGY	1,219	IO94VD	545	59	674	68	10EY
33	G3JKY	1,195	JO01DH	475	70	720	100	4EY
34	G3KAX	1,138	IO93AS	228	32	910	106	4X4EY
35	G4AOL	1,125	JO00AT	424	65	701	86	10EY
36	G3KTZ	1,120	IO91VR	487	87	633	101	5EQ
37	G4RHS	1,074	JO00DR	478	64	596	76	4/4EY
38	G4KF	1,061	JO02DA	429	71	1,061	111	4/4EY
39	G4DKN	1,043	IO91OF	413	71	630	96	4EY
40	GI4ONL	1,038	IO64LX	174	14	864	57	4EY
41	G4ERG	1,007	IO93UK	373	49	634	78	4EY
42	G4WTR	955	IO74NP	442	54	513	66	5EY + 3EQ
43	G4TZM	925	JO01KW	423	65	502	70	4EY
44	G3UFB	922	IO90XV	324	55	598	91	4EY
45	G3PSM	900	IO93FU	—	—	900	83	5EY
46	G3WUX	895	JO01BW	408	68	487	79	4EQ
47	G2SP	835	IO92HW	207	42	628	107	6EY
48	G4APN	678	IO80BO	257	29	421	44	5EY

Posn	Callsign/P	Points	Loc	CW section Points	CW section QSOs	SSB section Points	SSB section QSOs	Antenna
49	G4OAD	657	JO01FD	278	48	379	63	6EY
50	G3ORY	506	IO92NP	169	36	338	58	3EY
51	G4ITF	399	IO90KX	98	24	301	52	2EY
52	G4OTV	339	JO01GC	82	23	257	44	4EY
53	G3LNN	323	IO92CO	114	26	209	40	4EY

RESTRICTED SECTION

Posn	Callsign	Points	Loc	CW section Points	CW section QSOs	SSB section Points	SSB section QSOs	Antenna
1	G3FDW	1,912	IO84UR	671	61	1,241	113	6EY
2	GW3UVR	1,680	IO83JA	694	80	986	124	6EY
3	G4DDN	1,642	IO80ST	641	76	1,001	108	6EY
	GW3UEY	1,642	IO82JG	636	81	1,006	124	6EY
5	GU4IUW	1,610	IN89TK	582	50	1,028	82	4EY
6	G4CXT	1,543	IO91JM	637	87	906	120	5EY
7	G4FRO	1,471	IO81QH	480	67	991	123	6EY
8	G3LHJ	1,423	IO80FN	642	66	781	79	6EY
9	G3BRS	1,336	IO83TP	557	68	779	99	4EY
10	G4ILI	1,326	IO81XU	534	84	792	117	8EY
11	GM4PHG	1,259	IO75PS	503	37	756	54	4EY
12	G4EYD	1,226	IO82XJ	416	62	810	124	6EY
13	G4FUU	1,200	IO91XH	442	68	758	113	6EY
14	G3LTY	1,199	JO01OI	403	51	796	90	12EY
15	GW4TAW	1,184	IO81FP	396	50	708	91	5EY
16	G3ZOI	1,156	IO91KF	468	68	688	100	4EY
17	G4EMK	1,136	IO92TR	486	79	650	98	7EY
	G4CWH	1,136	IO91XG	498	78	638	93	5EY
19	G4HLX	1,133	IO91FN	393	67	740	105	9EY
20	G4CTU	1,126	IO82RJ	493	73	633	93	10EY
21	G3WMR	1,076	JO01BH	376	63	700	100	6EY
22	G3ZNU	1,049	JO02KD	399	53	650	83	12EY
23	G4NLZ	1,019	IO93HH	350	60	669	97	4EY
24	G3TWG	1,016	IO91QS	428	74	588	98	4EY
25	G4KFK	1,012	IO93XG	382	54	630	82	5EY
26	G4PIE	1,002	IO91PP	404	72	598	100	8EY
27	G4FOH	981	IO92WE	301	52	688	104	5EY
28	G3WRJ	972	IO92VB	410	68	562	89	4EY
29	GM4OBD	959	IO86RW	406	26	553	33	10EY
30	G3NTJ	947	IO83RS	258	31	689	66	4EY
31	G3PSP	920	IO91VR	366	66	554	94	9EY
32	G3ZFZ	818	1084KE	218	25	600	63	3EY
33	G3PJX	814	IO91TF	358	66	456	80	8EY
34	GI4WWF	802	IO74AD	218	16	584	42	4EY
35	G3TVW	789	JO01DW	338	58	451	79	4EY
36	GW4OKT	785	IO83LC	232	33	553	80	3EY
37	G4RHZ	712	IO93JK	285	47	427	62	5EY
38	G4HGI	681	IO93AD	376	62	305	59	4EY
39	G3VRD	657	IO93QS	455	63	657	86	4EY
40	G3RXP	624	IO93VK	270	45	354	52	3EY
41	GM4DGT	620	IO76XB	191	17	429	33	6/6 slot
42	G2XV	583	JO02AD	246	49	337	59	4EY
43	GW3TAL	408	IO73VH	—	—	408	45	9EY
44	G4MSF	372	IO94EV	115	17	257	27	4EY
45	G4RQK	322	IO92ST	—	—	322	52	4EY
46	G4ANP	120	IO93KM	21	9	99	22	4EY

SWL SECTION

Posn	Station	Points	Loc	SW section Points	SW section QSOs	SSB section Points	SSB section QSOs	Antenna
1	BRS52543	470	IO83LT	—	—	470	52	5EY
2	BRS28198	142	JO00HX	—	—	142	26	TA31JR

144MHz RESULTS BAND

RESTRICTED SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
1	G4CDA	3,664	578	IO93	OK1KJX/P	1,278
2	GU4XEA	3,617	342	IN89	F1EQF	859
3	GW4MGR	3,493	472	IO83	HB9RDB/P	974
4	G8KQW	3,352	355	IO93	HB9RDB/P	853
5	G6EKR	2,806	308	JO01	GM3PJP	725
6	G5ECD	2,721	370	IO84	F6HPP/P	717
7	G5BK	2,665	395	IO81	HB9FG/P	882
8	G3PIA	2,429	360	IO91	PA3DYS	575
9	G8ZK	2,291	359	IO92	DC6XL	612
10	G4DDY	2,257	405	IO91	F6GRB/P	771
11	GI4SSF	2,232	215	IO74	ON4ASL/A	743
12	GW3OXD	2,214	297	IO82	HB9KK/P	999
13	G8NWM	2,046	229	IO92	DL8GP	637
14	G6BRA	2,011	251	IO80	DK0YY	822
15	G3RAF	1,996	295	IO81	F1ERF	886
16	G4WET	1,968	363	IO93	HB9RDB/P	830
17	G4TBT	1,936	296	IO83	F6HPP/P	623
18	G3ZVL	1,912	265	IO91	HB9RDB/P	766
19	G4VRC	1,895	330	IO91	HB9SJV/P	694
20	G8HSG	1,854	222	IO93	F/PA0ERA	659
21	G3NJA	1,848	183	IO80	F6KOU/P	969
22	G8OHM	1,768	305	IO82	HB9RDB/P	872
23	G8TNK	1,741	304	JO01	HB9RDB/P	681
24	G3TCR	1,681	264	IO91	HB9RDB/P	763
25	G4SWX	1,672	192	JO02	F6CJG/P	723
26	GM4AGG	1,667	186	IO75	F6KAW	749
27	G4AHG	1,632	239	IO81	PA0GUS/P	586
28	G3PRD	1,595	178	IO84	F6HMQ/P	711
29	G3ASR	1,579	239	IO91	HB9RDB/P	730
30	G4WAW	1,502	227	IO81	HB9RDB/P	1,130
31	G4EUZ	1,462	159	IO94	F/PA0ERA	586
32	GM4RTN	1,404	136	IO76	F/PA0ERA	809
33	G4JDL	1,398	273	IO92	F1DXD/P	703
34	G4VKE	1,387	181	IO84	F6HMQ/P	643
35	G4RSB	1,361	209	IO93	DF0DA/P	662
36	G3FJE	1,360	221	IO92	DL9GS	521
37	GM0BOA	1,313	105	IO76	F/PA0ERA	810
38	G4GXP	1,283	212	IO82	PA0GUS/P	681
39	G8EVY	1,250	184	JO02	HB9RDB/P	752
40	G4VHF	1,232	195	IO92	DF0DA/P	527
41	G6GS	1,215	220	IO91	HB9RDB/P	700
42	G4JS	1,213	149	IO83	Not recorded on 427	
43	G4BTS	1,194	150	IO93	F1KSL/P	732
44	GW3CSA	1,190	201	IO83	F1DYD/P	566
45	G3WKX	1,178	211	IO91	HB9RDB/P	761
46	G5FZ	1,149	163	IO93	DL2KAL	609
47	G4NWZ	1,125	180	IO92	DJ9YE	656
48	G8TRS	1,117	185	IO93	F6HPP/P	546
49	G4ATH	1,075	139	IO83	ON4ASL/A	560
50	G4TPJ	1,064	232	JO01	GM4RTN/P	593
51	G4GCT	1,053	169	IO81	GM6LEZ/P	508
52	G4FUR	1,047	167	IO91	ON4AMX	1,041
53	G4EHW	1,012	134	IO92	EI9ED/P	456
54	G4TEI	985	129	IO92	F6HPP	472
55	G1ELC	983	144	IO83	EI4DV/P	652
56	G3NCL	946	224	IO91	HB9RDB/P	748
57	GW4JEC	892	122	IO81	HB9SJV/P	907
58	G3ZBI	889	176	IO93	ON5WL/A	498
59	G6XWA	878	142	IO93	F8OU/P	514
60	G5ZG	827	128	JO01	DL8GP	544
61	G3PTV	821	168	IO93	F6HMQ/P	592
62	G6SPS	774	114	JO01	HB9RDB/P	694
63	GM3VLB	622	150	IO85	Not recorded on 427	
64	G3CNX	608	122	IO93	F6KBF/P	693
65	GW3UHN	291	44	IO73	F6KBF/P	456

OPEN SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
1	G4PUB	10,507	826	IO80	I2FHW/P	1,174
2	G4LIP	9,637	823	JO03	OK1KIR/P	928
3	G4APA	9,297	746	IO94	HB9KK/P	1,035
4	GM3WCS	8,958	800	IO74	F1FSL/P	991
5	G3ZIG	8,815	798	JO02	F1HJM	846
6	G4BWG	8,388	725	JO01	Y23SB/P	774
7	G8LNC	7,799	752	IO90	DE0CT/P	868
8	G6HH	7,467	634	JO00	EA2RCI	977
9	G4HRS	6,626	724	IO90	F5IL	971
10	G3EFX	6,358	622	IO90	F6EPE	855
11	GM4HAM	6,212	582	IO85	F/PA0ERA	1,195
12	G3WSC	6,202	557	JO01	DL0BQ	816
13	GM4PTT	6,044	594	IO74	F6KAW/P	659
14	GW6GW	5,612	696	IO81	F6GRB/P	928
15	G3WQK	5,481	534	JO00	F6HTJ/P	936
16	G4RFR	5,238	514	IO80	F6HTJ/P	974
17	G4CFG	5,134	555	IO81	HB9CIU/P	938
18	G4DDC	5,066	567	IO91	F6BUL/P	829
19	G3PRC	5,029	540	IO80	GM3HRZ	748
20	G4WAV	4,959	450	IO70	GM3BSQ/P	713
21	GW2OP	4,945	489	IO71	PA0HIP	659
22	G3SDC	4,454	563	IO92	FC1GDV/P	856
23	G4ARN	4,429	407	JO02	HB9CIU/P	811
24	G3GHN	4,290	550	JO01	F6KAU/P	876
25	GW8VHI	4,275	537	IO81	HB9FG/P	1,018
26	G3NVO	4,188	556	IO91	F6HBP/P	861
27	G4NVA	4,187	539	IO93	DL8GP	740
28	G4CRA	4,129	427	JO01	F6BUL/P	780
29	G3ZME	4,097	580	IO82	FC1GTU	862
30	G4SSS	4,049	436	IO81	F6HTJ/P	1,070
31	G3FVA	3,933	531	IO93	HB9RDB/P	928
32	G4CCC	3,901	520	IO91	F6HTJ/P	1,025
33	GW3YZD	3,769	558	IO83	DL8GP	830
34	G3WKS	3,734	430	JO01	HB9KK/P	717
35	G4SYL	3,652	486	IO91	HB9FG/P	823
36	G4CDC	3,650	458	IO93	DL8GP	680
37	G2SU	3,461	441	IO93	DL8GP	791
38	GW4LNP	3,361	430	IO81	HB9FG/P	954
39	G3ZMS	3,325	413	IO90	F6HTJ/P	960
40	GW6LAC	3,297	413	IO73	PE1KMH	607
41	G1FRS	3,246	455	IO91	F6BUL/P	788
42	G6BUT	3,047	404	JO01	F6HBP/P	851
43	G8GBY	2,734	327	IO93	DC5JO	834
44	G1DXY	2,717	423	IO91	DL0WV	556
45	GM0BRS	2,414	273	IO85	F6KBF/P	709
46	G3KUE	2,390	399	IO84	F6KAW/P	1,265
47	G6CW	2,376	354	IO92	F6KMO/P	714
48	G3TXC	2,214	303	JO02	HB9SJV/P	741
49	G4EKT	2,189	230	IO94	F1KSH/P	747
50	G3AFT	2,110	269	JO01	HB9SJV/P	800
51	G3VEF	2,071	279	IO90	FC1CMG	1,419
52	G4VRS	2,004	351	IO91	HB9RDB/P	757
53	G6BSE	1,973	253	JO02	DL6FAW/P	615
54	G3ZTT	1,820	284	IO83	F6HMQ/P	542
55	G8PRH	1,816	241	IO83	F6KAW/P	1,242
56	G3PJR	1,750	288	IO93	DL8GP	665
57	G3RSC	1,730	312	IO92	GM6LEZ/P	516
58	G3CMH	1,628	218	IO80	F6HTJ/P	1,026
59	G3XEP	1,610	239	IO93	HB9RDB/P	964
60	G4ECT	1,552	220	IO91	DF0CT/P	667
61	G6APN	1,410	221	IO94	F6KAW/P	564
62	G8OIV	1,157	178	JO01	HB9KK/P	765
63	GI3CFH	1,148	87	IO64	F/PA0ERA	778
64	G8GIZ	963	157	IO83	F6HMQ/P	515
65	G6CTC	940	184	IO92	F6HPP/P	472
66	G3SFG	892	258	IO91	F6KAW/P	1,287
67	GI4MFT	579	121	IO64	ON4ASL/A	400

RECEIVING SECTION

Posn	Station	Points	QSOs	Loc	Best dx	Km
1	BRS32525	1,073	174	JO01	F6GZC/P	737
2	BRS25429	1,049	121	IO93	F6HPP/P	620
3	BRS52543	979	125	IO83	ON4ASL/A	539
4	BRS46296	543	103	IO83	EI4DV/P	416
5	BRS28198	97	19	JO00	G3PRC/P	323

Check logs gratefully acknowledged from G1DDF, G1GGT/P, G2AVR/P, G2DHV/P, G3KWU, G3NMD, G3XBF/P, G6RZZ, G6TGB, G8UDV/P, G8YGD, GM3BSQ/P, GW6CSY/P.
G2HIF

432MHz BAND RESULTS

OPEN SECTION

Posn	Callsign (/P)	Points	QSOs	Loc	Best dx	Km	Square
1	G8TFI	4,152	412	JO01KK	DL0NF	769	JN59PK
2	G4JAR	3,553	309	IO80BO	F1EQF/P	1,025	JN12EK
3	G4JNZ	3,290	353	IO90XV	F6KSX	887	JN02JW
4	G0API	2,826	286	IO80WP	F6ISI/P	875	IN13GK
5	G4CLA	2,781	286	JO03CE	HB9/F1FHI/P	836	JN36GU
6	G4THB	2,679	250	IO94RJ	HB9/F1FHI/P	974	JN36GU

Posn	Callsign (/P)	Points	QSOs	Loc	Best dx	Km	Square
7	G1HHH	2,447	257	JO00HU	DK2GR	743	JN59IE
8	G5LK	2,445	244	JO01OC	DG7NBE/P	896	JO40XI
9	G4LOJ	2,264	227	JO02QV	HB9/F1FHI/P	767	JN36GU
10	GM8TSI	2,213	195	IO85DJ	G1HHH/P	581	JO00HU
11	G4DSF	1,812	216	IO81JC	HB9KK/P	933	JN36TP
12	G4RUL	1,714	195	JO00DR	F1ADT/P	706	JN14SS
13	GM4DIJ	1,655	155	IO74NP	G1HHH/P	561	JO00HU
14	G3LRS	1,601	195	IO93RS	HB9/F1FHI/P	918	JN36GU
15	G4BVE	1,586	254	IO93FI	F6BQX	691	IN97OD
16	G4VWH	1,504	211	IO91IO	HB9MIN/P	785	JN37OE
17	GW4JKV	1,437	186	IO81NV	F6ISI/P	1,023	JN13GK
18	G4TJE	1,425	233	JO01DH	HB9/F1FHI/P	730	JN36GU
19	G4HGU	1,423	171	IO81CC	HB9KK/P	968	JN36TP
20	G3SRT	1,319	238	IO82QL	PA0PLY/A	525	JO22MH
21	G3UHF	1,299	208	IO93BF	ON7WR/A	515	JO20EP
22	G6ISY	1,291	177	IO90JO	HB9/F1FHI/P	704	JN36GU
23	G3WZT	1,277	200	IO90SV	HB9BA/P	707	JN37SG
24	G4XBT	1,243	146	JO02MN	HB9BA/P	762	JN37SG
25	G4WFR	1,210	161	JO01KW	DB0EJ	593	JO40MJ
26	G4ADM	1,142	205	IO93AC	F/PA0ERA	410	JN09IT
27	G4GZA	1,131	161	IO93UK	EI8AH/P	527	IO54XT
28	GW3XVA	1,111	176	IO83ID	PA0PLY/A	568	JO22MH
29	G8DDC	1,089	175	IO91RU	HB9/F1FHI/P	756	JN36GU
30	G6FRS	1,044	202	IO91OF	HB9BA/P	747	JN37SG
31	G2CPM	1,037	177	IO91GI	HB9/F1FHI/P	766	JN36GU
32	GW4WMK	1,030	120	IO71OW	F/PA0ERA	452	JN09IT
33	G4NKC	1,002	183	IO82RQ	GM6MGS/P	472	IO86RW
34	G4PJO	983	135	IO80LV	HB9AOF/P	832	JN36DO
35	G4GZO	925	131	JO00AT	HB9/F1FHI/P	647	JN36GU
36	GW6DOK	851	119	IO73UJ	PE0MAR/P	575	JO21BX
37	G4HTD	847	96	IO80AQ	HB9/F1FHI/P	879	JN36GU
38	G4OTN	826	129	IO84SA	G1HHH/P	409	JO00HU
39	G4RPK	760	132	JO01EW	F6BQX	550	IN97OD
40	G6AZV	722	149	IO92NP	PA0GUS/P	432	JO23RD
41	G0CCC	719	138	IO91IH	HB9/F1FHI/P	755	JN36GU
42	G4HVC	716	127	IO93RA	GM1HXU/P	408	IO75PS
43	G6LPZ	673	122	IO90WV	HB9MIN/P	675	JN37OE
44	G8NVW	658	100	IO83QO	PE0MAR/P	487	JO21BX
45	G1ECE	640	132	IO91PS	PA0GUS/P	444	JO23RD
46	G3PGN	636	109	JO02DA	HB9/F1FHI/P	729	JN36GU
47	G8XNH	586	67	IO70PA	GM8TSI/P	545	IO85DJ
48	G3EKW	585	102	IO92HW	F6BQX	390	IN97OD
49	G6UT	581	178	JO01BW	DL2KAL	461	JO30FQ
50	G4RPQ	567	91	JO01GC	HB9MIN/P	652	JN37OE
51	G1HIL	562	137	IO91IQ	HB9MIN/P	764	JN37OE
52	G8ZTT	559	112	IO83PF	GM6MGS/P	412	IO86RW
53	G3ZGA	543	88	IO93FU	F/PA0ERA	475	JN09IT
54	G4EMW	537	102	IO93AS	PA0PLY/A	496	JO22MH
55	G4RSE	522	102	JO01FO	HB9/F1FHI/P	694	JN36GU
56	G3UVW	515	93	IO92DB	GM6LNM/P	471	IO75PW
57	G1AHN	500	94	IO92CO	F6BQX	611	IN97OD
58	G3RWL	441	99	IO91VR	F6BQX	605	IN97OD
59	G8KGI	412	81	IO90KX	HB9/F1FHI/P	723	JN36GU
60	G4MWE	324	52	IO94VD	G4JAR/P	465	IO80BO
61	GM8BDX	298	40	IO85WT	PI4KGL/A	608	JO21FW
62	G4NXH	276	58	IO94GR	G4JNZ/P	436	IO90XV
63	GW4PYO	289	81	IO81FR	HB9MIN/P	984	JN37OE
64	GM3KJF	210	29	IO74UU	G4JAR/P	473	IO80BO
65	G6CRC	144	44	IO91XU	PA0PLY/A	351	JO22MH
66	G3GIZ	103	26	IO83ND	G4JNZ/P	315	IO90XV
67	GW6JXR	102	24	IO81FP	GU4XIT/P	258	IN89TK
68	GI8JRE	70	20	IO64PQ	G4ADM/P	200	IO93AC
69	GI4OUN	61	15	IO64LX	G8NVW/P	325	IO83QO

RESTRICTED SECTION

Posn	Callsign (/P)	Points	QSOs	Loc	Best dx	Km	Square
1	G4RNL	1,927	300	IO93AD	HB9MIN/P	928	JN37OE
2	G8ULU	1,252	156	JO01OI	DL9HN	646	JO53AN
3	G4RCD	1,228	127	IO84UR	F/PA0ERA	622	JN09IK
4	GW8WDC	1,188	186	IO83JA	ON7WR/A	584	JO20EP
5	GU4XIT	1,186	112	IN89TK	F6HTJ/P	859	JN12EK
6	G0BIK	1,147	145	JO02KD	GM4DIJ/P	472	IO74NP
7	G4CXJ	1,075	165	IO91FN	GM6LNM/P	529	IO75PW
8	G4CGS	1,056	130	IO80ST	HB9BA/P	827	JN37SG
9	G4OHM	1,054	180	IO82XJ	F6BQX	591	IN97OD
10	G4XIP	1,002	157	IO91KF	GM8TSI/P	494	IO85DJ
11	G3ZPB	997	182	IO91XH	HB9AOF/P	694	JN36DO
12	GW3YRJ	931	141	IO82JD	HB9/F1FHI/P	923	JN36GU
13	G4YHF	906	130	IO92TR	HB9/F1FHI/P	819	JN36GU
14	G4WDE	878	160	IO82RJ	PA0PLY/A	514	JO22MH
15	G4PDS	832	143	IO81XU	F6BQX	530	IN97OD
16	G8ERX	831	130	IO93PW	GU4XIT/P	514	IN89TK
17	G4CW	797	145	JO01BH	HB9/F1FHI/P	681	JN36GU
18	G8SJP	782	101	IO93XG	HB9/F1FHI/P	853	JN36GU
19	G4WGE	769	133	IO91XG	HB9/F1FHI/P	685	JN36GU
20	G4BWE	752	114	IO81QH	HB9/F1FHI/P	752	JN36GU
21	G3UER	725	118	IO93JK	PA0EZ	451	JO22QF
22	GM1HXU	719	80	IO75PS	G8TFI/P	606	JO01KK
23	G4ZTB	713	178	IO83TP	PE0MAR/P	472	JO21BX
24	G5RS	707	130	IO91TF	GM8TSI/P	513	IO85DJ
25	G1EME	692	145	IO92CA	GM8TSI/P	395	IO85DJ
26	G4OXT	664	152	IO91JM	F6BQX	480	IN97OD
27	G3SHY	655	126	IO91UR	PA0GUS/P	427	JO23RD
28	GI3LLQ	651	65	IO74AD	G6ISY/P	508	IO90JO
29	G8KGC	639	104	IO93BA	PE0MAR/P	421	JO21BX
30	G3IZD	635	87	IO84KE	G1HHH/P	449	JO00HU
31	G3RAF	620	125	IO81PH	HB9/F1FHI/P	834	JN36GU
32	G8PPQ	616	124	JO01AH	GM8TSI/P	519	IO85DJ
33	G4RZY	594	104	IO81QJ	PA0GUS/P	582	JO23RD
34	G4VXF	580	107	IO92VB	HB9/F1FHI/P	756	JN36GU
35	G3WTP	545	126	IO92WE	DK9VD/A	575	JN39NR
36	G6PLA	521	86	JO01HS	HB9/F1FHI/P	694	JN36GU
37	G4EBK	507	79	IO93VK	G4JAR/P	400	IO80BO
38	G4OCQ	483	68	IO94EV	F6BQX	863	IN97OD
39	G6PNB	459	87	IO81SN	F6BQX	510	IN97OD
40	G4DXW	454	78	IO92TN	PA0GUS/P	396	JO23RD
41	G4IHZ	446	79	IO93KM	PE0MAR/P	392	JO21BX
42	G6GMW	431	71	IO83LU	G4JNZ/P	385	IO90XV
43	GW3SHK	418	59	IO73VH	G8TFI/P	407	JO01KK
44	G6COL, GM6MGS	410	99	IO93QJ	PE0MAR/P	397	JO21BX
46	G4FWC	403	78	IO93DB	PI4KGL/A	435	JO21FW
47	G8NJA	399	57	IO80FN	PE0MAR/P	555	JO21BX
48	G8IGQ	365	87	IO92MT	PI4KGL/A	379	JO21FW
49	G4WIN	363	61	IO92ST	HB9/F1FHI/P	829	JN36GU
50	G6ASH	359	77	JO02AD	PA0GUS/P	382	JO23RD
51	G0ABA	320	83	IO92EL	GM8TSI/P	352	IO85DJ
52	G0ACL	314	80	IO91PP	PA0PLY/A	401	JO22MH
53	G4PPR	300	74	IO93HH	PE0MAR/P	406	JO21BX
54	G6GWZ	295	66	IO92PG	F/PA0ERA	291	JN09IT
55	G6YOG	244	80	IO91VG	HB9/F1FHI/P	694	JN36GU
56	GW4AVV, G1BKZ	212	41	IO81FP	G8TFI/P	320	JO01KK
58	G6HKK	207	52	JO01DW	PA0PLY/A	325	JO22MH
59	G3NTJ	175	33	IO83RS	G8TFI/P	460	JO01KK
60	G1HCU	158	45	IO93BQ	G4JAR/P	368	IO80BO
61	GM4VGR	103	16	IO76XB	G4JNZ/P	634	IO90XV
62	GM4KHS	98	21	IO85SP	G3SR	352	IO82QL
63	GM6YJS	66	11	IO76FA	GW8WDC/P	365	IO83JA
64	G4BZP	16	4	IO84IG	GM1HXU/P	190	IO75PS

SWL SECTION

Posn	Station	Points	QSOs	Loc	Best dx	Km	Square
1	BRS52543	215	41	IO83LT	G4JNZ/P	383	IO90XV
2	BRS25429	179	34	IO93FX	G6ISY/P	376	IO90JO
3	BRS32525	172	43	JO01AK	HB9/F1FHI/P	695	JN36GU

Check logs received from G8XBF/P, G6TGB, G4ULJ/P, G3FXA.
Four per cent of total claimed score lost due to logging errors.

1,296MHz BAND RESULTS

OPEN SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best DX	Km
1	G4NXO	1,091	127	JO01KK	HB9AMH/P	658
2	G3GRO	1,084	116	JO01OC	HB9AOF/P	623
3	G4ANT	1,044	120	JO02QV	DK1PZ	593
4	G4HWA	1,015	95	IO94RJ	DL0HC/P	701
5	G0ALE	1,000	86	IO80BO	HB9/F1FHI/P	869
6	G4ECY	979	107	JO03CE	DC9XO	569
7	G3ZUD	789	80	IO93RS	PA0GUS	534
8	G4CCH	740	88	IO93UK	DJ6JJ	549
9	G3WOI	739	117	IO91GI	PA0WXI	479
10	G3SVW	627	89	IO93BF	ON7WR/A	515
11	G3NPF	590	96	IO90SV	FC1FEN/P	750
12	GM4OGM	583	51	IO85DJ	G4CQR	545
13	G3ULT	534	96	IO91IH	PA0GUS/P	503
14	G4RFC	533	89	JO01DH	F6OUP/P	474
15	G4IUT	525	88	IO82RQ	F/PA0ERA	392
16	GM4BYF	497	47	IO74NP	G4NXO/P	523
17	G4WHO	496	60	IO80WP	HB9AMH/P	781
18	G0ALB	489	95	IO91RU	PA0GUS/P	430
19	G4YTT	482	73	IO93FI	PA0GUS/P	465
20	G4AUF	468	75	IO90XV	HB9/F1FHI/P	658
21	G3YKI	391	59	JO00AT	HB9AMH/P	660
22	G4KPX	368	76	IO91OQ	GM4OGM/P	455
23	GW4TTU	334	54	IO81NV	GM4OGM/P	393
24	G4LUA	312	49	JO02MN	ON7WR/A	313
25	G4JKN	310	42	IO81CC	HB9/F1FHI/P	885
26	G6IOV	284	48	IO90JO	PA0PLY/A	473
27	G0ASP	272	59	IO82QL	GM4OGM/P	332
28	G4FRS	217	55	IO91OF	PA0PLY/A	418
29	G4BOX	209	45	IO93AC	G4ELZ/P	303
30	G4KZD	159	41	IO91VR	G3SVW/P	201
31	G4UCW	142	42	JO02HE	PA0GUS/P	342
32	G4HRY	128	26	IO81JC	G4ECY/P	329
33	G4GUJ	116	31	JO01FO	PA0PLY/A	326
34	G8VOI	107	29	IO90KX	GU8FBO	202
35	G4ENR	99	21	IO93AS	G4NXO/P	323
36	G3WFM	96	32	IO91XU	PA0EZ	361
37	G3XWZ	95	25	IO93RA	PE0MAR/P	368
38	G4ZTT	87	23	IO83PF	EI9ED/P	285
39	G4YTV	83	11	IO94VD	PA0WWM/P	379
40	G4URT	81	20	JO00DR	PI4KGL/A	319
41	G4XTR	62	14	IO80AQ	F/PA0ERA	345
42	GW6WKP	61	16	IO81FR	G6IOV/P	216
43	G3GAF	56	23	JO01EW	G4CCH/P	174
44	G8LVQ	50	12	IO93FU	G3JXN	272
45	G4RXR	28	12	IO94GR	G3OHM/P	262
46	G4DRV	11	7	JO01GC	F/PA0ERA	145
47	GM3THI	7	3	IO74UU	GM4OGM/P	71

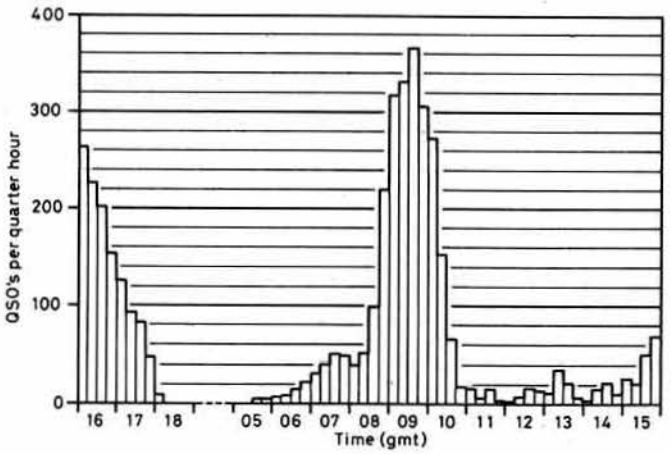
RESTRICTED SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
1	G8FEZ	712	87	JO01OI	DL9HN	646
2	G3NNG	626	98	IO91FN	PA0PLY/P	459
3	G3CKR	623	100	IO93AD	PA0EZ	493
4	G3OHM	619	101	IO82XJ	ON7WR/A	484
5	G8IFT	576	72	IO93XG	PE0MAR/P	440
6	G4BRA	553	63	IO80ST	HB9/F1FHI/P	791
7	G3VCT, G4ODA	546	98	IO91OS	GM4OGM/P	446
		546	74	IO92TR	HB9/F1FHI/P	819
9	G4JTJ	490	86	IO92WE	GM4OGM/P	510
10	G4DDK	446	62	JO02KD	DL0HC/P	533
11	G8TB	426	86	IO91XH	GM4OGM/P	513
12	G3IGQ	423	81	IO91XG	G3JYP/P	412
13	G3JYP	418	44	IO84UR	PE0MAR/P	523
14	G4PKE	416	74	IO91JM	GI4OPH	439
15	G3COJ	293	61	IO91PP	PA0EZ	411
16	GW3NZS	289	43	IO82JG	ON7WR/A	554
17	G4ELZ	280	35	IO80FN	G8GP	594
18	GU4WRP	250	28	IN89TK	FC1FEN/P	714
19	GW4TZW	239	47	IO83JA	G3GRO/P	368
20	G3EEO	219	45	IO93BA	F/PA0ERA/P	398
21	G4KAL	174	28	IO93VK	PA0EZ	387
22	G4PRJ	166	50	IO91TF	PE0MAR/P	322
23	G6KWA	148	32	JO02AD	PA0GUS/P	382
24	G4YPK	127	31	IO91KF	G4HWA/P	354
25	G8BHD	120	43	JO01BH	PA0RDY	349
26	GW3NAT	107	21	IO81FP	G4KIY	254
27	G4RMD	95	36	IO91VR	G4JKN/P	257
28	G4GBF	86	18	IO94EV	G3VCT/P	356
29	GM6JVC	56	6	IO75PS	G3OHM/P	413
30	G4INL	43	14	IO81XU	G4JKN/P	147
31	GM3ZBE	30	4	IO86RW	G4HWA/P	309
32	G4YTR	12	4	IO93KN	G4HWA/P	100
33	GM4WGC	3	1	IO76XB	GM4OGM/P	77

1985 HF NATIONAL FIELD DAY RESULTS

PERHAPS IT WAS because NFD was one week earlier than usual, but for the first time in several years not a single thunderstorm was reported, and most of the UK basked in the sun for both days of the event. In the south there was a strong SW wind, which kept temperatures down and created problems for a few groups who were located on exposed sites. Static was minimal on the lower frequencies and, with 14MHz conditions substantially better than were predicted for the lower part of the solar cycle, some very high scores were made. There were some good "E" openings to Europe on 28MHz, albeit of limited duration, and being able to catch these quick-fire sessions—together with the optimum use of 1·8MHz—was the key to building a winning score.

The entry was up on recent years, and a total of 53 Open and 64 Restricted groups sent in logs for checking. There was excellent support from the W German and Swiss groups, and over 250 DL/P and 35 HB/P calls appeared in the logs. These, together with another 38 European /P groups, ensured that there were plenty of stations to work, even if the dx was sparse.



Quarter-hourly QSO break-down clearly shows the two main peaks and how relatively few QSOs were made at other times

Open Section

The Gravesend group, G3GRS/P, again won the NFD Shield, and runners-up G3RAC/P and G3NJA/P receive certificates. All three groups had claimed scores in excess of 3,500 points, but log errors resulted in the loss of some points during checking. Gravesend may perhaps be excused, as their one and only Tilly lamp was in a car which left the site before dark, and for several hours they operated by the light of G4FAM's cigarettes!

G3GRS/P was operated by G4BUO and G4FAM, who together made 825 valid contacts, including 224 on the bonus bands which netted them over 1,600 valuable points. They used a Ten-Tec Omni-D transceiver, a three-element triband Yagi, a four-element 14MHz Yagi, loops on 7 and 3·5MHz and a 256ft c/f wire.

Racal "A" also used a Ten-Tec transceiver and a wide range of antennas, including a two-element quad, groundplanes, loops, a 7MHz beam and a range of inverted-V dipoles. The operators were G3PGM, G3YER and G4CXT, and although they made almost the same number of contacts as Gravesend, they did not make as many bonus points. G3LHJ, G4EDG, G4ELZ and G4VPM operating G3NJA/P concentrated their main efforts on the 3·5 and 7MHz bands, and used 14MHz and the bonus bands to help their score. They also used a number of different antenna systems, including a five-element 7MHz array, a vertical, a three-element tri-band Yagi and a multitude of dipoles. It is interesting to note that all three leading stations used a separate "spotting" receiver connected to a multiband dedicated antenna.

Restricted section

As the Restricted had more entrants than the Open, the Gravesend Trophy became available for the runners-up in this year's event. With two trophies to win, there was a lot of competition and some very high scores, the main contenders being Channel, G4DAA/P, and the Three As group; G0AAA/P. Both groups claimed in excess of 3,500 points, and made extensive use of the bonus bands with around 180 double-pointers each. Channel managed to achieve a slightly faster QSO rate and this gave them the edge and the Bristol Trophy, leaving Three As with the Gravesend award. In third place was the Marple "B" entry, G3CXX/P, who receive a certificate for their efforts.

G4DAA/P was operated by G3FXB and G3MXJ, and they used Drake "twins" with a 260ft c/f wire antenna. G0AAA/P had a similar antenna 265ft long and a TS930S transceiver with operators G3SXW, G3TXF and G3WVG. The Marple "B" team was G3WPF, G4HIU and GW3YDX, and they also used a TS930S and a 270ft c/f wire. All three groups commented on hf conditions, which they felt were well below par. While they may have missed the dx, they certainly more than kept up with their high rates of inter-Eu contacts!

Other awards

As reported in the 14MHz band report, three groups were in contention for the Frank Hoosen (G3YF) Memorial Trophy, GU3HFN/P, G6LX/P and G3YDD/P. Guernsey had gale-force winds at their site and were unable to erect their usual run of multiband antennas. Croydon "A" re-entered the Open section after a number of years in the Restricted, but also had some bad luck. They operated from a high location on the North Downs and lost a mast and three-element triband beam during erection due to a sudden local wind gust. Because of the problems, both confined their efforts to a single-band 14MHz entry; Guernsey with a jury-rigged three-element Yagi at 18ft, and Croydon with a wire dipole at 25ft. With the advantage of a rotary antenna and possibly the GU prefix (although Guernsey do not accept this!), they achieved a higher QSO rate and finished 100 QSOs ahead to win the trophy.

Glenrothes "A", GM4GRC/P (Open section), and their "B" station, GM3ULG/P (Restricted), were the two main contenders on claimed scores for the Scottish NFD Trophy. After checking, GM4GRC/P were once again the top team and retain the trophy. The spirited challenge from GM3ULG/P came to no avail as they had a substantial number of log errors and were overtaken by the West of Scotland, GM8TT/P, who finished as the runners-up.

The HF Contests Committee awards certificates to the fixed station in each continent whose check-log shows that they provided UK competitors with the highest number of contacts from that continent. This year the certificates go to Z23JO for Africa, OZ1III for Europe, and K3ZO for North America. There were no check-logs from the other three continents.

1·8MHz (by RS20249)

Activity was spread over a longer period than in recent years, and contacts were being made from as early as 2000 until nearly 0400. With nearly 100 UK portables, plus a host of HB, PA and many other European stations, it was just as well that the load was spread. Those that came on later certainly missed out, as the QSO rate during the early session was at a high level.

Open section band leaders, Southgate, G3SFG/P operated by G3KTZ and G4KZD, claimed that the lack of thunder and static made the event rather boring. Runners-up in the section were Verulam, who expeditioned to Wales and operated under the call GW3VER/P. In the Restricted section, the Marple group "B" station, G3CXX/P, took the band award. They were followed by the West of Scotland "B" team, GM8TT/P as runners-up. Only two prefixes were noted from outside Europe, VE1 and UA9. As was said in last year's report, UB5, UC2, etc are west of the Urals and only merit two points. Several hopefuls logged QSOs with DL/P stations, but DARC assure us that there was no /P operation on the band.

3·5MHz (by G6LX/G4RWW)

Logs show that there was activity on the band throughout the 24 hours of the contest, possibly due to the very low static levels that prevailed. As might be expected, the night sessions produced the greatest activity, and several groups managed to average over 60 contacts/hour during the period 0300 to 0500. The general use of simple wire antennas proved, as usual, to be a great leveller between the sections, and there was only 16 points difference between the Open and Restricted band winners. A few stations reported contacts with USA and Canada, and several entrants managed the odd QSO with ZL and VK during the early morning hours.

Clifton "B", G3JKY/P, were the Open section winners, and Echelford, G3UES/P, operating in the Restricted section take the other certificate. Both were single-band entries, with Clifton using a full-wave c/f wire and Echelford a squashed loop. Echelford managed a higher QSO total, but had less four-pointers than Clifton. No other groups came anywhere near to achieving the 1,100 plus score made by these two stations, but as they were the only single-band entries, it is perhaps not surprising.

7MHz (by G3KDB)

Fortyseven Open and 64 Restricted groups operated on the band and some 14,000 contacts were made. Skip was too long for sustained inter-G working, and the majority of traffic was with Europe. Very little dx was recorded, the odd exception being South America, a small number of VKs and a few USA stations.

The overall highest band score was made by G3XRO/P, the Eccles/XRO group, who entered a single-band station in the Restricted section. The next highest was also a single-bander Restricted entry from the Grimsby group, G3CNX/P, with Lichfield, GW3WAS/P, in third place. The highest score in the Open section was achieved by the Racal "A" team, G3RAC/P, followed by the East Notts CG, G3TBK/P, and the East Anglian group, G4ANT/P.

14MHz (by G3SJJ)

Many entrants found the band uninteresting, with little dx to work and openings to Europe well down compared with previous years. These comments were not really justified, as while there were no significant runs of USA contacts, quite a lot of dx was worked and Europe was available throughout the whole of the 24 hours. As reported earlier, single-band entrants, Guernsey, GU3HFN/P, and Croydon "A", were the Open section band leaders and runners-up respectively. While the majority of stations used the band for limited periods and consequently missed out on many of the shorter openings to VK, ZL, JA etc, the section leaders with 24 hours at their disposal, were able to collect a substantial amount of dx and Eu/P stations. There were two main peaks of activity, with Europe between 1800 and 2000, and with the USA between 2200 and 0300. During these times some very high QSO rates were achieved.

Channel, G4DAA/P, led the Restricted section with Aberdeen, GM3BSQ/P, in second place. Many entrants in the section found it hard to make many dx contacts, but had little difficulty with the Europeans. It seems that the higher angles of radiation from antennas mounted at 35ft or less matched the prevailing propagation and evened out the differences in working conditions between the sections.

21MHz (by G4DJX)

"Oh well, at least the sun was shining." This comment by Sutton & Cheam sums up most of the feelings towards 21MHz this year. Once again conditions were poor and use of the band was limited to short visits, with the majority of contacts being inter-G, or with DL and HB portables. 4Z4NUT/P gave a few entrants a useful six points, and some other dx was worked, with Z23, ZD8, 5B4, ZS6, JY9, CX, PY, JA and W appearing in the logs. A total of 3,514 QSOs were made by entrants, mostly during the first and the last hours of the event. With the conditions that prevailed there seemed to be little advantage in having a beam, and similar scoring rates were achieved by

stations in both sections, the difference in final score being determined by the time spent on the band.

Open section leaders were G3PDL/P, who made 113 QSOs, with G4MBC/P in second place. The three As group, G0AAA/P, headed the Restricted entries with 85 QSOs, and there was a tie for the runners-up spot between G3WSC/P with 70 contacts and G4MCC/P with 74—both finished with a checked score of 262 points.

28MHz (by G3TXF)

"Best for years." The 28MHz openings were a welcome surprise for those that caught them. Over half the 4,028 QSOs logged were made between 1600 and 1645 and between 0845 and 1000. Fig 1 shows graphically the peaks as well as a late flurry of activity in the last half-hour.

Band leaders were Racal "B", G3RVM/P, in the Open section and Three As G0AAA/P, in the Restricted. Runners-up were Cheltenham, G5BK/P, and Red Dragon, GW8GT/P. Propagation appeared to favour stations that were both southerly and westerly, a point that has been noticed in earlier NFD events.

Inspections

Approximately 25 per cent of entrants were inspected this year. In addition to the likely leaders, some groups were chosen at random. It is the HF Contests Committee's intention to see that every entrant receives at least one inspection during NFD contests in future years. Several groups were surprised to be asked to undertake inspections of nearby groups. This is quite normal, as apart from the use of a few regular inspectors, committee and Council members and Society representatives, most inspectors are drawn from other NFD teams.

Two inspectors reported difficulty in finding a station. The first was at night, but the group's generator had failed and they had shut down. The other was a daytime visit, and although the inspector could see the antennas in the distance, he was unable to find a way into the site as all the gates were locked and there were bulls in the field through which he would have needed to pass. Entrants should remember that failure to locate the station can result in disqualification, as can hindrance to the inspector reaching the station after entering the site. Groups intending to operate from military or other private areas must ensure that the inspector can reach the operating position without obstruction or delay. A locked gate that has to be opened by a member equipped with a hand-portable, is certainly not acceptable!

Equipment and antennas

For many years the FT101 series has been the mainstay of the majority of entrants, but this year only 33 were in use compared with 44 TS930S transceivers. The advantage of full break-in and superior filters/cross-modulation performance probably accounts for the change. The other 40 entrants used a wide variety of other transceivers, including almost every model in the Drake, Icom, Ten-Tec, Trio and Yaesu ranges.

In the Open section, hf beams were the "norm"; 23 groups used tri-band Yagis, 14 used multiband quads, and 10 had single-band, three- or four-element Yagis for 14MHz, some in conjunction with a 21/28MHz quad or a triband Yagi. One group went to the extreme and had stacked 21/28 five-element mono-banders on a mobile 60ft tower, another four-element 14MHz Yagi on a separate tower, and yet another three-element monobander for 7MHz. Sadly, after all this work, they do not appear on the leader board! There were a number of wire arrays used on 7MHz, and a few rotary beams. On 1·8 and 3·5MHz, simple dipoles and c/f wires were the order of the day.

Eighty per cent of all the entrants in the Restricted section used the c/f 1·8MHz half-wave, but again with a wide variation in the length (from 230 to 290ft—and everything in between!). A few entrants favoured the 5RV, with or without tuned-feeders. Several loops were in use, including one that was described as a VZ special? Other antennas included trap dipoles and verticals, end-fed wires, a Z-dipole and a delta-matched multiband G6CJ. Most stations in the section were equipped with multiple tuning units for ease of band changing.

Equipment problems seem to have been fewer this year. The generator is still the weakest link, and many groups had difficulties of one sort or another. Gas driven generators seem to be gaining in popularity, and a number of entrants found them to be convenient and quiet with the added advantage of not having to refuel during the contest period. A number of groups reported that they were using computers for log-keeping and on-site duplicate checking. Few reported difficulties, but one group found that every contact had the prefix JA no matter what was entered in the computer. Removing a table lamp from the top of the computer cleared the problem!

The mobile crane and the tower vehicle were again in use, as was the double-decker bus. Plymouth reported that they erected a garage on the site, but for what purpose they did not say! Another group used a workman's hut mounted on a lorry, which was fine until someone removed the ladder in the dark. In addition to the unusual type of "shacks" there were a number of caravans, motor-homes and vans in use. As reported last year, many groups found it quicker and easier to operate from a vehicle, rather than having to erect tents, particularly if the weather was bad.

Future of NFD

Nearly every group has asked about the future of NFD and if it has been decided to drop the proposed merger of NFD and SSB FD. There were suggestions that perhaps the RSGB was not taking a strong enough line and that we should make a UDI. This, we could certainly do, but it would most likely result in a shortage of Eu/P stations in NFD, and virtually none being on during the September SSB event. The HFCC believes it is to the advantage of RSGB members to continue to discuss the situation with the other IARU Region 1 societies and try to persuade them to change their minds.

The writer of this report has kept in contact with the main European supporters of NFD, and, together with representatives of DARC, has been working very hard to reserve the position. Since the Cefalu conference in April 1984, the HF Working Group of Region 1 met in March of this year, and although RSGB and DARC said they were not able to accept the concept of the VERON resolution, the meeting decided that it must stand, at least until it could be raised again at the next regional conference in 1987. No dates were set for the adoption of the multi-mode event, and it was agreed that if any society wished to opt out and run their own national FD, on any dates that were convenient, they were free to do so.

As a follow-on to this, the RSGB and DARC have jointly agreed that they will work together to continue to promote a cw FD during the June NFD weekend, and a separate SSB FD on the first weekend of September. Discussions are taking place with the Swiss, who were understood to be supporting the multi-mode event. There are indications that they are still considering their position, and it may be that they will join RSGB and DARC. We are also in touch with several other IARU Region 1 societies (who have not previously supported NFD) with a view to obtaining their active support. One consequence of the concord with the other societies may well be that the RSGB and DARC will have to reschedule the start and finish times to 1500gmt, but this will be a small point to concede if it results in being able to keep the separate contests with higher levels of portable activity. Much work has already been done, but there is still some way to go. The HFCC is very hopeful, and a further report will appear in *Radio Communication* in due course.

Logs

A question raised by a number of groups is why their published score always seems to be lower than the number of points claimed. They are sure that their original running logs are accurate and that they have been very careful when preparing the individual band logs and in their checking for duplicates. Several asked if they could have their checked log returned so that they could see where they were at fault. It is RSGB policy not to return logs, but it might be helpful if the checking process is explained and why points are deducted. The HFCC, wherever possible, makes a line-by-line comparison between the information (time, callsign, RST, number) in the sender's log and the information recorded in the log of the receiving station. If the receiving station's log shows a contact which is not in the sender's log, or has recorded a wrong callsign, or has not shown a /P or /A where applicable, or added a /P or /A when it was not sent, then the receiving station loses all the points for the contact. If the receiving station has recorded a different report or number to that shown in the sender's log, a percentage of points are deducted depending on the number of errors. The HFCC is very careful to check that the fault is not with the sending station (sloppy morse, operator sending his own callsign and not the group's, etc). This is done by examining the logs of a number of stations that had contacts with the possible offender. If there is evidence that the sender is to blame, then the receiving station is not penalized and points are deducted from the sender.

Another reason for loss of points is that the incorrect band is shown on the log. This year several groups made contacts on one band, but included them in the log for a different band. As the contacts do not cross-check, they are void and all the points for these QSOs are lost. Apart from unmarked duplicate contacts, which are heavily penalized, the other reasons for losing points include the claiming of an incorrect number of points for a contact, and incorrect page, band or contest totals.

This year every adjudicator commented on the large number of log errors they found in the entries (almost 1,000) and many groups will find their total scores to be quite different from those they claimed. Unmarked duplicates are thankfully declining, although there are still too many. One group managed to find a substantial number of duplicates in their log and marked them. Unfortunately, for them, five of these were not double contacts, but somehow they managed to miss a further 11 that were. In addition they lost a large number of points through log errors, and they also mixed up their band logs. The HFCC reluctantly decided that they were unable to accept this entry. Another group, who were well in the running for a trophy, lost nearly 300 points through having one unmarked duplicate and a host of wrong callsigns and reports. This year the adjudicators had the benefit of a list showing all the DL/P stations that were active, and this proved to be most useful in weeding out a number of doubtful calls that appeared in the logs.

In conclusion

Regular readers of the NFD report will note that "Comments from competitors" has been omitted this year. Space in *Radio Communication* is currently at a premium, and the editor has imposed strict limits on the number of pages that can be used for contest reports. We are sorry about this and hope that we will be able to re-introduce this feature in future reports.

G4BUO was responsible for the entry procedures, inspection arrangements and the tabulations for this year's NFD. The individual band adjudicators were RS20249, G6LX/G4RWW, G3KDB, G3SJJ, G4DJX and G3TXF. G6LX co-ordinated the adjudication, edited the band reports and wrote this overall report.

The next NFD will be on 7/8 June 1986 and, apart from a possible change in the start and finish times, the rules will be similar to those in current use. We hope to see (and work) all of you.

G6LX

OPEN SECTION

Posn	Society or Group	Callsign	Band (MHz) 1·8	3·5	7	14	21	28	QSOs *	Final score
1	Gravesend RS A	G3GRS	814	654	569	704	228	796	825	3,765
2	Racal ARG A	G3RAC	680	749	718	671	102	592	819	3,512
3	Torbay ARS A	G3NJA	682	716	603	482	146	806	767	3,435
4	Leicester Polytechnic ARS	G3SDC	596	752	670	535	170	660	762	3,383
5	Racal ARG B	G3RVM	598	557	492	608	234	870	756	3,359
6	Cheltenham ARA	G5BK	580	540	497	629	237	836	740	3,319
7	Addiscombe ARC	G4ALE	740	606	596	549	173	612	726	3,276
8	Verulam ARC A	GW3VER	838	692	601	552	70	496	716	3,249
9	Scunthorpe ARC A	G3PDL	608	583	461	756	373	412	774	3,193
10	Mid Beds CA	G4MBC	740	620	416	540	342	452	730	3,110
11	East Notts CG	G3TBK	696	718	679	373	230	362	683	3,058
12	East Anglian CG	G4ANT	562	625	676	637	118	328	738	2,946
13	Glenrothes & D ARC A	GM4GRC	634	571	535	810	192	192	718	2,934
14	Hull CG	G3ZRS	700	595	551	531	146	388	661	2,911
15	Harlow & D ARS	G6UT	678	617	543	536	62	470	648	2,906
16	Leicester RS	G3LRS	792	628	516	401	152	316	638	2,805
17	Wirral ARS	G3NWR	712	570	550	442	60	364	637	2,698
18	Edgware & D RS A	G3ASR	732	520	381	522	158	296	574	2,609
19	Plymouth RC	G3PRC	648	461	220	556	60	642	523	2,587
20	Southgate ARC	G3SFG	906	276	298	324	262	476	539	2,542

Posn	Society or Group	Callsign	Band (MHz) 1·8	3·5	7	14	21	28	QSOs *	Final score
21	Chiltern ARC	G3CAR	482	464	656	223	103	564	530	2,492
22	Hornsea ARC	G4EKT	514	445	344	629	70	378	539	2,380
23	Shirehampton ARC	G4AHG	520	502	402	359	77	412	497	2,272
24	Chelmsford ARS	G4DAN	504	540	362	338	88	418	486	2,250
25	Reading ARC	G3ULT	446	280	454	460	94	434	481	2,168
26	Humberston CG	G3IYT	680	592	499	311	14		476	2,096
27	Kilmarnock & Loudoun ARC	GM0ADX	336	330	556	580	96	56	491	1,954
28	Ainsdale ARC	G2OA	682	324	304	229	184	204	420	1,927
29	Basildon Marconi/SE Essex	G4RSE	484	588	422	168	16	212	435	1,890
30	Southdown ARS	G3WOK	708	444	313	267	2	152	394	1,886
31	Tayside CG	GM3GBZ	592	16	542	714	8		455	1,872
32	Norfolk ARS	G4ARN	464	426	446	165	265	64	430	1,830
33	Guernsey ARS A	GU3HFN				1,690			569	1,690
34	Falkirk & D RC	GM4MCB	360	64	396	331	174	360	367	1,685
35	Ilford RC	G3XRT	310	676	503	195			437	1,684
36	Maidenhead & D ARC A	G3WKX	784	206	56	129	234	254	321	1,663
37	Sutton & Cheam RS	G3DCZ	700	334	261	325	31		365	1,651
38	Cheshunt & D ARC	G4ECT	472	326	353	174	80	226	378	1,631
39	Bromsgrove & D ARC	G3VGG	354	202	297	276	88	396	357	1,613
40	West Kent ARS	G3WKS	344	526	386	302	42	8	390	1,608
41	Greenock & D ARC	GM3ZRC	238	170	239	336	164	396	353	1,543
42	Burton upon Trent & D ARS	G3NFC	328	280	330	156	48	330	303	1,472
43	SRCC A	G6LX				1,426			453	1,426
44	Conwy Valley ARC	GW6TM	604	304	297	123	52		280	1,380
45	Salisbury R & ES	G3FKF	40	483	567	94	16		338	1,200
46	BSC Port Talbot ARS	GW3EOP	332	64	225	298	74	184	275	1,177
47	Clifton ARS B	G3JKY		1,164					345	1,164
48	Clifton ARS A	G3GHN	476			395	10	242	217	1,123
49	Maldon & D RC	G4WOI	234	72	201	164		316	221	987
50	Maidenhead & D RC ARC B	G3LVW			402	489			250	891
51	Dynamics Hatfield ARS	G0AER		406	367	90		24	237	887
52	Hereford ARS A	G3YDD				882			313	882

RESTRICTED SECTION

Posn	Society or Group	Callsign	Band (MHz) 1·8	3·5	7	14	21	28	QSOs *	Final score
1	Channel CG	G4DAA	752	717	715	699	110	578	804	3,571
2	Three As CG	G0AAA	564	650	666	488	302	808	787	3,478
3	Marple CC B	G3CXX	882	732	732	366	248	416	740	3,376
4	Red Dragon CG	GW8GT	502	619	686	397	197	806	716	3,207
5	Lichfield ARS	GW3WAS	628	608	813	544	127	412	720	3,132
6	Stockport RS	G6UQ	764	712	636	430	204	352	699	3,098
7	White Rose ARS A	G3PSM	750	672	647	465	227	218	697	2,979
8	Gloucester ARS	G4AYM	644	534	523	319	184	548	591	2,752
9	Crawley ARC	G3WSC	668	590	688	329	262	214	617	2,751
10	East Barnet ARCC	G6KQ	740	580	726	424	64	152	609	2,686
11	Guildford & D RS	G5RS	412	524	590	374	152	516	609	2,568
12	West of Scotland RS	GM8TT	774	414	562	464	226	96	588	2,536
13	Glenrothes & D ARC B	GM3ULG	762	611	460	411	8	272	582	2,524
14	Marple CC A	G4MCC	736	553	397	296	262	252	543	2,496
15	Hereford ARS B	G4CNY	764	596	471	401	94	160	551	2,486
16	Aberdeen ARS A	GM3BSQ	586	481	331	621	240	186	564	2,445
17	Leyland Hundred ARG	G4TLH	492	552	499	531	98	260	573	2,432
18	Colchester RA A	G4CRA	752	492	512	495	102	64	555	2,417
19	Thames Valley ARTS	G3TVS	652	560	516	210	170	304	567	2,412
20	South Manchester RC	G3FVA	704	562	457	418	78	188	556	2,407
21	Verulam ARC B	G4DUS	658	716	603	261	18	100	526	2,356
22	G4GZQ NFD Group	G4GZQ	370	560	541	246	106	432	541	2,255
23	Oxford & D ARS	G5LO	532	562	489	323	205	106	535	2,217
24	Gordano ARC	G4DZE	464	485	493	377	133	246	509	2,198
25	Melton Mowbray ARS	G4FOX	656	668	420	259		60	491	2,063
26	Farnborough & D RS	G4FRS	596	467	578	208	112	84	478	2,045
27	Telford & D ARS	G3IMP	534	478	533	295	16	188	470	2,044
28	Western ARC	GD3RFH	582	296	520	279	62	180	443	1,919
29	Easington ARS	G4APN	608	290	411	220	128	204	422	1,861
30	Royal Signals ARS	G4RS	560	230	324	442	150	148	426	1,854
31	Edgware & D RS B	G4IUZ	290	536	370	179	66	372	406	1,813
32	Windy Yetts CG	GM3NIG	460	306	517	269	174		432	1,726
33	Leeds & D ARS	G4LAD	296	271	542	454	32	124	428	1,719
34	Meirion ARS	GW4LZP	592	494	387	209			373	1,682
35	Stirling Bridge Battlers	GM6NX	280	208	495	234	212	196	394	1,625
36	Preston ARS	G3KUE		681	436	391	42	68	423	1,618
37	Scarborough ARS	G4BP	224	474	340	356	96	116	398	1,606
38	Blackpool & Fylde	G8GG	376	451	465	243	34	24	363	1,593
39	Aberdeen ARS B	GM4AZZ	270	206	557	134	216	190	371	1,573
40	CEGB No. 1	G3FDW	508	280	392	196		84	323	1,460
41	Thornton Cleveleys ARS	G4ATH	390	288	459	100	128	60	341	1,425
42	Crystal Palace & D RC	G3VCP	282	454	254	345		62	339	1,397
43	SRCC B	G3SRC	452	164	72		219	464	263	1,371
44	Echelford ARS	G3UES		1,148		168			387	1,316
45	South Hants ITS	G3DIT	24	226	413	268	4	352	295	1,287
46	Scunthorpe ARC B	G4FUH		750	237	204	42	48	354	1,281
47	Guernsey ARS CG B	GU4NYT		234	337	342	62	300	363	1,275
48	Loughborough Falcon	G3RAL	368	342	281	112	34	108	276	1,245
49	Ayr	GM3MHG		268	398	393	20	40	313	1,119
50	Braintree ARS	G4JXG	8	326	260	353	28	112	316	1,087
51	Shefford & D ARS	G3FJE		500	384	120	78		308	1,082
52	Worthing & D ARC	G3WOR	332	266	259	168		56	253	1,081
53	Eccles & D ARS/XRO CG	G3XRO			1,041				312	1,041
54	Grimsby ARS	G3CNX			1,005				328	1,005
55	Medway ARTS	G5MW	328	214	290	145		24	220	1,001
56	Weston-super-Mare RS	G4WSM	60	218	279	129	187	124	255	997
57	White Rose ARS B	G3XEP	216	70	233	232	117	72	226	940
58	North Bristol ARS	G4GCT		356	285	99	50	52	229	842
59	Torbay ARS B	G4SBH		493	181	94	20		222	788
60	Havering & D ARC	G4HRC	12	352	208	127		76	242	775
61	Gravesend RS B	G4FJW		172	259	228	80	12	211	751
62	Cunningham & D ARC	GM3USL		188	112	292	90	56	205	738
63	RCT ARS	G4GGD		323	329	54			192	706
64	Perth & D ARG	GM4EAF		56	151	232	28	24	197	491

Check-logs: G3AHD, G5ECD, OZ1III, W3ARK, K3ZO, Z23JO.

*QSO total is claimed figure only

28MHz Phone and CW Cumulative Contests 1985 rules—correction

In the rules for these contests, *Rad Com* September 1985, pp 722-3, the date given in Rule 9 for phone section entries should read Monday 28 October, not 18 October.

May 1985 144MHz and SWL Contest results

This year the contest was run with an experimental squares multiplier system. Judging by the considerable increase in entries from single-operator stations compared with last year, this proved a popular move. Comments in the logs were divided, however, with a slight majority in favour of the new scheme, although most made no comment. A number of requests for reversion to the old locator system were received, although the vast majority of stations worked gave the new locator. In practice the multiplier scheme has made little difference to the overall results, and if anything tends to reinforce the so-called "East Coast effect". The top 10 positions in each section would have been only marginally different without multipliers. Stations in the north and west tended to have lower multipliers despite having high scoring contacts, which depressed their positions in the tables by up to six places, but they did benefit from extra contacts generated by the incentive of a new multiplier.

The logs contained many of the usual tales of bent masts and dead generators, with many stations experiencing poor weather. Conditions seemed generally reasonable on the Saturday, falling off on the Sunday, and Continental activity was high. A few bad signal complaints were noted, but none was independently confirmed.

Congratulations go to Geoff Brown, GJ4ICD, and to the Parallel Lines Contest Group G4LIP/P, taking their apparently customary positions at the top, and to runners up G4PIQ and G4ANT, who will all receive certificates. BRS25429 will receive a certificate as leading swl. *G3XDY*

SECTION S

Posn	Callsign	Points	QSOs	Mult	Loc	Best dx	Km
1	GJ4ICD	321,950	532	47	IN89WF	PE1KLQ	762
2	G4PIQ	117,576	354	36	JO01MU	FC1BOC	737
3	G4NBS	66,708	287	34	JO02AF	F1EWP/P	656
4	G8TPR	62,056	419	28	IO91TN	ON7KC	612
5	G5ECD/P	37,863	292	21	IO84IG	G4CRC/P	470
6	GM6WIX/P	36,020	192	20	IO85CE	PA3AEF	677
7	G3YDY	32,075	213	26	JO01FQ	GI4VIP/P	521
8	G1BUE	30,992	233	26	IO91US	DL2OM	577
9	G6TEP	26,838	181	21	JO01QJ	GI4VIP/P	592
10	G1EGC	25,462	184	29	IO91RQ	DL6FBJ	
11	G6NWF	25,296	206	24	IO83SC	F1FHI	666
12	GW4ZUL/P	20,502	219	17	IO81LQ	PE1KNA	580
13	G6XVV	19,988	186	19	IO93JK	F1FHI	700
14	G8CHW	19,690	223	22	IO91TQ	DF8VK	575
15	G6IAT	18,228	159	21	IO91TV	DF8AE	593
16	GJ6TMM	15,440	84	20	IN89WE	G4LIP/P	494
17	G4XWE/P	14,706	151	18	IO81QF	G1AWP	520
18	G4TBR	14,200	160	20	IO91QQ	GM3HDT/P	468
19	G6ZWP	14,080	147	20	IO82SQ	GM4AXB	496
20	G8ZRE	12,954	150	17	IO83NE	F1FHI	675
21	G6NQX	11,304	90	18	JO01PJ	G3IZD/P	429
22	G6HXU	9,826	125	17	IO83RF	GM3BSQ/P	412
23	G0AAO	7,840	88	16	IO90AT	GM3BSQ/P	378
24	G1DWO	7,812	110	14	IO93IO	G3IZD/P	383
25	G4CIB	6,715	70	17	IO81VX	GI4VIP/P	363
26	G1JVQ	6,165	90	15	IO90WU	G3IZD/P	422
27	G4RYV	5,655	83	15	IO91OI	G3IZD/P	352
28	G6ZVL	5,568	68	16	IO91IJ	GM3BSQ/P	610
29	G6HLC	5,096	104	13	IO92CM	PE1HTL	384
30	G4FVK	5,046	84	14	IO92VN	GI4VIP/P	420
31	G6OES	4,860	70	15	IO83OC	GM3BSQ/P	426
32	G8TZJ	3,497	35	13	IO84OA	G4WAV/P	397
33	G3ORX	2,988	49	12	IO81VK	G4ANT	281
34	G4FPV	2,832	51	13	IO82UC	GJ4ICD	320
35	G1AMX	2,508	25	12	IO95FB	GW4NXO/P	380
36	G6ICR	2,376	56	12	IO83NJ		
37	G6MXL	2,275	31	13	IO80XR	G3IZD/P	391
38	G6CPO	2,256	40	12	IO82VI	GJ4ICD	375
39	G4YCA	2,232	40	12	IO83NE	G6CSY/P	
40	G8FKP	2,040	58	10	IO91PQ	GJ4ICD	375
41	G2DHV, G4FAS	1,330	35	10	JO01BK	GJ4ICD	295
		1,330	31	10	IO83VI	G1MRC	287
43	G1BRC	1,280	22	10	JO00DS	F6HBP	699
44	G1GWS	1,272	41	7	IO83MF	GI4VIP/P	233
45	G6CSY/P	836	140	*	JO01BH	G6OES	418
46	G1LFF	803	212	*	IO91TK	F1FHI	509
47	G1JJA	630	132	*	IO92AG	ON7EH	468
48	G6TGB	498	25	6	IO90GV	GJ6TMM	191
49	G3ILO	298	55	*	IO81VQ	F6FLB	294
50	G6RJZ	284	35	4	IO91SN	G6HH/P	105
51	G8UDV	175	7	5	IO70VM	G3WOI/P	214
52	G8ABI	158	42	*	IO82XL	G4WAV/P	275

SECTION M

Posn	Callsign	Points	QSOs	Mult	Loc	Best dx	Km
1	G4LIP/P	861,445	989	65	JO03CE	DB2RR	894
2	G4ANT	647,570	823	58	JO02QO	DC7UT	809
3	G4DEZ/A	554,792	832	56	JO01IO	DJ4OT	787
4	G6HH/P	495,916	720	54	JO00HU	DF1CF	798
5	G4SIV	433,004	628	52	IO92TR	DG6SAK	821
6	G3WQK/P	394,689	657	51	JO00DT	F6HYX/P	935
7	GW4NXO/P	393,450	791	50	IO81LQ	DL5EAC	885
8	G4CRA/P	352,992	650	48	JO01KW	F9TY/A	709
9	G8LNC/P	335,543	608	53	IO90JO	DH1RAD	910
10	G4CDA/P	313,537	687	47	IO93AD	DL3GCS/P	906
11	G4NVA/P	297,302	688	43	IO93FI	F1EWP/P	804
12	G4NUT/P	268,981	668	47	IO91NV	FC1BOC	782
13	G4GFX/P	257,680	610	40	IO82LB	DB6KI	813
14	G4DDC/P	242,550	615	50	IO91RU	DK8SG	727
15	GW4MGR/P	239,854	699	43	IO83JA	DL8GP	817
16	G3PIA/P	237,595	687	41	IO91FN	DL5BBL	695
17	GW6GW/P	233,434	728	38	IO81NV	DL2OM	754
18	G4WWD/P	229,200	597	50	IO91PC	DJ9EV	742
19	G4VAT/P	227,562	615	46	IO91TW	EA3SF	1200
20	G1MRC	221,466	615	42	JO01EH	DF8AE	721
21	G3WKS/P	213,854	467	46	JO01GC	DL6NAA	799
22	G4UHF/P	212,432	633	44	IO91LT	DA2RR	676
23	G4SSS/P	205,584	489	48	IO81CC	F1FJT	1093
24	G3FKF/P	188,723	544	41	IO81XA	DL2OM	698
25	G3FVA/P	188,039	559	43	IO93BF	F1EWP	798
26	G3EFX/P	170,520	434	35	IO90XV	DB2IR	839
27	G4YRU/P	167,092	371	37	JO03BG	DK4OT	812

Posn	Callsign	Points	QSOs	Mult	Loc	Best dx	Km
28	G1FKN/A	163,754	416	41	JO00EW	DJ8UV	1048
29	G3SFG/P	163,134	524	38	IO91NA		
30	G3WOI/P	156,912	534	42	IO91GI	DH8NAA	760
31	G3YMD/P	140,877	473	33	JO01NC	DK2GR	685
32	G4HVC	133,824	407	41	IO93LB	DH0EAJ	819
33	G3GHN/P	127,335	399	39	JO01DH	DL3LAL	699
34	G3WOR/P	116,444	423	43	IO90TV	F6FZK	674
35	G4VHF/P	112,768	362	32	IO92WM	F1EWP/P	689
36	G1KMI/P	111,232	412	44	IO91JA	GM3BSQ/P	663
37	G4YIP/A	110,425	404	35	IO92SD	DK8SG	736
38	G3IZD/P	105,821	414	29	IO84KE	F1FHI	792
39	G4SKG/P	102,068	309	34	JO03AD	DH1HAT	649
40	G4DLB/P	98,784	448	36	IO92GB	DL7GS	1020
41	G8ZK/P	75,999	334	33	IO92MJ	DF8VK	679
42	GM3BSQ/P	74,280	240	24	IO86RW	G6SFR	723
43	G5LK/P	68,603	413	31	IO91VG	GM4CXM	586
44	G4WAR/P	68,190	379	30	IO92MO	DL8GP	664
45	GM3KJF/P	63,426	243	21	IO74UU	PA0CIS	640
46	G4WRA/P	57,078	448	27	IO82WJ	F1FHI	585
47	GW3YZD/P	56,280	446	24	IO83ID	PE1KNA	609
48	G6SFR	54,964	265	28	IO90AS	GM3BSQ/P	686
49	G4TLH/P	54,567	326	27	IO83PP	F1FHI	729
50	G4VUA/P	54,480	246	29	IO92OV	DL8GP	661
51	G4WAV/P	53,118	236	26	IO70PP	GM3BSQ/P	713
52	GM3HDT/P	51,474	205	23	IO85WT	PA3CCI	666
53	G4ORC/P	48,950	396	25	IO93AO	GM4LPI	464
54	G1LOG	39,988	194	26	JO02IK	DF8VK	556
55	G8WCL/P	39,312	276	24	IO83MJ	F1FHI	689
56	G4UUG/P	32,058	264	26	IO92NP	ON1KSU	571
57	G1IEC	28,125	232	24	IO92AI	F1FHI	580
58	G6CTC/P	20,860	245	20	IO92DB	F1FHI	549
59	G3CZU/P	18,940	183	20	IO91TE	PA0XMA	506
60	G4VBG	17,663	141	17	IO94FW	G8LNC/P	479
61	G3WRS/P	15,030	94	18	IO94MJ	DL9GS	643
62	G0ARC/P	10,476	132	18	IO91FH	GM3BSQ/P	629
63	G3IGQ	6,465	123	15	IO91OF	G3TSL/P	341
64	G4BWD/P	2,762	447	*	IO91PS	GM4CXM	589
65	G4GQR/A	640	118	*	IO90VU	DL0FH/P	636

SWL SECTION

Posn	Station	Points	QSOs	Mult	Loc	Best dx	Km
1	BRS25429	13,927	106	19	IO93FX	PA3BZO	534
2	BRS52543	9,180	100	15	IO83LT	G1FKN/A	384

Checklogs gratefully acknowledged from: G1DZS, G1IZK, PE1HLB, PE1EWR, G6RZZ, G6XTG.

Stations that did not claim any multipliers are indicated by a * in the multiplier column.

May 1985 432MHz-24GHz Contest results

This year's contest was once again well-supported with increased activity on the higher bands. It can be seen from the overall tables that even one QSO on the higher microwave bands can improve a group's overall position considerably.

Conditions were generally described as average or below average, apart from the "usual early morning lift" (G4THB/P). These conditions were no doubt associated with unfavourable weather conditions (rain, wind, mist and drizzle).

No adverse comments were received about the rules. Log-keeping was of quite a high standard, and with few exceptions distance scoring was very accurate. Congratulations to the winners and runners-up.

G4KGC

OVERALL TABLE (SINGLE-OPERATOR)

			Band position			
Posn	Callsign	Points	432MHz	1·3GHz	2·3GHz	3·4GHz
1	G4ANT	2,179	3	2	1	—
2	G4CBW	1,903	—	1	2	—
3	G4CQR	1,590	1	3	—	—
4	G4LRT	1,176	—	12	4	1
5	G8PNN	665	5	4	5	—
6	G4FOH	608	2	—	—	—
7	G1DOX	549	6	5	—	—
8	G3JYP	391	11	6	—	—
9	G1INK	272	4	—	—	—
10	GW3JXN/A	269	—	7	—	—
11	G6CMV	251	12	9	—	—
12	G4HAY/A	241	8	12	—	—
13	G8ACE	237	—	—	3	—
14	G4ZTR	231	—	8	—	—
15	G1KDF	203	7	—	—	—
16	G8JAY/P	178	9	—	—	—
17	G8WPL	174	—	10	—	—
18	G6GLP	128	11	13	—	—
19	G3ZQB/A	128	—	11	—	—
20	G6AMN	127	10	—	—	—
21	G6CSY/P	35	13	—	—	—
22	G3ILO	7	14	—	—	—
23	G4HQX	5	15	—	—	—

Checklogs received with thanks from G2DHV and G4TBR

OVERALL TABLE (MULTI-OPERATOR)

			Band position					
Posn	Name of group	Points	432 MHz	1·3 GHz	2·3 GHz	3·4 GHz	5·7 GHz	10 GHz
1	Sheppey Western CG	4,738	2	1	2	1	1	—
2	HADRABS & Addiscombe CG	3,395	1	2	4	—	—	1
3	Parallel Lines CG	2,562	3	5	1	—	—	—
4	Hillbillies	2,204	4	3	3	—	—	—
5	East Kent RS	1,721	7	6	8	—	—	2
6	Warrington CG	1,441	5	4	—	—	—	—
7	South Birmingham	974	11	9	5	2	—	—
8	Five Bells	879	8	8	6	—	—	—
9	South Manchester	840	10	7	—	—	—	—
10	Exmoor RC	548	9	11	—	—	—	—
11	U of Surrey EARS	463	13	10	—	—	—	—
12	G4NVA	462	12	12	—	—	—	—
13	Edinburgh & DVHF Group	314	14	13	—	—	—	—
14	G6NWF & G6TMP	154	15	15	9	—	—	—
15	Selray CG	88	16	14	7	—	—	—

432MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4CQR	991	151	JO01	GM8TSI/P	606
2	G4FOH	603	67	IO92	DL2KAL	484
3	G4ANT	354	40	JO02	DG4FAR/P	561
4	G1INK	270	44	IO82	DF1VW/P	709
5	G8PNN	269	21	IO95	FC1CAW/P	566
6	G1DOX	262	60	IO82	GM8TSI/P	398
7	G1KDF	201	31	IO83	FC1KAW	456
8	G4HAY/A	180	30	IO91	PA0EZ	360
9	G8JAY/P	176	36	IO91	PE0MAR/P	417
10	G6AMN	126	18	IO91	PE0MAR/P	325
11	G3JYP	116	14	IO84	G4CQR	426
12	G6GLP	96	14	IO80	PE0MAR/P	563
13	G6CMV	69	11	IO82	G4TUB/P	276
14	G6CSY/P	35	5	JO01	G3FVA/P	252
15	G3ILO	7	3	IO81	G8OHM/P	81
16	G4HQX	5	3	IO81	G8OHM/P	84

432MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4PUB/P	3,984	340	JO01	F2OO/P	739
2	G8TFI/P	3,882	372	JO01	DK2GR	741
3	G4CLA/P	3,666	300	JO03	DC9BV/P	740
4	G4THB/P	3,370	273	IO94	DH0FAP/P	833
5	G4RNL/P	3,175	379	IO93	DF0AP	741
6	GW4BVY/P	2,879	299	IO81	DG4FAO/P	821
7	G6EKR/P	2,403	233	JO01	DK2NH	653
8	G8ZHP	1,540	151	IO92	DF5KE	551
9	G4SSS/P	1,259	141	IO81	DK0VS/P	1,154
10	G3FVA/P	1,251	211	IO93	DL2KAL	640
11	G8OHM/P	1,113	179	IO92	DF1VW/P	700
12	G4YTT/P	979	155	IO93	PA0GN/P	537
13	G4WGE/P	802	170	IO91	DG4FA/P	608
14	GM8TSI/P	703	57	IO86	FC1KAW/P	696
15	G6NWF/A	424	84	IO82	PE0MAR/P	453
16	GW4AVV/P	129	25	IO81	G4THB/P	365

1·3GHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4CBW	7,772	42	IO83	PA0GUS/P	518
2	G4ANT	6,388	29	JO02	DF1EQ	431
3	G4CQR	4,584	28	JO01	G3JYP	427
4	G3PNN	2,505	14	IO95	G4ANT	343
5	G1DOX	2,213	20	IO82	G8PNN	288
6	G3JYP	2,130	12	IO84	G4CQR	427
7	GW3JXN/A	2,094	9	IO72	G4NXO/P	374
8	G4ZTR	1,798	13	JO01	G4JKN/P	303
9	G6CMV	1,405	11	IO82	G4HWA/P	276
10	G8WPL	1,349	13	IO83	G4NXO/P	297
11	G3ZQB/A	994	9	JO03	G4NXO/P	217
12	G4LRT	764	8	IO92	G3IGQ/P	145
12	G4HAY/A	459	5	IO91	G4LIP/P	140
13	G6GLP	238	3	IO80	G4CVI	165

1·3GHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4NXO/P	20,057	105	JO01	DC9XO	557
2	G4ALE/P	15,138	82	JO01	DC9XO	528
3	G4HWA/P	13,858	56	IO94	PE1CQQ	469
4	G3CKR/P	12,910	75	IO93	PA0GUS/P	494
5	G4LIP/P	12,871	64	JO03	PA0WMX	404
6	G3LTY/P	11,174	65	JO01	PA3DIJ	387
7	G3UHF/P	10,545	67	IO93	PA0RDY	469
8	G4SIV	7,826	36	IO92	PA0WMX	421
9	G3OHM/P	5,248	40	IO92	PE0MAR/P	417
10	G3IGQ/P	5,247	56	IO91	G4HWA/P	348
11	G4JKN/P	4,652	27	IO81	G4ALE/P	360
12	G4NVA/P	4,337	34	IO93	G4ALE/P	297
13	GM8MJV/P	2,765	12	IO86	G4CBW	357
14	GW3NAT/P	435	7	IO81	G3OHM/P	137
15	G6TMP	358	8	IO82	G3UHF/P	73

2·3GHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4ANT	2,332	15	JO02	PA0EZ	265
2	G4CBW	2,105	12	IO83	G0ALE/P	314
3	G8ACE	553	4	IO91	G4PCS/P	257
4	G4LRT	183	2	IO92	G4PCS/P	126
5	G8PNN	169	2	IO95	G3WOH/P	116

2·3GHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4PCS/P	3,990	20	JO03	PA3DIJ	394
2	G4FRE/P	3,048	19	JO01	G3WOH/P	342
3	G3WOH/P	2,662	11	IO94	PE0MAR/P	410
4	G0ALE/P	2,553	16	JO01	G4CBW	314
5	G8GDZ/P	1,500	11	IO92	G0ALE/P	256
6	G4SIV	407	4	IO92	G0ALE/P	194
7	GW4TAW/P	137	1	IO81	G8GDZ/P	137
8	G8FEZ/P	131	4	JO01	G4BCH/P	47
9	G6TMP	119	3	IO82	G4CBW	52

3·4GHZ SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4LRT	57	1	IO92	G6KOA/P	57

3·4GHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4FRE/P	616	4	JO01	PA0EZ	310
2	G6KOA/P	57	1	IO92	G4LRT	57

5·7GHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G4FRE/P	94	1	JO01	G3LQR	94

10GHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Best dx	Km
1	G8PUB/P	89	1	JO01	PE1BLE/A	178
2	G6TRM/P	47	2	JO01	G4BCH/P	47

June 1985 432MHz Trophy Contest results

This year's contest saw very flat conditions with widespread reports of poor weather and no dx, indeed only four Ds were logged and a mere three contacts over 600km. The use of high power and large antenna systems was highlighted by such conditions, with the leading stations using 10kW plus eirp. Propagation the previous week had been good with dx from EA round to LA being worked in central England. This, along with the major Continental vhf contest the weekend before (during HF NFD) perhaps reduced the Continental activity, but activity within G was high, and most seemed to enjoy the event if not the weather. Congratulations to the winners and runners up.

G8TFI

FIXED STATION SECTION

Posn	Callsign	Points	QSOs	Loc	Best dx (km)	Antenna	Pwr
1	G4NXO	1,671	201	IO82	625	4×16e	26dBW
2	GD8EXI	902	76	IO74	502	88mbm	26dBW
3	G4SIV	836	109	IO92	509	8×21el	22dBW
4	G4NQC	822	147	IO91	557	16×21el	22dBW
5	G6HKM	455	76	JO01	536	21e	17dBW
6	G4NBS	368	74	JO02	482	16e	20dBW
7	G2LO	329	105	IO91	524	24e	17dBW
8	G1HGJ	303	39	IO95	486	4×21e	18dBW
9	G4HAY	268	68	IO91	524	48mbm	17dBW
10	G0AHQ	252	59	IO83	334	2×21e	25dBW
11	G4TBR	220	62	IO91	515	4×19e	16dBW
12	G1INK	202	47	IO82	254	17e	17dBW
13	G4ULS	193	44	IO82	273	19e	17dBW
14	G1DOX	192	44	IO82	372	24e	15dBW
15	G4FOH	180	25	IO92	469	21e	7dBW
16	G4DDL	162	48	IO91	245	19e	10dBW
17	G1JHC	153	40	IO82	267	4×17e	10dBW
18	G6AMN	116	26	IO91	351	19e	16dBW
19	GW1JSH	107	19	IO81	295	48mbm	10dBW
20	G4TLX	90	19	IO81	464	21e	15dBW
21	G6PAD	—	12	IO82	106	19e	1dBW
22	G3ILO	19	7	IO81	88	9e	1dBW

SWL SECTION

1	BRS52543	129	25	IO83	339	19e	—
2	BRS25429	74	14	IO93	338	—	—

Checklogs G4ZNM, PE1EWR, G3UHF/P, G6AXO

ALL OTHERS SECTION

Posn	Callsign	Points	QSOs	Loc	Best dx (km)	Antenna	Pwr
1	GW4LIP/P	1,858	224	IO83	617	4×21e	26dBW
2	GW4MGR/P	1,268	177	IO83	588	4×19e	26dBW
3	GM8MJV/P	1,192	82	IO85	600	2×21e	20dBW
4	G4NVA/P	1,054	157	IO93	439	21e	25dBW
5	G6EKR/P	764	105	JO01	593	4×19e	14dBW
6	G4FRE/P	617	91	JO02	430	4×15e	22dBW
7	G3WOI/P	605	131	IO91	531	4×19e	16dBW
8	G3SFG/P	575	107	IO81	—	2×19e	24dBW
9	G8SDS/P	499	87	IO80	500	21e	18dBW
10	G3WTP/P	439	93	IO92	480	21e	15dBW
11	G4CRA/P	279	63	JO01	385	4×17e	10dBW
12	G8JAY/P	204	40	IO91	460	21e	12dBW
13	G8URI/P	197	59	JO01	428	17e	5dBW
14	G6OI/P	146	45	IO82	270	44mbm	10dBW
15	G3UUP/P	136	41	IO91	372	4×8/8e	10dBW
16	G6ZVH/P	133	33	IO90	296	2×10e	10dBW

June 1985 1,296MHz Trophy Contest results

Generally poor conditions with just a few short periods of slightly above average propagation was the pattern for this event. Several portable stations found high winds and rain, and equipment breakdowns seemed to be the order of the day.

Certificates and congratulations go to the winners and runners-up, and, subject to Council approval, the VHF Contest Committee Cup will be awarded to G3CKR/P as overall leader.

G3LCH

Portable section posn	Fixed section posn	Callsign	Points	QSOs	Loc	Best dx	Km	Power	Ant
1††		G3CKR/P	446	77	IO93AD	PA0RDY	469	60	4×23
	1*	G4CBW	438	66	IO83UB	GM8MJV/P	335	200	4×23
	2†	G0ALE	436	80	JO01AH	GM8MJV/P	573	400	8×23
	3	G4NXO	394	52	IO82LB	GM8MJV/P	433	180	4ft D
	4*	G3JXN	355	73	IO91UM	GM8MJV/P	542	100	4×23
2**		GM8MJV/P	338	26	IO85CW	G0ALE	573	100	4ft D
	5*	G3XDY	289	43	JO02OB	DD8DA	417	250	4×23
3		G3UHF/P	279	49	JO93BF	PE1CKK	489	50	6ft D
	6	G4SIV	274	40	IO92TR	DK1VC	559	150	6ft D
4*		G4NVA/P	268	47	IO93FI	GM8MJV/P	321	20	2+28Q
5		G3WOI/P	236	50	IO91GI	GM8MJV/P	531	150	3ft D 4×23
	7	G4ANT	211	27	JO02QQ	DK1VC	445	100	6ft D
6		GW4MGR/P	189	36	IO83JA	GM8MJV/P	327	90	23E
7		G3WTP/P	184	42	IO92WE	PE1CKK	363	80	2×23
8		G4DDK/P	168	28	JO02KD	DD8DA	442	10	4ft D 4×23
9*		G8IFT/P	166	46	JO02EB	GW4LIP/P	261	200	8×23
	8*	G1KDF	164	30	IO83NN	G6EKR/P	369	50	19E
	9*	G8GDZ	160	34	IO92AK	GM8MJV/P	409	80	4×23
	10*	G1DOX	149	29	IO82SQ	GM8MJV/P	372	30	4×23
	11*	G4ZTR	124	34	JO01FS	G4HWA/P	299	80	4×23
10		G8CUB/P	109	35	JO01DO	GW4LI/P	270	10	2×23
	12*	G8DKK	107	27	IO91TV	G4HWA/P	278	60	2×25
	13*	G4NBS	89	19	JO02AF	G4HWA/P	244	1	4×23
11*		G6CSY/P	72	16	JO01BH	G4NXO	347	1·2	23E
	14*	G8ZQB	64	18	IO92JN	G4CQR	190	40	4×27Q
12		G4KZY/P	53	11	IO81WG	G3CKR/P	208	0·5	27Q

* Single-operator
† Tatsfield ARS operated by G3RQZ and G4GLN
†† Warrington CG operated by G4XUM, G4WDL, G4NGI and G6LUZ
** Operated by GM8MJV and GM8MNG

1st 1·8MHz Contest 1985 results

This year's event attracted a good number of entries and conditions were reasonable with plenty of bonus points on offer. Some confusion was caused by the PACC event taking place at the same time. Over 55 per cent of the logs lost points, the main reason being the location of EM8CSB in UC2, not UM8.

We still have entrants using vhf and not hf log sheets; those who fail to submit HFC2 cover sheets; and those who fail to complete in full their HFC2. One day everyone will be perfect and the HF Contests Committee's job will automatically become far easier!

BRS32525

BRITISH ISLES SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	GW3YDX	924	24	G5MY††*	442
2	G4BWP*	884	25	G4OGB	432
3	G3FXB*	855	26	GW3JI††	419
4	G3MXJ	843	27	G4OTU	411
5	G3PDL	760	28	G3BPM	394
6	G4BUO	731	29	G4XFB†	392
7	G4GIR	698	30	G4ELZ	387
8	G6UT(op G4WWH†*)	677	31	G3SVL†	360
9	G4OBK	670	32	G4CNY	347
10	G3OLB	622	33	G3DOT	339
11	G3FKH	590	34	G3VYI	335
12	G2MJ	577	35	G4PDQ	284
13	G3JKS/A	559	36	G3YLA†	272
14	G4KHC†	556	37	G3PEK	270
15	G4KGG	552	38	G3BGM	265
16	GM4ZRR/A†	551	39	G3WRJ	264
17	G3JJG	549	40	G3AWR	262
18	G3SWH	537	41	G2BTO	234
19	G4WYG	527	42	G3GMM	221
	GM4SID	527	43	G4EBK	177
21	G3CCZ	480	44	G3FVW	169
22	G4KJD†	468	45	GW4KVJ	135
23	G3RSD	444			

OVERSEAS SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	OZ1W*	485	19	OK2PLR	167
2	UA2FX*	397	20	OK1PGF	146
3	UQ2OC*	355	21	UC2AFD	141
4	EI4DW*	309	22	EM8CSB	137
5	UZ3DD*	300	23	UA3AQW	121
6	UQ2GCQ	285	24	OK3CXS	120
7	FD6HYR*	268	25	SP9EEE	108
	OL5BGM*	268	26	UL7MAN	94
9	UC2WAZ*	217	27	UA6LFQ	80
10	UY5OO*	214	28	RA6AOS	72
11	OL6BID	210		RW3AA	72
12	OK2BQU	206	30	UA6BJF	67
13	RA3DOX	199	31	UA9CBO	62
14	UC2AA	198	32	EA2CR	56
15	UP2NK	197		OK2PGT	56
16	RT5UR	190	34	UA9FKM	53
17	OK2PLH	172	35	CT1BSN	48
18	UC2IDZ	171	36	UA9MR	37

† First-time entrant.
†† Senior citizen.
* Certificate winner.

Check logs gratefully received from UZ6LXM and OK1AYD.

SWL SECTION

Posn	BRITISH ISLES Station	Points	Posn	OVERSEAS Callsign	Points
1	BRS1066	414*	1	UP2-038-1580	126
			2	UB5-060-2057	48

July 1985 Low Power Field Day results

With good band conditions on 3·5MHz, there was increased activity over the 1984 event; although 7MHz suffered from longskip with few inter-G QSOs, and most stations had to rely on European contacts to increase their score. There were several comments again on the timing of the 7MHz session, and these will be considered when drawing up the 1986 rules.

Hilary Claytonsmith, G4JKS/P, was Section A winner, and the runner-up was Verulam ARC, G3VER/P, operated by Frank Claytonsmith, G3JKS. There was an increase in logs received for Section B, reflecting the growing interest in the event. Seven check-logs were received and a certificate will be awarded to G3ZRH, who gave points to 23 portables on 3·5MHz and nine on 7MHz.

Logs were well-presented except for one group who submitted an unrewritten log, making checking difficult, and another group using stationery seven years out of date. Some entrants will find their score reduced due to careless log-keeping, while a few operators failed to use their correct county code as listed in *Rad Com* January.

Subject to Council approval, G4JKS/P will be awarded the Houston-Fergus trophy.

G3SJJ

SECTION A (15W input maximum)

Posn	Callsign	Power (W)	Tx/Rx	Antenna	QSOs 3·5MHz	QSOs 7MHz	Points
1	G4JKS/P*	10	TS120V	Dipoles	66	25	820
2	G3VER/P*	10	TS120V	Dipoles	56	26	743
3	G4ELZ/P*	12	FT301	Dipoles	53	28	733
4	G4MBC/P	15	TS120V	Dipoles	61	22	725
5	G3GRS/P	15	Omni-D	Dipoles	53	22	655
6	G3ASR/P	14	TS520S	Doublet	46	19	620
7	G4CLR/P	10	Shimizu	Doublet	37	17	508
8	G4RCC/P	15	TS120	300ft Zepp	45	15	478
9	G4KGG/P	15	TS120V	Dipoles	52	4	436

Posn	Callsign	Power (W)	Tx/Rx	Antenna	QSOs 3·5MHz	QSOs 7MHz	Points
10	G3VRE/P	15	FT757	Dipole	54	16	426
11	G3DIT/P	12	FT301	G5RV	26	15	405
12	GW4ALG/P	15	FT101E	Dipole	41	1	398

SECTION B (5W input maximum)

Posn	Callsign	Power (W)	Tx/Rx	Antenna	QSOs 3·5MHz	QSOs 7MHz	Points
1	G4MQC/P*	3	Racal	Inv-V	36	20	525
2	GM3OXX/P*	1	H/B	300ft Zepp	38	24	518
3	G3VIP/P*	5	FT301S	Dipoles	33	15	505
4	G4DDX/P	5	Argonaut	Dipole	34	14	493
5	G0AER/P	2	TS130S	Dipoles	35	18	483
6	GI3PDN/P	3	HW8	300ft ef	9	23	358
7	G3YRC/P	5	—	—	22	10	317
8	G4KLQ/P	5	Argonaut	W3EDP	31	—	308
9	G3SB/P	3	HW8	Whip	19	—	230
10	G4JJN/P	3	H/B	Dipole	14	5	185
11	G3VDF/P	5	H/B	Whip	13	—	145
12	G4MIJ/P	1	H/B	66ft ef	1	1	25

* Certificate winners.

Summer 1·8MHz Contest 1985 results

The summer event has become established as a firm favourite among contesters, and participation remains at a high level. While dx propagation was hardly outstanding, quiet band conditions contributed to enjoyment and to record-breaking scores.

A total of 407 different stations was reported, including 148 from overseas. The 73 logs received contained over 5,200 QSOs in 33 different countries. Highest number of overseas contacts was with DL, followed by OK, UA and UC2. Intercontinental traffic was sparse, but contacts were reported with HZ, UA9, UI8, UJ8, VE and W.

Of the 76 UK counties only 47 were activated during the contest, with Humberside heading the table of QSOs, followed by London and Norfolk. Numerous stations who did not submit a log are identified in the computer-assisted analysis as having made many QSOs: their logs will be greatly appreciated by the HF Contests Committee next year!

During adjudication seven per cent of all claimed points were deducted. Nearly all stations now avoid the heavy penalties incurred by unmarked duplicate contacts, and the major source of lost points is wrongly-recorded callsigns. One in thirty QSOs was disallowed for this reason.

Congratulations to the winners who are indicated in the tables. The experiment to attract younger operators failed, but congratulations to Ian Watt, GM4ZRR/A, on a fine score and a highly accurate log.

Some entrants commented that the last hour is slow going, but the committee is loath to shorten the contest by one hour and prefers to achieve increased participation by wider publicity. Perhaps we could each aim to introduce one new entrant to the next event, leading to increased competition and enjoyment. *G3SXW*

BRITISH ISLES

Posn	Callsign	Total QSOs	Bonus QSOs	Final points
1	G3ZEM†	162	65	802
2	G3MXJ†	154	60	747
3	G4MBC (M)	148	58	717
4	G3PDL	147	58	716
5	G3VZT	150	60	705
6	GM4ZRR/A*†	130	60	684
7	G4VER/P	145	55	665
8	G4OBK	126	57	660
9	G3OLB	132	54	646
10	G4KGG	129	60	643
11	G3OAY	122	53	617
12	G4KHC	108	55	595
13	G3SWH	113	49	581
14	GW3NJW	104	53	574
15	G4FNC(M)	112	50	572
16	G3SJJ	108	51	570
17	G3TXF	103	52	569
18	G3CCZ	103	49	545
19	G4OGB	102	48	526
20	G4UMS	106	45	524
21	G4ELZ/P	101	48	518
22	G4ODC	120	58	493
23	G3ULN	85	49	481
24	GW3JI	76	47	457
25	G4EBK	81	43	455
26	G2MJ, G3VIP/A, G4DJX	94	45	444
		84	42	444
		79	43	444
29	G4LPK(M)	78	42	435
30	G3XRO	151	55	429
31	G3MCX	65	41	392
32	G4OTU	83	41	390
33	G3VDF	61	40	377
34	G4BUO	61	38	373
35	G3YLA	60	38	370
36	G3WRJ	57	36	351
37	G4POX/A	68	38	345
38	G3GHY	57	34	308
39	G8VF	57	38	307
40	G4XFB	44	31	287
41	G3GMM	50	34	274
42	G3SZG	49	32	264
43	G4SLE	62	35	250
44	G3ILO	35	27	240
45	G4PYD	41	29	240
46	G4PJO	37	30	223
47	G4NFX	31	26	188

OVERSEAS

Posn	Callsign	Total QSOs	Bonus QSOs	Final points
1	UP2BR†	70	37	374
2	UA1DZ†	64	33	341
3	UC2IDZ†	52	34	283
4	DF8FR†	51	32	269
5	OK1DOC†	46	32	266
6	UB5WF†	42	25	248
7	DF6NJ	41	29	239
8	OK1DRU	34	24	216
9	OL7BLO	31	26	199
10	SP4GFG†	29	23	196
11	OK2PLH	28	23	193
12	UC2LAR	31	26	189
13	RT5UY	39	27	188
14	G6ZY/EA6†	24	20	172
15	UC2WBM	25	22	171
16	OK1FGC	30	23	154
17	LZ2RF†	22	18	148
18	UC2WBP	23	18	145
19	EA2CR†	21	17	129
20	UR2RCO†	25	16	125
21	UB5LCV	18	13	98
22	UA6AG	14	11	96
23	UB5IJA	11	11	82
24	EA5TX	5	5	34
	Totals	**5,224**	**2,697**	**26,992**

† = certificate winner
(M) = multi-operator
* = under-18 award

Check-logs received from G4MUL/A, GW4PXQ, UA1-1692083, UC2-00543, UC2-0067, UN1-088525

Second 1·8MHz Contest 1985 rules

1. The general rules for RSGB HF contests, as published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply.
2. Date and time. 2100gmt Saturday 9 November to 0100gmt Sunday 10 November 1985.
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 001. British Isles stations must also give their county code as shown 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/gmt; callsign; RST/number sent; RST/number received; code received; bonus; points. Duplicates must be clearly marked without claim for points. Unmarked duplicates will be penalized at the rate of 10 times number of points claimed, and logs containing more than five unmarked duplicates, for which points have been claimed, would normally result in disqualification. 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. Name and address for entries. Address logs to "HF Contests Committee" as follows: British Isles entrants to J C Burbanks, G3SJJ, "Southlands", 16 Colgrave Road, Plumtree, Nottingham NG12 5NX. Overseas entrants to PO Box 73, Lichfield, Staffs WS13 6UJ, England.
9. Date for entries. Logs must be post marked not later than 15 days after the end of the contest.
10. Awards
(a) The Victor Desmond 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 with the First 1·8MHz Contest of the same year.
(c) Certificates of merit will be awarded 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 British Isles entrant who has reached pensionable age on or before the date of the contest. Candidates for this award should mark their log "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/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 British Class B licences may enter the receiving section.

November 144MHz CW Contest rules

There will be two sub-sections in this event:
Section 1 24h; 1400–1400gmt, 2–3 November 1985.
Section 2 6h; 0800–1400gmt, 3 November 1985.

This contest is timed to coincide with the Marconi Memorial CW Contest. Scoring will be at 1pt/km to enable logs to be forwarded for this event.

The following general rules, published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply: 1, 2, 3, 4d, 5a, 6b, 7b, 9, 10a, 11a, 12b, 13–24.

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

144MHz Fixed Contest and Affiliated Societies VHF Contest 1985 rules

The 144MHz Fixed Contest will have an additional element this year, with its expansion to include inter-club competition in the form of an affiliated society team contest, similar in concept to the well established 3·5MHz CW event. The contest will still be open to individual entries, both single and multi-operator, as before. Affiliated societies are encouraged to enter as many stations and teams as they can. Individual station scores and overall team results will be separately tabulated, and certificates will be awarded to the leading stations and team in each RSGB Zone.
1. Date: 1 December 1985
2. Time: 0900–1700gmt
3. Teams. A society entering one team will have its placing determined by the aggregate scores of the five highest scoring stations in its team. A society may enter more than one team, in which case the aggregate scores of the five highest scoring stations will be placed in team "A", the next five highest scoring stations in team "B", etc.
4. Eligible entrants. Operators entering on behalf of an affiliated society must be a member of that society, but need not be a member of the RSGB. Other individual entrants must be members of the RSGB. All stations representing a society must be operated within 50km of the normal society meeting place. No station may represent more than one society. In the case of a society with national coverage, eg RNARS, each team may define a different society meeting place, but this should be a place of recognizable significance, eg a naval base. For all purposes, other than the indication of affiliation, each such team entry will be considered to be entirely separate. No operator shall use more than one callsign during the contest period.
5. Sections. There will be separate single- and multi-operator sections for tabulating station scores. A team may consist of both single- and multi-operator stations.
6. Entries. Each individual entry shall conform to the general rules. Each log must be accompanied by a 427 cover sheet, and should show the RSGB zone that the station operated from. RSGB zones are defined on page 18 of the January 1985 issue of *Radio Communication*. All entries from one society are to be sent in one package to the adjudicator. Packages underpaid and bearing

postage due stamps will be returned to the sender. Each package must include a declaration signed by an officer of the society that each entrant is a member of that society, and the normal meeting place address must be given. A note stating the number of teams representing the society, and their scores, should also be included.

7. Awards. Certificates will be awarded to the following:
The leading single operator station in each RSGB zone.
The leading multi operator station in each RSGB zone.
The leading affiliated society team in each RSGB zone.

8. General Rules. The following general rules, published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply: 1, 2, 4b, 6a, 7a, 10a, 11a, 12b, 13–24.

9. Adjudicator. All entries and check logs to: VHF Contests Committee, c/o J H Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED.

NB. Although the contest now includes an inter club element, entries from individual single- or multi-operator stations are encouraged.

7MHz Contest 1985 rules

1. The general rules for RSGB HF contests, as published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply.

2. Date and time. Phone: 1200gmt 1 February to 0900gmt 2 February 1986. **CW:** 1200gmt 22 February to 0900gmt 23 February 1986.

3. Sections. Single-operator entries only. British Isles entrants must also be members of RSGB. (a) British Isles. (b) European. (c) non-European.

4. Band and mode. SSB: 7·04–7·10MHz. CW: 7–7·03MHz. Entrants in the CW section are requested not to operate above 7·03MHz.

5. Exchange. RS(T) plus serial number starting 001.

6.1 Scoring.
(a)—British Isles section: five points for each completed contact with European stations, fifteen points for each completed contact with non-European stations. British Isles stations may not work each other.
(b)—European section: five points for each completed contact with British Isles stations.
(c)—Non-European section: fifteen points for each completed contact with British Isles stations.

6.2 Multiplier
(a) British Isles section: one for each ARRL DXCC country. In addition VE, VK, W and ZL call areas each count as a separate country.
(b&c) European and non-European sections: one for each different British Isles prefix worked, ie G0, G2, G3, G4, G5, G6, G8, GD0, GD2, GD3, GD4, GD5, GD6, GD8, GI0, GI2, GI3, GI4, GI5, GI6, GI8, GJ0, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM6, GM8, GU0, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6, GW8 (maximum of 49).

6.3 Final Score. Total contact points multiplied by total of multipliers.

7. Documentation. Logs to be headed: date/gmt; callsign; RS(T)/number sent; RS(T)/number received; multiplier; points. A summary sheet showing the multipliers worked must be included. Duplicates must be clearly marked without claim for points. Unmarked duplicates will be penalized at the rate of 10 times number of points claimed; logs containing more than five unmarked duplicates, for which points have been claimed, would normally result in disqualification. 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. Name and address for entries. Address logs to "HF Contests Committee" as follows: British Isles entrants to J C Burbanks, G3SJJ, "Southlands", 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX. Overseas entrants to PO Box 73, Lichfield, Staffs WS13 6UJ, England.

9. Date for entries. SSB logs must be received by 31 March 1986, and cw logs must be received by 21 April 1986.

10. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw contest. Certificates of merit will be awarded to the entrants placed first, second and third in the British Isles, European and non-European sections of each contest.

11. Receiving Section.
(1) Transmitting section rules 1, 2, 3, 4, 6, 7, 8, 9 will apply.
(2) A station may appear once only 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/gmt; callsign of station heard; RS(T)/serial number; callsign of station being worked.
(3) Holders of British Class B licences may enter the receiving section.
(4) Scoring
(a)—British Isles listeners should log only overseas stations in contact with British Isles stations. European stations logged, five points; others, 15 points.
(b)—Overseas listeners should log only British Isles stations participating in the contest. European listeners claim five points, others 15 points.
(5) Multiplier as per rule 6.2.

12. HF Contest Championship. Participation in this contest by British Isles stations will count towards the HF Contest Championship for 1985/86.

South Manchester DF Qualifying Event results

As a change, this event was run on OS118, "The Potteries" map, on 23 June, with the start near Congleton. Sixteen teams took part and had no problem in hearing the two transmitters at the start.

The "A" transmitter, G3FVA/P, operated by Dave Holland, G3WFT, and Dave Bolton, G8UQC, hidden in a thick rhododendron jungle about three miles from the start. The first to arrive at this station was the navigator of one team, who could be heard calling his operator to get him "in" but got lost and disappeared for another half-hour. Several teams arrived between 1450 to 1520, then all was quiet until 1600, when more bush beaters arrived. Dave Bolton had three teams sitting on top of him at one stage.

The "B" transmitter was operated by Geoff McBurney, G4AUR, and Trevor Hopkins, G8TYY. This station was over 14 miles from the start. A good long run-in was also on the agenda. The tx crew watched competitors wandering about, getting lost and exhausted, or on the wrong side of the M6. Greetings were usually unpleasant when the competitors finally arrived!

Mr C Plummer was awarded the South Manchester DF Trophy as winner of the event.

Posn	Name	Club	Time of arrival Station A	Station B
1	C Plummer	Mid-Thames	1447	1550
2	C Merry	Dartford Heath	1454	1610
3	B Mahoney	Rugby	1503	1610:42
4	J Armitage	S Manchester	1615	1504
4	D Newman	Slade	1453	1615
6	I Morrison	Macclesfield	1615:28	1500
7	T C Gage	Mid-Thames	1615:30	1513
8	G Foster	Stratford on Avon	1453:43	1621
9	A Judd	Mid-Thames	1625:42	1451
10	N Rathbone	Coventry	1456:44	1629
11	D Yorke	S Manchester	1454:15	—
12	T Winter	S Manchester	1454:30	—
13	C McKenzie	S Manchester	1510	—
14	C Wells	S Manchester	1517	—
15	N Woodley	Mid-Thames	1553	—

One competitor failed to locate either station. Subject to confirmation B Mahoney and J Armitage qualify for the national final.

South Manchester Quadruple Night DF Event results

This event again attracted the hardy and more insane elements of the df world for the fourth quad night event. The weather had improved since the previous week, temperatures being a few degrees below zero!

Signals were heard from three stations, bearings being given on the other.

Station "A" was located near Styal Woods about seven miles away, situated on the wrong side of the River Bollin. The more wily competitors avoided this pitfall, arriving in the area in good time. Transmitter operators Dave Holland and Chris Magher were amused by the antics of one team following the antenna, returning to a four-way tee and having conferences each time! First to arrive was Derrick Newman at 2053.

Station "B", located near Dunham Massey some five miles distant, was manned by Chris Barham and Mike Duckworth. They had an interesting evening watching torchlights come close then disappear again (with suitable curses, etc). First to arrive here was Neil Woodley at 2035.

Station "C" was further away, at Stockport about 12 miles distant. John McNeil and Trevor Hopkins waited in anticipation for arrivals. Although one competitor arrived fairly early he spent all night investigating the lattice of antennas. Derrick Newman arrived at 2334. Other competitors were close by towards the end of the contest but appeared to prefer the opposite river bank!

Station "D" was located XXXX (we will use this site again!). Operators Dave Bolton and Chris Muriel had a very lonely night. Although their signals were audible at the start, approximate bearings were given for the hard of hearing. However, these were incorrect and put all and sundry off the scent.

George Whenham won the event and the Night DF Rose Bowl.

Posn	Name	Club	Time of arrival "A"	"B"	"C"	"D"
1	G Whenham	Coventry	2228	2048	—	—
2	J Armitage	S Manchester	2145	2245	—	—
3	C McKenzie	S Manchester	2305	2110	—	—
4	N Woodley	Mid-Thames	2306	2335	—	—
4	D Yorke	S Manchester	2306	2202	—	—
6	D Newman	Slade	2053	—	2334	—
7	C Wells	S Manchester	2338	2146	—	—
7	C Merry	Dartford Heath	2338	2056	—	—
9	G Laing	S Manchester	2305	—	—	—
10	K Chan	S Manchester	—	—	2359	—

Contests Calendar

16, 24 Sept **2, 10, 18 October**	28MHz Phone Cumulative *(Rules in September issue)*
29 Sept, 6 Oct	ON *(Rules in October* MOTA)
5 October	AGCW—DL Hand key *(Rules in October* MOTA)
5, 6 October	432MHz–24GHz and IARU *(Rules in July issue)*
5, 6 October	GARTG-SSTV 1985 *(Rules in April* MOTA)
5, 6 October	VK/ZL/Oceania (phone) *(Rules in September* MOTA)
8 October	432MHz Cumulative
12 October	GARTG-RTTY 1985 *(Rules in April* MOTA)
12 October	DF Double Night Event, Slade
12, 13 October	VK/ZL/Oceania (cw) *Rules in September* MOTA)
13 October	21/28MHz Phone *(Rules in May issue)*
16 October	1,296/2,320MHz Cumulative
16, 17, 30, 31 Oct	YL Anniversary *Rules in October* MOTA)
20 October	21MHz CW *(Rules in May issue)*
24 October	432MHz Cumulative
26 October	DF Treble Night Event, Mid-Thames
26, 27 October **23, 24 November**	CQ WW DX *(Rules in October* MOTA)
27 October	70MHz Fixed
21, 29 October **8, 14, 22 Nov**	28MHz CW Cumulative *(Rules in September issue)*
1, 17 November	1,296/2,320MHz Cumulative
2, 3 November	144MHz CW *(Rules in October issue)*
2, 3 November	International Police ARC *(Rules in October* MOTA)
3 November	WAB CW *(Rules in February* MOTA)
9, 25 November	432MHz Cumulative
9, 10 November	2nd 1·8MHz *(Rules in October issue)*
1 December	144MHz Fixed *(Rules in October issue)*
3, 19 December	1,296/2,320MHz Cumulatives
11 December	432MHz Cumulative
15 December	70MHz CW
1986	
1, 2, 22, 23 Feb	7MHz *(Rules in October issue)*
8, 9 March	Commonwealth *(Rules in September 1985 issue)*

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 agan in **January 1986.**

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **December** issue should reach them by **18 October** and for the **January** issue by **15 November.**

Club programmes are given in order of date. subject, time and place of the 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.

Ainsdale (AARC G2OA)—8, 22 October (Normal meetings). 8pm. Scout HQ, Marine Drive, Southport. Sec G4YYV, tel 79825.

Barnoldswick (Rolls-Royce ARC)—2 October (Talk by Jim Fish, G4MH). 8pm. Sports and Social Club. Sec G4ILG, tel 0282 812288.

Blackburn (ELARC)—1 October (The Welshpool and Llanfair Light Railway), 29 October (Informal), 5 November (Home Construction). 7.30pm. The Conservative Club, Cliffe St, Rishton. PRO G6LXU, tel Gt. Harwood 887385.

Bury (BRS)—8 October (Club Construction Contest, judged by Rev George Dobbs, G3RJV, who will also speak on QRP operation). 8pm. Mosses Community Centre, Cecil St, Bury. PRO G4TBT, tel Burnley 24254.

Chester (C&DARS)—1 October (Committee meeting), 8 October (Surplus sale), 15 October (Underground communication), 22 October ("Marine radio licence and operation", G3TZO and G4JMF), 29 October (Hot pot supper), 4 November (Quiz at Ellesmere Port Club). 8pm. Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Details from G4EZO, tel Chester 40055.

Crewe (SCARS)—14 October (AGM). 8pm. The Victoria Club, Gatefield St, Crewe. Details G6IGW, tel Crewe 60062.

Fylde (FARS)—1 October ("Basic principles of, and factors affecting propagation", G3KEN), 15 October ("Further thoughts on propagation", G3IOR, RSGB tape/slide). 7.45pm. Kite Club, Blackpool Airport, Sec G8GG, tel 725717.

Liverpool (L&DARS)—1 October (AGM), 8 October (Open night), 15 October (Toroidal cores), 22 October (Microwaves in Radio), 29 October (Bring & buy). 8pm. The Churchill Conservative Club, Church Rd, Wavertree, Liverpool 15. Sec Albert Webb, tel 051-427 8557.

Manchester (Trafford ARC)—Thursdays, 7.30pm. 9th Urmston Scout Hut, Bradfield Rd, Urmston. Sec, tel 061-748 9804.

Manchester (MUARS, G3VUM and G8FUM)—Wednesday lunchtimes, informal meetings. The Shack, 1st floor northside of the Students' Union, Oxford Rd. Further details, G6ZGP, tel 051-625 7311.

Manchester (SMRC)—4 October (Mystery lecture, G6LCS), 11 October (Quiz), 18 October ("Amateur radio in Scandinavia". K Chan and M Ellis), 25 October (TBA), 1 November (Halloween df). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Sec G3WFT, tel 061-973 1837.

Oldham (OARC)—3 October ("DX call signs", G3SAO), 21 November ("X-ray equipment and techniques", G1GZK). 8.30pm. Moorside Conservative Club, Moorside, Oldham. New sec, Kath Catlow, G4ZEP, tel 061-624 7354.

Penrith (Eden Valley RS)—17 October (Visit to Radio Carlisle). 7.30pm. The Kings Arms, Temple Sowerby on A66 between Penrith and Appleby.

Preston (PARS)—10 October ("WAB", G4PLB), 24 October (Video, "The Secret Listeners"), 7 November "Trams", Anthony Stevenson). 8pm. Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Sec G3ZXC, tel 0772 718175.

Thornton Cleveleys (TCARS)—7 October "Power you can rely on" Mr R G Heaton, NORWEB), 14 October (Club on air/informal meeting), 21 October (AGM, members only), 28 October "Antennas" G3AOW). 7.45pm. 1st Norbreck Scout HQ, Carr Rd, Bispham. Details from chairman, G4BFH, tel 0253 853554.

Wirral (WARS)—2 October (Sale of surplus equipment), 16 October (AGM), 6 November (Chairman's night). 8pm. Heswall Parish Church Hall, Heswall. Sec G4KPY, tel 051-625 7311.

Wirral (W&DARC)—2 October (D&W at The Wheatsheaf, Ness), 5/6 October (432MHz/23GHz Contest. Club entry), 9 October (Debate), 16 October (D&W at The Ridger, Newton), 23 October (Home construction competition), 27 October (70MHz Fixed. Club entry), 30 October (Ladies' night—Faberge eggs and D&W at The Irby Mill), 3 November (144MHz CW Contest. Club entry). 8pm. Irby Cricket Club, Mill Hill Rd, Irby. Sec G8TRY, tel 051-630 1393.

Wirral Raynet—3rd October, 7.30pm. Birkenhead YMCA. Net nights 10/20/30 monthly S8, 8pm. New members welcome. Details, G6FNF, tel 051-653 4067.

I would like to thank West Manchester Radio Club for their hospitality and reception during my visit on 31 July. Particular thanks go to president Don, chairman Tony and secretary Robert. The Red Rose Rally was a great success thanks to your Club's efforts and organization.

Thanks also to The Rolls-Royce ARC for their kindness and generosity on my visit 7 August. To Ron for "talking me in" and Les for providing supper without me having to sing for it. Also to the gentleman in the audience who wore a dinner suit for the occasion. Both these clubs are thriving and are a credit to Region 1.

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

Doncaster & District Raynet Group (D&DRG)—22 October (Group meeting). 7.30pm. Sypte Club, North Bridge, Doncaster. Details G4ZWQ, tel 857526.

Hornsea (HARC)—2 October (RSGB Video show), 9 October (Open meeting), 16 October (Rally preparation), 20 October (ELHOEX '85), 23 October (Rally post mortem), 25 October (AGM). 7.30pm. The Mill, Hornsea. Details G4NJP.

Leeds (L&DARS)—Mondays, new venue, Yarbury RUFC, Brownberrie Lane, Horsforth. Details G1EBS, tel 0274 665355.

Halifax (Northern Heights ARS)—2 October ("The IARU and its work", G3PSM), 9 October (Committee meeting), 16 October ("Computer communications", G3TQA and G8HWK). 8.15pm. The Bradshaw Tavern, Bradshaw, Halifax. Details G3UI.

Pontefract (P&DARS)—3 October (Sale of gear, Silent Key G4PRE), 10 October (Committee meeting), 19/20 October (JOTA station GB2AS), 24 October (Tape and slide show, G3SVW/VP3LK). Carlton Community Centre, Pontefract. Details G0AAD, tel 0977 43101.

Royal Corps of Transport (RCTARS)—Thursdays 7.30pm. Normandy Barracks, Leconfield. New season of morse classes are about to start. Details G4ZJW.

Todmorden (T&DARS)—7 October (Construction hints and start of construction competition), 21 October (Surplus equipment sale). 8pm. The Queen Hotel, Todmorden. Sec G6MDB, tel 2494.

UK FM Group Northern—6 October (Group meeting). 7.30pm. Royal Hotel, Barnsley. Details G4UNA.

Wakefield (W&DARS)—1 October (On the air & natter night), 15 October (RSGB video of G6CJ's aerial circus), 29 October (Pie & supper night at the Rose & Crown Inn, Methley). 8pm. Ossett Community Centre. Details G8PBE.

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

Birmingham (Midland ARS)—Every Monday (Construction night), 1 October (Committee meeting), 2 October (Computer night), 3 October (Lecture), 4 October (Raynet Group meetings), 4 October (RAE class), Weekends (Contests), 15 October (AGM). 294a Broad St, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—2 October ("Amtor", G3WHO). 7.45pm. Hampstead House, Fairfax Rd, West Heath, Birmingham. Sec Tim Scrimshaw, tel 021-476 8312.

Bromsgrove (BARS)—8 October (Lecture night), 22 October (General meeting). 8pm. Hundred House, Stourbridge Rd, Bromsgrove. Regular morse classes open to all. Sec G4LVK.

Bromsgrove (B&DARC)—Alternate Fridays, 8pm. Avoncroft Arts Centre, Bromsgrove. 11 October ("Old communication receivers", G4XWD), 19 October (JOTA station). Every Thursday club net 144·575MHz and morse tuition. Sec G4NYH, tel 73847.

Coventry (CARS)—4 October (AGM), 11 October (Night on the air), 18 October (Quiz), 25 October (Night on the air). 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. Sec G4JDO, tel 73999.

Halesowen (MEB Sports and Social Club)—8 October ("Ambulance service", G8RCE), 22 October (General meeting). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—4 October ("Calculating distances", David Fry), 18 October (Informal meeting). 8pm. Civil Defence HQ, Goal St, Hereford. Sec G3WRQ, tel 0432 54064.

Keele (UoKARS)—Recently reactivated. Room 112, Physics building, Keele University. Sec G4TQB, tel 0782 621111.

Lichfield (Lichfield Chad RC)—New meeting place. Cricket Club, Birmingham Rd, Lichfield.

Oswestry (O&DARC)—First Tuesday in each month. 1 October ("Simple hf aerials", G8PG). 8pm. Bell Hotel, Oswestry. Sec GW6YIY.

Shropshire (Salop ARS)—3 October (Natter night), 10 October (AGM). 8pm. Old Bucks Head, Frankwell, Shrewsbury. Sec G6DQY, tel 92 260668.

Solihull (SARS)—15 October (AGM). 7.30pm. The Manor House, High St, Solihull. Sec G8AYY, tel 021-783 2996.

Stafford (S&DARS)—8 October (Monthly meeting), 22 October (Night on the air), 29 October ("What's so bad about cb?", G8YFA). 8.30pm. Morse classes, all speeds, 7.30pm. The Coach and Horses Motel, Weston, Nr Stafford. Sec G4RWQ, tel 0785 714963.

Stratford-upon-Avon (SuA&DARC)—14 October ("History of computers", G0AJB), 28 October (Test equipment evening). 7.30pm. Baptist Church, Payton St, Stratford-upon-Avon. Sec G8OVC, tel 750584.

Telford (T&DARS)—2 October (Natter night and committee meeting), 9 October (Video and film night), 16 October ("SSB generation", G4AZV), 23 October (HF activity night), 30 October (Natter night and committee meeting). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G6XUF, tel 0952-770568.

Warwick (Mid-WARS)—8 October (Members' rtty equipment), 22 October ("Helicopters in the Far East", G3III). 8pm. 61 Emscote Rd, Warwick. Sec G8MFP, tel 0203 542877.

Wolverhampton (WARS)—1 October (AGM), 8 October (Discussion night), 15 October ("POW clandestine radio", G3BA), 22 October (Slide and film show), 27 October (144MHz df hunt, 11am, Tettenhall Green), 29 October (Night on the air). 8pm. Electricity Sports Club, St Marks Rd, Chapel Ash, Wolverhampton. Sec K Jenkinson, tel 0902 24870.

Worcester (W&DARC)—7 October (Visit by Dewsbury Electronics), 23 October (Informal meeting). 8pm. Oddfellows Club, New St, Worcester. Sec G4RBD, 14 Oakleigh Heath, Hallow, Worcester.

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

Bolsover (BARS)—2 October (AGM), 9 October (Natter night), 16 October (Natter night), 23 October (TBA), 30 October (TBA). 7.30pm. The Angel Hotel Bolsover. Sec N G Herrington c/o G4AGE.

Buxton (BARS)—8 October (TBA), 22 October (Open forum). 8pm. Haddon Hall Hotel, London Rd, Buxton. Sec Dave Cooper G6MIF, tel Buxton 6174.
Eastwood (Notts & Derby Border ARC)—1 October (Fox hunt), 8 October (AGM), 15 October (JOTA Planning), 22 October (Fox hunt), 29 October (RTTY/packet evening), 5 November (Failed projects evening). 7.30pm. Marlpool United Reform Church, Chapel Street, Marlpool, Heanor Derbys. Sec G4UFC, tel Ilkeston 302990.
Grimsby (GARS)—3 October (AGM and awards evening), 10 October (Computer evening), 17 October (Junk sale). 7 for 8pm. Cromwell Social Club, Cromwell Rd, Grimsby. Sec George Smith, G4EBK, tel Grimsby 887720.
Leicester (LRS)—The club has recently opened a new purpose-built clubroom adjacent to the present club, this will enable the society to have lectures with large attendance. This club room represents a large investment by the club. Sundays 10.30am, Mondays 7.30pm. Gilroes Cottage, off Groby Rd, Leicester. Sec G4PDZ, tel 871086.
Mansfield (MARS)—4 October ("Antennas for confined spaces", G3AMY), 15 October (Club project evening). Victoria Social Club, Princes St, Mansfield. Sec G1DZH, tel 652812.
Newark (N&DARC)—3 October ("Meteor Scatter", G4OIG). 7.30pm. Worthington-Simpson Sports Pavilion, Hawton Lane, Balderton, Newark. Sec G4SDZ, tel 702076.
Scunthorpe (S&DARC)—1 October (Construction evening), 8 October (Joint meeting with Grimsby ARS), 15 October (Technical Topics), 22 October (Construction from junk), 29 October (Natter night). 8pm. Grange Farm Hobbies Centre, Franklin Cres, Scunthorpe. Sec G4ZGJ, tel 732268.
Skegness (S&DARS)—18 October (Spilsby junk sale). 7.30pm. The Corn Exchange, White Hart Hotel, Spilsby. Sec G6HYF.
Spalding (S&DARS)—11 October (Shuttles in Space). 7.30pm. The Ship Albion, Albion St, Spalding. Sec G4ZGT, tel 2781.
Worksop (WARS)—1 October (Space Shuttle video), 18 October (Quiz night with Maltby club), 29 October (Return visit by Maltby club). 7.30pm. The Old Maltkins, Gateford Rd, Worksop. Sec G4ZUN, tel 486614.

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

Dunstable (DDRC)—11 October (Open evening with demonstrations), 25 October ("Improving your dx on 2m", G8VR). 8pm. Chews House, Room 3, High St, Dunstable, Beds. Sec G6EES, tel 607623.
Nene Valley (NVRC)—2 October (Natter night), 9 October (Grand junk sale and bring and buy), 16 October (Natter night), 23 October ("A bit of a lift on", weather and vhf/uhf propagation, G3YLA), 30 October (Natter night). 8pm. Dolben Arms, Finedon, Northants. Sec G4XEN.
I believe this club has a new venue. Would the club secretary please let me have further details.
Peterborough (GPARC)—24 October ("The sharp end of broadcasting", G4HPE). 7.30pm. Southfields Junior School, Stanground. Sec G4NRJ.
Shefford (S&DARS)—3 October ("Understanding wave ratio measurement", G3WRJ), 10 October (Interference forum, chaired by G3UFB from the RSGB EMC Committee), 17 October (Demonstration of amateur radio computer programmes), 24 October ("Satellite tv", G8AFN), 31 October ("Getting going on 10GHz," G8OFA). 7.45pm. Church Hall, Shefford, Bedfordshire. Sec G4PSO.

Welcome to the Daventry ARC. Will the secretary of that club please contact me. The holiday season is now over so please start sending in your club programmes to me and not to the editor direct. It was nice to see so many of you braving the weather at Woburn in August. G3DOT, RR5.

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

Abingdon Contest Club (G4UHF)—Are you interested in contest operating on the vhf/uhf bands? Are you keen to operate 24hrs on a cold wet windy hill? Yes! For details of how to join this small group, contact Alan, G4PSU, tel 0488 38696.
Chesham (C&DARS)—Wednesdays, 8pm. The Stable Loft, Bury Farm, Pednor Rd, Chesham. 22 November (Annual dinner). Sec G4SNQ, tel 024-06 25.
Oxford (RAFARS)—Monthly net on 3,710kHz ssb, changed to 11.30am on second Sunday each month. Civil Service Club, Marston Rd, Oxford. Details G6ZH, tel 0491 651259.
Reading (R&DARC)—15 October (Junk sale), 29 October ("24cm tv repeaters", G3VZV of BATC and the RMG). Details Chris Young, G4CCC, Sec 18, Wincroft Rd, Caversham, Reading, Berks RGA 7HH.

Will club secretaries please let me have their winter programmes. RR6

REGION 7—RR R Sykes, G3NFV, 16 The Ridgeway, Leatherhead, Surrey KT22 9AZ. Tel 0372 372587.

Ashford (Echelford ARS)—14 October (Talk by G3VPK). 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 82823.
Biggin Hill (BHARC)—15 October ("Cellular radio", R Owen). 8.30pm. St Marks Church Hall, Church Road, Biggin Hill. Sec G0AMP, tel 0689 57848.
Cray Valley (CVRS)—3 October (Junk sale). 8pm. Christchurch Centre, Eltham High St, Eltham SE9. Details G4WYG.
Croydon (SRCC)—7 October (Junk sale). 8pm. TS Terra Nova, 34 The Waldrons, South Croydon, Surrey. Sec G8IYS, tel 01-657 0454.
Crystal Palace (CP&DRS)—19 October (Junk sale). 8pm. All Saints Parish Room, Upper Norwood SE19. Sec G3FZL, tel 01-699 6940.
Redhill (RATS)—15 October ("Receiver noise measurement", G4EUG). 8pm. Constitutional and Conservative Club, Warwick Rd, Redhill. Sec G8JXV.
Surbiton (308 ARC)—29 October (Junk sale). 8pm. The Coach House, Church Hill Road, Surbiton. Details G1EOO.
Sutton (S&CRS)—18 October ("Propagation", by G2FKZ). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey. Sec G4BOX.
Thames Ditton (TVARTS)—1 October (Carnarvon Trophy and talk on 50MHz). 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec G3ENI.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Burgess Hill (Mid-Sussex ARS)—3 October (Inter-club quiz between MSARS and CARS), 10 October (Informal/natter night/cw practice). 7.30pm. Marle Place, Burgess Hill. Details G1FRF, tel 07918 2937.
Canterbury (East Kent ARS)—3 October (AGM). 7.30pm. Cabin Youth Centre, Kings Rd, Herne Bay. Details G6TRM, tel 02273 69454.
Chichester (CARC)—1 October (Bring along a computer evening. The Long Room), 17 October (Junk sale. The Green Room), 19, 20 October (Jamboree-on-the-Air. 12th Chichester Scout HQ, Sherbourne Rd, Chichester). 7.30pm. Fernleigh Centre, 40 North St, Chichester. Details G4EHG, tel 789587.
Crawley (CARC)—3 October (Inter-club quiz against Mid-Sussex ARS, Burgess Hill). Trinity United Reform Church Hall, Ifield, Crawley. Details G4IQM, tel 882641.
Dartford (DDFC)—12 October (2-station night hunt, Slade), 15 October (Pre-hunt meeting), 20 October (Club hunt), 26 October (3-station night hunt, Mid-Thames). Pre-hunt meetings after 9pm. Horse and Groom, Leyton Cross, Dartford Heath. Details G8DYF, tel Greenhithe 844467.
Eastbourne (Southdown ARS)—7 October (Main meeting, surplus equipment sale). 7.30pm. Chaseley Home, South Cliff, Eastbourne. Various courses are run in the clubrooms at Hailsham on Tuesday nights and Friday nights are chat nights. Details G4XNL, tel 638653.
Gillingham (BRATS)—17 October (Official opening of club shack). 8pm. Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham. 19,20 October (Jamboree-on-the-Air, GB2MP). Scout HQ, Mafeking Park, Walderslade. Station Manager, G0ARB. Details G4ZTF, tel Medway 474670.
Hastings (HERC)—16 October (Junk sale). 8pm. West Hill Community Centre. Other activities during week. Details G4NVQ, tel 420608.
Swale (SARC)—7 October (AGM). 8pm. The Ivy Leaf Club, 52 Dover St, Sittingbourne. Details G4NDM, tel Minster 873147.
Tunbridge Wells (West Kent ARS)—October meetings awaiting confirmation. Fridays, 8pm. Adult Education Centre, Annexe, Quarry Rd, Tunbridge Wells. Details G4KIU, tel 33586.
Worthing (W&DARC)—2 October (AGM), 9 October (Ragchew evening), 16 October ("Spectroheliography", Cmdr Hatfield). 7.30pm. Lancing Parish Hall, South St, Lancing. Details G4SWH. WADARC, PO Box 599, Worthing BN14 7TT.

REGION 10—RR E J Case, GW4HWR, 2 Abbey Close Tyrhiw, Taffswell, Mid-Glam CF4 7RS. Tel 022 810368.

Aberystwyth (A&DARS)—8 October (AGM—adoption of new constitution for the society. GW4HWR, RR10, will be present). 8pm. Bay Hotel (on the seafront opposite the bandstand). Sec GW4JXB, tel 828365.
Cardiff (CRSGBG)—14 October (AGM, followed by general discussion). 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec GW6ZHP, tel Cowbridge 3212.
Swansea (SARS)—26 October (Visit to radio exhibition at Granby Halls, Leicester). Details GW4HSH, tel Swansea 404422.

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

Clwyd County Raynet—Second Tuesday in each month. Green Lawns Hotel, Bay View Rd, Colwyn Bay, Clwyd. Sec. GW4UWI, tel 0492 2149.
Colwyn Bay (Conwy Valley ARC, GW6TM)—10 October (Visit to North Wales Police HQ, party restricted to 20 members, to meet 7.30pm. Open night for remaining members). 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. Sec GW4VVW, tel 0492 636376.
Deeside (Alyn & Deeside ARS)—7 October (D&W), 14 October ("The signal injector", a talk and demonstration, G8OJQ), 21 October (Committee meeting and D&W), 28 October (TBA). Sec GW4RKX, tel 0244 660066.
Dolgellau (Meirion ARS)—3 October ("Japanese morse", G3CSG). Dolserau Hall Hotel, Dolgellau. Sec W K Judge, GW4KEV. Tyddyn Mawr, Arthog, Gwynedd LL39 1LJ.
Porthmadog (P&DARC)—17 October (Video, "Frequency measurement", GW2HCJ and GW6CGR). 8pm. Harbour cafe, Ffestiniog Railway, Porthmadog. Sec GW4WKQ, tel 0758 740445.
Rhyl (R&DARC, GW4ARC)—7 October (Film night), 21 October (Junk sale). 7.30pm. Mona Hotel, Market St, Rhyl. Sec GW1AKT, tel Nantglyn 469.

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

Aberdeen (AARS)—4 October (Junk sale. New format), 11 October (Your questions answered; members' enquiries), 18 October (This is amateur radio, part 10, "Putting it together"), 25 October (Shell films), 1 November (Junk sale), 8 November (Cheese and wine evening). 7.30pm. 35 Thistle Lane, Aberdeen. Details GM4GXD, tel 0847 63638.
Grampian Repeater Group—During peak times, 7.30-9am and 4.30-6pm, GB3GN now has a limit on talkthro' of two minutes, Monday to Friday only. At other times the talkthro' time is still five minutes. The shortened time is indicated by changing the invitation to transmit from the normal "K" to a series of five "dits". The repeater is now available 24hrs per day, following a change of building, on the same site, which allows the group 24hr access for closedown. The group is indebted to Tom Waller, GM4HIG, who has spent a great deal of his free time moving the unit to its new location and clearing the recent faults which have occurred. Details of group, Alec Jones, GM8HGD.

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

Berwick on Tweed (BARS)—18 October (AGM, nominations to sec by 4 October). Sec S Jones, G1IUK. 128 Dean Drive, Tweedmouth, Berwick on Tweed TD15 2DB.
Edinburgh (Lothian RS, GM3HAM)—Second and fourth Wednesday in each month. Harwell House, Ettrick Rd, Edinburgh 10. Details GM4YPL, tel Winchburgh 890177.
Glenrothes (G&DARC, GM3ULG, 4GRC)—Every Wednesday and third Sunday in each month. 20 October ("DX operating", GM3YOR), 17 November (TBA). 7.30pm. Clubrooms, Provosts Land, Leslie, Fife. Details GM4TNP, tel Glenrothes 755958.

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

Ayr (AARG)—4 October ("History of the telephone", GM8BSE), 18 October ("Tuners and Matchers"). 7.30pm. Wellington Centre, Ayr. Details GM3THI.

Dumfries (Maxwelltown ARK)—16 October (AGM), 20 November ("Aerial Circus", RSGB Video). Details GM4NNC.

Dunoon (D&DARC)—25 October ("What is Raynet", GM3ZDH). Details GM1KJN, tel 036984217.

Glasgow (West of Scotland ARS)—4 October ("Activating WQ square and expedition to Ardnamurchan", with slides, GM4CXM), 18 October ("Homebrew projects", with demonstration, GM3HOM). 8pm. 154 Ingram St, Glasgow. Morse classes available. Details GM8YBP, tel 041-776 2814.

Greenock (G&DARC)—Tuesdays and Fridays of each month at 7pm. 22 Inverkip St, Greenock, RAE instruction on demand. Details GM3XNJ.

Lochgilphead (Mid Argyll ARC)—Interested members please contact Paul Williams, GM4VXA.

Motherwell (Mid-Lanark ARS)—11 October (Lecture evening). 7.30pm. Wrangholm Hall Community Centre, Jerviston St, Motherwell. Weekly cw and RAE classes now in progress. Details GM4UXX.

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

Ballyclare (E Antrim ARC, GI4KKK)—8 October ("RTTY Demonstration") 8pm. Fairview Primary School, Ballyclare. Sec GI4PRH.

Ballymena (BRC, GI3FFF)—3 October (AGM). 8pm. 70 Nursery Road, Gracehill, Ballymena. RAE classes now withdrawn Sec GI4HCN.

Enniskillen (Lough Erne ARC)—21 October ("Raynet", GI4NKD). 8pm. Railway Hotel, Enniskillen. Sec GI4CZW.

Londonderry (North West of Ireland ARC, GI3CFH)—3 October (AGM and RSGB Video). 8pm. Prehen Municipal Boathouse, Victoria Road, Londonderry. Sec GI4OUN.

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

Braintree (B&DARS)—2 October (Planning JOTA), 16 October (Constructors contest). 8pm. New venue at Community Centre, Victoria Rd (next to bus station), Braintree. Details G6THE, tel 0376 25587.

Bury St Edmunds (BStERS)—15 October (Junk sale). 7.30pm. The Guildhall, Guildhall St, Bury St Edmunds. Details G3GBB, 29 Angel Hill, Bury St Edmunds.

Chelmsford (CARS)—1 October (AGM), 5 November ("Satellite tv", G8MKX). 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details G4BYR, tel 0279 33049.

Colchester (CRA)—3 October (AGM), 17 October ("Gliding", Steve Card), 31 October ("Objective testing", G3FIJ). 7.30pm. Colchester institute, Sheepen Rd, Colchester CO3 3LL. Details G4FIJ, tel 0206 851189.

Great Yarmouth (GYRS)—10 October ("Satellite update", G3IOR), 24 October (Informal), 7 November (Open evening). 7.30 for 8pm. STC Sports and Social Club, Beevor Rd South, Denes, Gt Yarmouth. Details G3NHU, tel 0493 721173.

Ipswich (IRC)—2 October (JOTA plans), 30 October (Bring and buy, venue tba). 8pm. Rose and Crown, Norwich Rd, Ipswich. Details G4IFF, tel 0473 44047.

Leiston (LARC)—First Tuesday at Sizewell Sports and Social Club, King George's Avenue and third Thursday at 5 Main Rd. 1 October (Bomb disposal RAOC), 17 October (Fault finding), 12 November (AGM nb change of date). 7.30pm for 8pm. Details G6ORK, tel 831597.

Loughton (L&DARS)—11 October (Multiple-choice quiz, quizmaster, G6FWT), 25 October ("Modems explained", G8DZH). Details G6LWR, tel 0279 29457.

Martlesham (MRS)—Occasional first Wednesdays of each month at 7.30pm. British Telecom Research Labs, Martlesham Heath, Ipswich. Details Paul Tattersall, G4SYG, tel 0473 88663.

Stanford-le-Hope (SLH&DARC)—7 October (VHF night), 14 October (Natter night), 21 October (TBA), 28 October (Project night). 8pm. St Joseph's Parish Rooms, Scratton Rd, Stanford-le-Hope. Details G4OVG, tel 0375 642312.

Vange (VARS)—3 October (Junk sale). 8pm. Barstable Community Centre, Basildon. Details Mrs D Thompson, tel 0268 552606.

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

Amateur Radio and Computer Club (AMRAC)—4 October (Open meeting with demonstrations). 8pm. The Crown, Bishops Waltham, Hants. Chairman, G4YBO. Tel Locks Heath 82041.

Andover (ARAC)—1 October (VU7 Dxpedition), 16 October (W5LFL lecture). 8pm. Wolversdene Club. NB Club net, S18 on Sundays at 2pm and Tuesdays at 8pm. Sec G0AMO, tel Andover 51539.

Basingstoke (BARC)—7 October (AGM). 8pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G4WIZ, tel Tadley 5185.

Blackmore Vale (BVARS) 8 October ("Crystal Grinding", G3WRV). 7.45pm. The Bell and Crown, Zeals (on the A303). Sec G1GRG, tel 0963 70969.

Binstead (IOW BARS)—A new club which has applied for affiliation. Meets Wednesdays, 7.30pm. First Ryde/First Binstead Scout Group HQ. Sec G4RTT, tel Isle of Wight 295951.

Eastleigh (Itchen Valley ARS)—11 October ("Crystals", the McKnight Company), 25 October ("The Weatherman" (provisional)). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford, Hants. Sec G6DIA, tel 0703 863039.

Fareham (F&DARS)—2, 16, 30 October (Natter nights). 9 October (Talk by Davtrend), 23 October ("A better way with End Fed Aerials", G3CCB. 7.30pm. Portchester Community Centre, Portchester, Hants. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DARS)—11 October, ("A film night," G4MBZ). 23 October (Surplus equipment sale). Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. PRO G4MBZ, tel Farnborough 837581.

Horndean (H&DARC)—7 October (AGM). Merchiston Hall, London Rd, Horndean. PRO G4BEQ.

Jersey (JARC)—19, 20 October (Jamboree-on-the-Air, 48hr operation from Friday night. 80/40m GB4JSA/GB0JSA, GJ4HXJ on 144MHz and GJ4ICD on 14MHz. All members welcome, free food and wine, sleeping accommodation provided. The Mill, St Quens. Sec GJ4ICD, tel 0534 77067.

Liphook (Three Counties ARC)—2 October ("VHF repeaters", Farnham VHF Group), 16 October ("Interference", G4JXO). 8pm. The Railway Hotel, Liphook. Sec G3TBT, tel Passfield 368.

Plessey (Christchurch) ARS—Second Thursday of each month. Plessey Social Club, Christchurch, Hants. NB Change of night. Sec G6WQU, tel 0425 72108.

Poole (PARS)—30 October ("Working 50MHz). 7.30 pm. Poole College, North Rd, Poole. Sec G4XYX.

Portsdown Hill Repeater Group (GB3PH)—For information or to join the group and help support the repeater, please contact Steve Frost G4VNM, tel 0329 239702.

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

Wessex Amateur Wireless Club—A new club recently affiliated. Meets alternative Tuesdays, 8pm. "The Cricketers", Wimborne. Next meetings 15 and 29 October. Chairman G6SDQ, tel 0202 822125.

Winchester (WARC)—19 October. (Visit tv studio, meet at King Alfred's College, 7.30pm.) The Log Cabin, Stockbridge Rd, Winchester. Sec G4FPC, tel 0962 64747.

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

Aycliffe & Shildon (ARC)—27 October, (Hamday, bring & buy and trade stalls). Scout HQ, 4 Cross St, Shildon. NB new club sec, G1NNU, tel 0388 774081.

Berwick (Borders ARS)—4 October (Nominations for committee), 18 October AGM. Tweed View Hotel, Tweed St, Berwick. Sec G1IUK, tel 0289 305465.

Cleveland (RAFARS)—23 October (Visit to BBC Cleveland). Club net Sunday mornings 145·35MHz 1100hrs. RAFARS Area Representative GOBIA, tel 0642 486474.

Great Lumley (R&ES, G4EUZ)—6 October (Great Lumley Rally). Community Centre, Great Lumley. Sec G4OCQ, tel 0385 40827.

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

Redcar (East Cleveland ARS·G4CRS)—25 October (Club bring & buy). RAE class now in progress. RAFA Club, Newcomen Tce, Redcar. Sec G1GMF, tel 0642 474769.

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

Boreham Wood (BEARS)—First Monday of each month, 8pm. 8 October (A talk). Full details, Sec Tony King, tel 01-207 3809. This is a new club.

Bishops Stortford (BSARS)—Third Monday of each month, 8pm. British Legion Club, Windhill, Bishops Stortford. Sec G6HKK. Information from Ass Sec D J Durrant G3MUI, tel 0279 57107. This is a new club.

Cheshunt (CDARC)—20 October ("Lightening Protection", Peter Tingey), 9 October (Natter night). 7.45 for 8pm. The Church Rooms, Church Lane, Wormley, Herts. Sec G4OAA, details from G3OJI, tel Ware 4316.

Chiswick (ABCARC)—15 October ("Impedance Matching", G3IGM). 7.30pm. Chiswick Town Hall, High Rd, Chiswick, London W4. Sec G3GEH, tel 01-992 3778.

Edgware (E&DRS)—10 October (TBA), 24 October (Film evening). 8pm. 145 Grange Hill Rd, Burnt Oak, Edgware. Details G4SYI, Tel 958 9868.

Harrow (RSH)—4 October ("Talk Challenge", G2UV Prize), 11 October (Activity night 80m), 18 October ("Making Electricity"), 25 October (Activity night 20m). Roxeth Room, Harrow Arts Centre, High Rd, Harrow Weald, Middlesex, tel Rickmansworth 779942.

Havering (H&DARC)—2 October (Business meeting). 9 October (Informal). 16 October (Constructors Cup Competition). 23 October (Informal), 30 October ("Oscar Satellites", G3RWL). 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Sec G1HTQ, tel Romford 23996.

St Albans (Verulam ARC)—8 October (Informal and workshop), 22 October ("Switched mode psus", Mr Roe). 7.45pm for 8pm. RAFA HQ, New Kent Rd, St Albans. Details G4JKS, tel St Albans 59318.

Welwyn (W&Hatfield ARC)— 7 October ("Radio controlled model aircraft", G0AII), 21 October (RSGB Video Show). 8pm. Knightsfield Scout HQ, Welwyn Garden City. Nets on S15 at 8pm on other Mondays, morse on Thursdays. Sec G0AII. Tel 0707 326138.

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

Bristol (BRSGBG)—28 October (Visit by zonal rep & John Nelson of RSGB HQ Staff). 7.30pm. Small Lecture Theatre, Bristol University. Details G4SQQ, tel 0272 508451, or G4ROX, tel 0272 513573.

Bristol (South Bristol ARC)—2 October ("Packet radio", G8XIH), 9 October ("High Speed Morse night", G3XED, G4TXW), 16 October ("Computer night", G4RZY), 23 October ("Final arrangements for the rummage", G1LDJ), 30 October ("Lecture —RSGB Bristol", G8VPG), 6 November (BTI morse tests, 7pm to 9pm). 7.30pm. Whitchurch Folk House, East Dundry Rd, Whitchurch, Bristol BS14 OLN.

Cirencester (CADARC)—10, 24 October (Natter nights). 7.30pm. Phoenix Centre, Beeches Rd, Cirencester. Details G3TSO, tel Coln St Aldwyns 532.

Gloucester (GARS)—2 October (Talk and film), Gloucester Film Club), 9, 16, 23, 30 October (Natter nights), 6 November (Talk and demonstration of sstv). 7.30pm. St John Ambulance HQ, Heathville Rd, Gloucester. Details G6AWT.

Portishead (Gordano ARG)—23 October (TBA). 8pm. The Ship, Redcliffe Bay, Portishead. Details John Davies, G3LJD.

Street (S&DARS)—1 October ("Gardening for the DXer", G4DZW), 5 November ("Computing in amateur radio", Andrew Peachment). 7.30pm. Strode College, Church Rd, Street. Details G4SCD, tel 0458 45145.

Stroud (SARS)—2, 16, 30 October (Natter nights). 8pm. Nelson School, Stratford Lodge, Stroud. Details G1DCT, tel Nailsworth 2773.

Stroud (S&DARS)—1, 8, 15, 22, 29 October (Natter nights). 7.30pm. Scout HQ, Parliament St, Bisley Rd, Stroud. Details G3TEV.

Weston-super-Mare (WsMARS)—14 October ("Weather forecasting and effects of weather conditions on amateur radio", Mike Woodley from Bristol Weather Centre). 7.30pm. Rugby Club (off Drove Rd), Weston-super-Mare. Details G1DJW, tel Weston 514429.

Yeovil (Y&DARC)—3 October ("JFET audio amplifiers", G3MYM). 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Details G3GC, tel 0935 75533.

If your club is not shown your secretary has failed to advise the RR.

Mobile Rallies Calendar

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

6 October
Great Lumley ARES Rally. Community Centre, Great Lumley, Nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Details G4OCQ, tel 0385 40827.
27 October
Aycliff & Shildon ARC "Ham Day", Elm Road Working Mens Club, Shildon, Co Durham. Talk-in on S22. Open 11am-5pm. Details G4OHZ, tel 0325 314638.
27 October
South Bristol Radio Rummage, Youth Centre, Hareclive Ave, Harcliffe, Bristol. 10am-4pm. Talk-in on S22 and SU8. Enquiries to Mike Ward, G1LDJ, tel 0272 667179.
2 November
The Fifth North Devon Radio Rally, Bradworthy Memorial Hall (near Holsworthy). Talk-in on 144MHz (S22). Open 10.30am-5pm. Details G8MXI.
24 November
Carmarthen ARS Rally. St Peter's Civic Hall, Nott Square, Carmarthen. Open 10.30am-5pm. Admission £1. Talk-in on S22. Free parking. Details from A F Dowling, The Old Farmhouse, Pant yr Athro, Llanstephan, Dyfed SA33 5AJ, tel 026 783 460.
24 November
West Manchester RC Mobile Rally, Pembroke Halls, Walkden, Worsley, Gtr Manchester. Details G6YIO, West Manchester RC, Astley & Tyldesley Miners Welfare, Meanley Road, Gin Pit Village, Astley, Tyldesley, Manchester.
1 December
The St Albans (Verulam) Christmas Rally, The City Hall, St Albans. Opens 11am. Talk-in on 144MHz and 432MHz. Entrance 50p. Enquiries to G4JKS, tel 59318.
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.
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.
18 May 1986
The 29th Northern Mobile Rally, Great Yorkshire Showground, Harrogate. Details G3CQQ, tel 0943 602118.
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.
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 G4HUJ.
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.
7 September 1986
Lincoln Hamfest, Lincolnshire Showground. Further details to be published at a later date.

Special Event Stations

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

5 September-2 October, GB4HB
Exmouth RC will operate this station at Hayes Barton, East Budleigh, Devon on hf bands, 144 and 432MHz, Oscar 10 and RS satellites. Hayes Barton is the birthplace of Sir Walter Raleigh who was born there in 1554, and established a colony in North Carolina in 1585, and it is hoped to contact the Raleigh ARS in the city of Raleigh, as part of their 400-year celebrations. It is also hoped to contact the Operation Raleigh ship *Sir Walter Raleigh* callsign GB0SWR/MM on her round-the-world mission. Special QSL cards will feature the Elizabethan farm house. Details M Newport, tel 0395 274172.
20 September-17 October, GB4HMS
The Royal Navy ARC will operate from Hedge End, Hampshire on 144MHz fm and hf ssb to celebrate their Silver Jubilee. Contacts made will count towards one of the five required special event stations for the RNARS Silver Jubilee Award. QSLs and further details, G3ONG.
26 September-24 October, GB0GDB, GB2GDB, GB4GDB
National Guide Dogs for the Blind. During 4, 5 October callsign GB4HGD only. HF and vhf subject to conditions. Award certificate for contact with three National Guide Dog stations. Special QSL cards. Fee, £1.50. Details G4OAT.
27 September-4 October, GB4DDC
The Dunstable Portable Amateur Radio Group are planning to transmit on hf, vhf, cw and rtty from a rare area of Wales. Special QSL cards. Details, Tony, tel 0582 508259.
October, GB4KRN
The RNARS will be operating this station throughout October from the Partially Hearing Unit, Hugh Christie School, Norwich Avenue, Tonbridge, Kent, celebrating 25 years of the Royal Naval ARS. Operation will be on ssb, 3,660kHz, and local 144MHz.
1, 2 October, GB2UBR.
Operated by Brunel University ARS to run in conjunction with the freshers fair, promoting amateur radio to new students. Operation on hf and vhf.
5 October, GB2BUS
Operated by Spen Valley ARS from the West Yorkshire Passenger Transport Museum, Bradford. The station will be run from one of the museum's static bus exhibits from 10am. Special QSL cards. Details from club sec, G4PHR.
12 October, GB4URC
Operated in connection with the autumn market, Lion Walk United Reform Church, Colchester. Sponsored station in aid of rebuilding Lion Walk Church. The aim will be to contact as many stations between 10am-4pm on hf and 144MHz. Details G0CCI, tel 0206 396610.
19 October, GB0DMS
Part of JOTA 1985, operated by 134th Derby (Mackworth) Scout Group from their HQ, Leytonstone Drive, Mackworth Estate, Derby. Open 10am-5pm. Operational on hf and vhf. All contacts and swl reports receive a QSL card. Details from G1DCH, tel Derby 700610.
19, 20 October, GB2GGA
Wisbech Radio and Electronics Club will operate this station from the Guide's HQ, Wisbech. Celebrates 75th Girl Guides Anniversary and JOTA. Operational on hf and vhf. Special QSL cards. Details G4ODH, tel 0945 585696.
19, 20 October, GB2STR
A JOTA station operated by the 2nd Cirencester (Stratton) Scout Group from their HQ, Stratton, Cirencester. Operational on all hf bands, 144MHz and 432MHz atv. Details G4EVE, tel 0285 4207.
21-25 October, GB2KSS
Part of a space science course run by Somerset Education Authority at Kilve Court, nr Bridgwater. Yeovil ARC will supply the stations which will principally be satellite operations, but there will also be hf and vhf. Details G4WMV, tel Yeovil 21246.
25, 26 October, GB4OWW
This station is being organized as part of the Marlborough Brandt Group One World Week festivities, at St John's School, Stedman Building, Marlborough, Wiltshire. It is hoped to contact stations in The Gambia on hf, as Marlborough has a link with the village Gunjur. In addition there will be operation on 144MHz, ssb, fm and 432MHz. Special QSL cards are available for all contacts. Details G6EPM.
11-25 November, GB2ACC
Dunfermline RS will celebrate the 150th anniversary of Andrew Carnegie's birth, operating on hf and vhf, cw, ssb and rtty. Skeds welcomed. Special QSL cards. Details GM4WYR, tel 0383 736401.
29 (or 22) December, GB4OLD, GB8OLD, GB4NEW, G8NEW
Radio amateurs throughout Europe (and the rest of the world!) are invited to join in the Lutterworth New Year celebration. Active on as many bands as possible, GB4OLD and GB8OLD will be used until midnight on New Year's Eve, and GB4NEW and G8NEW after midnight. The stations will operate from St Mary's Church, Lutterworth, Leicestershire. Details G6ZZE, tel 0533 768181.

Members' Ads

CHANGE OF PRESENTATION

Commencing with the November issue, "Members' Ads" will be transferred from *Radio Communication* to the *RSGB News Bulletin*, which will become an eight-page supplement in the centre of the magazine.

The *RSGB News Bulletin* is not typeset in the usual way but is printed by photographic reproduction of typescript produced at RSGB headquarters, and in future all Members' Ads must be addressed to: Members' Ads, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW; as must all enquiries concerning them.

In their present form, "Members' Ads" is the most expensive, in terms of editorial time, of any section in the magazine, and this time can now be employed to better advantage in other sections.

The Conditions of Acceptance are now published on the label carrier/order form used to despatch *Radio Communication*, and the cost of Members' Ads will be published in the *RSGB News Bulletin*. The current rate for Members' Ads is £2.30, including VAT, for 40 words or less, plus an additional £2.30 for every additional 40 or less words.

FOR SALE

FT707 12V hf mobile vgc, and mic manual mobile mount, £325. TR2400 quick charger, £20, gd cond, wkg. Pye R460 uhf rx, offers to G4NPH, QTHR.
ATU Daiwa CNW419 cross-needle meter, forward and reflected power plus swr at a glance, 2 i/p plus long wire, £120. Trio TL120 linear hf amp, 10W i/p 100W o/p, £125. Graham, G4VOE, QTHR. Tel 061-740 4126 anytime.
Planning permission problems overcome by purchasing my 60ft heavy duty mobile mast, fully transportable in very gd wkg cond, ideal for club field days, £600. New unused compact quiet lightweight 240/12V petrol generator, £200, cost £316. G6CUQ, tel 052-789 2282.
FT790 MMB11, £235. 1W/10W 70cm homebrew linear, £25. Totsuko 2100M 2m ssb only tx/rx, £75. Tonna 9-el 2m, £10. Multibeam MBM48/70, £25. Welz SP10X meter, £15. SMA FU200 rotator, £30. Microwave Modules MMC144/28HP gasfet converter, £28. R408 comms rx 13kHz to 28MHz,

excellent swl rx, £80. Marconi signal gen 16-150MHz, with psu, £15. Both items large/heavy, must be collected or delivery within 20 miles Cambridge. G6VCI, QTHR. Tel 0763 61102.

Creed 444 45/50 baud with ST5 tv (incl autoprint), complete rtty outfit, £75. 100K BBC half weight drive, cream metal case, boxed as new with cables, £80. Sony CDP101 compact disc player with four discs, £300. G4IAC, QTHR. Tel 06755-2745.

60ft tiltover telescopic lattice mast with winch, but less base post, very heavy duty construction, £100 ono. Buyer collects, can be viewed in Gravesend, Kent. Tel Woking 27456.

Pye uhf equipment; PF2 handhelds, one tx only, other rx only, £10 ea. PF2 autocharger, 510. PF2 vehicle adaptor, £25. Boot mounted Westminster 6-ch RB0/RB2 fitted, £50. F9U base stn unmodified, £40. PF5 handheld untested, £5. Carriage extra. Tel 0280 812195.

KR500 elevation rotator plus 16m of control cable, vgc, £99 ono. Eupen 5121 0·5in foam dielectric corrugated coaxial, 16m long with 'N' type plugs, £35 ono. Ant products 14-el 70cms beam, £20. Adonis MM202S mobile mic, £15. G4SHB, QTHR. Tel 0453 45653.

SQ144 2m Hy-Gain beam, surplus to requirements as cannot place outdoors, £25. Malcolm, G1MBW, QTHR. Tel 01-529 4657 after 7pm.

400W for 2m pair 4CX250B amp in 19in rack mount with lt supplies and control, requires blower ht and 5W drive, £300. four 9-el Tonnas complete with phasing harness, £40, will not split. Sporadic-E detector R216 rx 19-175MHz with matching psu, £50. UKW Technik 23cm transverter, 144MHz drive 0·5W o/p, £50. 23cm 2C39A amp, RS6B square cavity design silver plated 40W o/p for 2W drive, £50. WB6IOM pair 2C39A amp for 23cm silver plated, will give 150W o/p, cathode circuit requires attention for efficient use, £50. KLM 10-160BL 160W 2m solid state amp, £70. Pye uhf Westminster 10-ch 8 fitted most repeaters and SU8 with control box, cable and handbook, £50. Sensible offers considered for all items, buyer to arrange carriage for larger items, others carriage at cost. *Wanted* 8877 new, 8938 new, Eimac only, or info on reliable USA source. G8JHL, QTHR. Tel 061-792 2697.

10fm Icom ICB1050 eprom conversion, 29·300 to 20·695, 5kHz steps, 25W 10m linear, mobile centre loaded antenna, slide mount, £45. G4RIK, QTHR. Tel 0783 815331.

Drake MN2700 2kW atu with balun, must be good value at £175. *Wanted* FT707 low power or TS120, both with external linear, swap for FT707 high power or w.h.y? Jackson, G4HYY, QTHR. Tel Todmorden (West Yorkshire) 5342.

Yaesu FT726 vhf/uhf base stn, today's price over £1300, sell for £800. Icom R70 rx, extras, £400. FT1G general coverage tx/rx, every conceivable extra and some more. All above immac and virtually unused. John, GW3VVC, QTHR. Tel 0248 714655.

Genuine AR88D s-meter, new, £12.50. Rxs, army R5223 GC 30 wavebands, £50. APR-4Y, £45. URR-27, URR-35C, R-216, HRO spare coils, variety laboratory test equipment, spectrum analyzer, sw meter 0·3-12GHz. Valves 2C39As, £7.50. 4CX1000A, £20. *Wanted* Nuvistors. Bob. Tel 0942 55948.

Kenwood TS430S AT250 Drae 24PS, G2DYM dipole, mint, £1000. IC24D psu and speech compressor 35 linear, £150. 2 colinears, £30. Blind op. Buyer inspect and collect. Taylor, G6KPI. Tel 0722 780396.

HRO psu coils GW0, £35. *Wanted* FTV650B, will collect/deliver 100mls, G4LTH, QTHR. Tel 0375 674301.

Spectrum rtty interface and programme by Scarab, split screen, memories, type ahead etc, £20. Tel 021-742 8850 (West Midlands).

Bored with rtty! Therefore my new EG2000 colour Genie plus Radsof tu and rtty program, plus URA and log programs are offered in mint cond, incl a Pye TR3654 cassette and dust cover, £120. G4SLG, QTHR. Tel Lincoln 751920.

Trio 7500 2m 10W fm with mobile mount, £130. May consider part exch for vhf scanning rx. GW8HDH, QTHR. Tel 0792 202287.

Yaesu FT980 full general coverage hf tx/rx, one year old, complete with Curtis keyer, 300Hz cw filter, 9kHz fm filter, manual, service manual. Full break-in, suitable for Amtor, recently re-aligned by importer. Boxed, as new, £1,145 ono. G4WVX, QTHR. Tel 06286 64415.

Trio 9000, £290. MML144/100s, £129. Weltz SP-15m 1·8-150MHz swr/power meter, £30. Icom IC-PS20 20W psu, £100. Adonis AM503 mic, £20. KR400RC rotator and lower clamp, £90. Met 19-el Yagi, £40. The lot, £610. G6PBG. QTHR. Tel 0293 510491 evenings.

Yaesu 7700 rx, mint cond, 2m converter plus atu, £275 ono. Icom IC260E 2m all mode wkg, requires some minor attn, £150 ono. G4KJV, QTHR. Tel after 6pm.

FT480R 2m multimode, very reliable and clean cond, sale only due to purchase of TS780, little mobile use, £300 ovno. Sorry box donated to council. G6KDK, not QTHR. Tel Caston (Norfolk) 539.

FT102 hand mic, manuals, boxed, immac cond, £525. CP5 5-band vertical antenna, cost £115 only £50. Antenna coupler Tokyo Hy-power HC150, £50. G3PPD, tel 01-422 4153. QTHR under GW3PPD, London.

Silent key sale, late G4RMF. Yaesu 2m multimode, FT480R with psu and colinear antenna (Ringo Ranger), buyer inspects and collects, as new, £320. tel Marlow 3141.

FT690R 6m tx/rx with FL6010 10W linear amp, £220 for both. Jaybeam 4-el 6m beam, £30, would consider part exch for mint FT208. G4VET, QTHR. Tel 01-647 1879.

Yaesu FT757GX, FC757AT, FP757GX, £775. Middleton, 49 Wolseley Road, Stafford ST16 3XW.

Trio TR2500 2m fm handheld, mobile mount/charger, 12V dc converter, spkr, mic, soft case, 25W tx/rx linear, all boxed and mint cond, £250. Nigel G1JKF, QTHR. Tel Royston 71149 evenings or weekends.

FT726R cw 2m 70cm satellite modules, mint cond, boxed, £875. SEM 2m 100W linear/preamp, £75. 10 turn 70cm Helix RHCP, £20. Altron SM30 tower, £150. Hirschmann rotator and l/bearing, £25. All above plus 2 x 10m H100 plugs, £1,125 ono. Kevin, GW6LGE. Tel Cardiff 752690.

Satellite equipment, new, never used. Latest rotator KR5400, 100m 8-core wire still in roll, special tripod, glass fibre boom, two new antennas 12xy/70cm, 8xy/2m. GFBA144E Mutek preamp. Ill health forces sale. Sensible offers accepted. G4MVW, QTHR. Tel 0202 36306.

Vertical hf antenna 10-40, £30. Mast 25ft, £10. Sony VTR, £40. Shiba 14in monitor, £8. Shibaden camera, £25. 20m mobile antenna, new, £15. 24-el log periodic 70cm, £12 ono's. Swap/part exch etc. Philip, G4LIR, QTHR. Tel Burton-on-Trent 814528.

Yaesu FT101B mains and battery powered tx/rx 160-10, gd cond, complete with manual, power leads, mic, cw filter and fan, £325 ono. Reason for sale, purchased new rig. Clive, GW4YKL, QTHR. Tel Llanharan 0443 226198.

KW2000A pa, fault and needs alignment, £120. Lafayette HA230 gen cov rx, faulty BFO, £25. AR77E rx, gwo, £35. Heathkit HA14 kilowatt linear, gd cond but bottles soft, £70. All ono. G3XAP, QTHR. Tel 0449 675018 evenings.

Racal RA117 rx plus RA216 sideband converter with fine tune in correct box, manuals, spare valves, £225. AR88D with s meter, org spkr, manual, spare valves, £75. Tandy PRO2002 50 memory scanner, £110. G4XPU. Tel Bolton 58200.

FDK multi 750 XX all mode 2m rig and psu, one year old, £275. G0AHE, QTHR. Tel Colchester 564687.

70cm 30W linear amp, Alinco ELH730G, £50. G8UZM, QTHR. Tel 0723 376732.

Racal Syncal 0·5-30MHz ssb tx/rx, 20W p.e.p., £300 ea or £550 pair. Buyer collects. Sony 305 dual trace 5MHz oscilloscope, new, unused, in transit crate, £1,200 ono. G4AYG, QTHR.

TS530SP, FC902, SP901, £675. TR2300, VB2300, 7A psu, 5/8 mag, Slim Jim, coaxial. £165. PF1s pocket fones and nite-call, £25. Sinclair 2in tv and adapter, nicads, £45. Nicads, charger, TR2300. Buying 930S. Please write 171 Grampian House, North Mall, Edmonton, London N9 0EG.

FRG7700 and FRT7700, both mint cond, boxed, manuals, £225 or exch for FT290R in similar cond. G4XXY, QTHR. Tel 0670 812028.

IC271E 25W base multimode, mint cond, used little, £550. Yaesu FT230 25W mobile with mobile mount, £180. Trio TR2500 handheld, mint, £185. ST2 base charger, £45, sold as pair. G1DCS. Tel 01-540 3959.

IC271E fitted Mutek, £575. BNOS 25-160 linear, nearly new, £180. Zetagi 25A psu, £75. Base mic with built-in compressor and equaliser, £45. Adonis AP-1 mic adaptor, any mic to Icom, £10. G6IAT, QTHR. Tel Luton 23750.

Icom IC740, boxed as new, incl electronic keyer module, mic and psu, hardly used, £600. TS120S with cw filter and noise cancelling mic, exc wkg order, £330. G3TA, QTHR. Tel Miserden 571.

Icom ICR70 rx with fm option fitted, mint cond, £400 plus carriage. Trio MC50 desk mic, £20. MC30S mobile mic, £10. 6-el 70cm Yagi, £10. All plus postage. G3DPR, QTHR. Tel Kemble 514.

FT7B 100W input 80m to 10m a.m., ssb, cw, boxed and complete with mobile mount and mic, £250. 12A matching base psu, type FP12 with internal loudspkr, £45. G4ODD, QTHR. Tel 0623 811681 (pm).

FT480R perfect cond, 10-el, Jaybeam, isopole, lightweight rotator, £320 the lot. Tel Cheltenham 580861.

SSB 2m portable, Mizuho SB2+ 1W sensitive rx, nicads, charger, as new £80 ono. 70cm 10W linear, £28. Creed teleprinter and terminal, £25. Signal generator 100kHz-100MHz, £25. Bearcat 100 handheld scanner 30-512MHz, £150 ono. *Wanted* FT230R, IC-2E 2m 100W linear, surplus PMR. G6HLK. Tel Leek 384660.

FT209R 2m keyboard computer control handheld with spkr mic, £180. FRG7700 50kHz-30MHz a.m. ssb fm rx, £170. Scopex 4D10B dual channel scope with probes, £110. All gd cond. G3XTQ, QTHR. Tel Leighton Buzzard 24281.

Most major components incl tubes for hf linear. 4-el 4m Yagi, £5. Ex-govt rx 1-20MHz, £20. Advance Q-meter, no handbook, £12. Vintage radio basket weave coils, gimbolder etc. G3VOJ, QTHR. Tel 0621 52757.

Shack clearout, mostly late 'sixties homebrew gear for 70cm/2m HRO, HT transformers, valves incl 4CX250B, 2C39A, QQV03/20A etc, £45 the lot. Buyer collects. GW8ARC, QTHR. Tel Cardiff 615366 evenings.

FRG7 comm rx, vgc, used little, no mods, manual, box, £125. SEM Z-match atu 10-80m, vgc, £35. Jaybeam MBM 48/70cm as new, £25. G4MWP, QTHR. Tel 0203 462035.

TS830S with 250 and 500Hz cw filters, deluxe tuning knob and service manual, £645. VFO230, £135. FL2100Z linear, £475. SP15M power/swr meter, £28. YG455C 500Hz filter, £46. G3PEK, QTHR. Tel 0244 300897.

Versatower HAM1V TH3 MK3 SNR plus low loss coaxial 100ft, £350, buyer dismantles and collects. KW1000 linear mint, offers, or buy a superb modern bungalow with large garden and fun antenna system, £62,500. For details of purpose built shack tel 0954 60584. G3NAC, QTHR.

FT208R 2m fm handle, spkr/mic, charger, m/mount, £150. Trio R1000 rx, £160. W & D 70cm fm tx/rx 500mW, cased, £35. Ikegami 0·5in vtr, wkg order, s/manual, 3 tapes, £40. Ex-WD WS22 and A510 set, offers. Buyer collects. G4JOJ not QTHR. Tel 0477 33589.

Labgear coil winder R1155N HRO(M), manuals Solartron 523S/2 advance D1, genuine new AR88 'S' meter, Kokusai and KVG filters, G2DAF xtals. *Wanted* Hy-Gain TH6DXX beam. G3ESB, QTHR. Tel 0332 671536.

Altron slimline telescopic tiltover mast, 30ft extended, 15ft closed, 2 years old, exc cond, £190 ono. Moving QTH. Buyer collects. G6DJO, QTHR. Tel Stockton-on-Tees 558315 after 6pm.

FT230R 2m fm tx/rx switchable 3/25W o/p, £200. Colour Genie comp with rtty transceive program (type ahead, split screen), £80. Daiwa DK210 iambic keyer, £25. All ono. G4MYA, QTHR. Tel St Helens 22647 after 6pm.

Realistic DX302 communications rx. Covers 01-30MHz cw/ssb/a.m. with digital frequency readout. Mint cond with orig box/handbook, £110 ono. G4ZTP. Tel Bournemouth 432610.

FT730R 70cm 10W fm mobile as new, boxed complete, £190. 48-el multibeam never used outside, as new, £30. 25W 2m linear, £32. Sony 50W hi-fi amp and spkrs, all vgc, £150 ono. G6NDC, QTHR. Tel Lutterworth 2123.

TR9000, B09, PS20, SP120, plus various antenna, £455. R1000, SP100, KX2 atu, £255. 12V 50A psu, rackmount, offers. R517 airband monitor, £49. B/W tv 20in, £20. All ono. G8XQF, QTHR. Tel 061-430 7539.

Trio 7730 2m fm 25W, installed in glove compartment of Maxi 1750HL, 1980, 42,000 miles, rare automatic, gd cond, regularly serviced, Pioneer stereo, electric antenna, Waso ultrasonic alarm, Kenwood boom mic, S0239 wing mount, £1,850. G4OHB, QTHR. Tel 021-449 3530.

Microwave Modules MMT432/144R 70cm/2m transverter, £110. MMT432/28 70cm/10m, £95. MTV435 tv tx, £115. MM4000 rtty/data tx/rx cw RCA keyboard, £175. MML144/40 40W 2m linear, £30. Odd g-whip coils £3 ea. New 2102-2 ram chips, 20p ea. 74LS262, £1.50 ea. G8AYN. Tel 04555 57790.

FT707 100W pep, FP707 ps, FC700 atu, YM35 mic, all mint, boxed, manuals, £500 or exch for FT102 similar with cash adjustment. G0BDF. Tel Lutterworth 57263 anytime.

Trio R600 gen cov rx. First class cond with orig packing and manual, £190. Buyer collects or carriage. GM0ATQ not QTHR. Tel Greenock 31871 evenings.

Racal RA17L, gwo, £150. Signal gen Marconi TF99S 1·5MHz-220MHz, £40. Counter timer 50MHz advance TC9, £40. Dymar distortion meter, £40. Marconi 1041B v/v dc ac 1000MHz, £40. KW Viceroy tx 80-10m, £70. Trio JR500 rx, £35. G8YMR. Tel 0684 295189.

Facit serial printer (4520), £80. F460 tx 433·2MHz, £15. F450T rx plus preamp 433·2MHz, £15. 5V 1·2A psu, £4. 12V 1A psu, £4. Xtal calibrator, £8. PR25 25W hi-fi spkrs, £20. 12V 25AHT battery, £10. Suncamp, £8. Tel Ipswich 718762, 6-7pm.

MM2000 rtty to tv converter, slight fault hence £65 ono. Radio control gear 3-function, three servos, nicads, charger, 35MHz fm, type approved, £60. G6HQK, not QTHR. Tel Wolverhampton 69285.

Heathkit RA1 160-80m rx, £40. Sharp MZ80K computer 48K, serial board I/O box, P3 printer, £175. G3UGR, QTHR. Tel 0935 850463.

Yaesu FTdx560 QRO hf, cw, FV400S vfo, vgc, £250. Belcom liner-2 fitted preamp, extra xtals, manual, works very well, £85. G1GLJ not QTHR. Tel 02214 4847 (Wiltshire).

Heathkit SB301, SB401 in gwo, complete with manuals, SB610 spkr, hf stn, £150. G4GLP, QTHR. Tel Camberley 24706.

Reluctant sale. TS930S built-in atu, £999. SP930, £40. MC35S, £10. LF30A, £10. DL150, £10. Cushcraft R3 vertical halfwave with remote control, £70. All mint. New wife, new baby, equals room needed so going QRT. G4PVV, QTHR. Tel Leamington Spa 881507.

Datong 144/28 2m converter, £20. SEM visa 80m rx, £20. Datong RFA wideband preamp, £20. 12V psu, £2. SWR meter, £3. Slim Jim, £2. Global atu, £20. Jaybeam 5-el 2m beam, £8. Martin. Tel 01-590 5490.

FT101ZD fm not fitted, fan, mic, manual FC902 atu and handbook, £425 ono for quick sale, will not split. G4TWJ. Tel 0706 57838 evenings.

Kenwood mon'scope SM220. Fitted BS8 pan-display unit. Suitable Kenwood tx/rx series 180, 820, 830, 930, 940, £130. G4CHP, QTHR. Tel 0508 470365.

FT225RD with xtals, all in vgc, £550. Mutek board, £60. Low loss relay, £9. 12-el ZL special, £15. All plus carriage. Peter, G6YFP. Tel Sheffield 369116.

Yaesu FT270RH fully synthesized 2m fm tx/rx, 45W high power, 5W low, 3 months old, as new, used little, £280 ono. Tel Stoke-on-Trent 328561.

Sota linear transverter, 12V 70cm to 28MHz, fitted antenna c/o relay and additional xtal to cover 430 to 434MHz incl repeaters, BNC sockets, offers around £100. 8/8 slot for 70cm Jaybeam, £20. 3-el 4m Jaybeam, £15. Shure 444 mic, £35. Single purchaser, the lot for £140. Lunch arranged for dx buyer. G2FNK, QTHR. Tel 0305 88608.

18AVT/WBA by Hy-Gain, five band vertical, £65. G4VOH, QTHR. Tel 06065 4719.

KDK 2030 fm only 5W/25W mobile mount as new, £180. Complete 70cm tv stn, Hitachi BW camera, MM up converter, MM 20W colour tx, 23-el parabeam, all as new, £215. Will separate. American 813 valves, new, £15 ea. 813 bases with collars, £4 ea. 4 x 150, new, £5 ea. Rollercoasters, large, £10 ea. HT transformer 2500-0-2500 0·5A (weighs 100lbs), £20. LT transformer 30A-10V, £10. Various high voltage paper capacitors, wide spaced variable caps, £10 ea. G4JYQ, QTHR. Tel Southport 77411.

Trio TR2500, rubber duck, soft leather carrying case, belt clip, as new, in orig packing, ideal Xmas present, £180 ono. P Dove. Tel Etwall 2101 after 6pm.

Regency HX2000E handheld scanner, unwanted gift, brand new, £200. Sharp PC1211 handheld computer with cassette interface, orig manuals and program list in custom fitted timber case, £55. Sinclair PFM200 digital frequency meter, as new, £35. G6IBC, QTHR. Tel 01-790 8163 evenings.

FRG7700 Yaesu communication rx, mint cond, used little, no memory, £300. G8OBK, QTHR. Tel 061-439 2021.

FT290R with nicads, charger, carrying case, mobile mount, manual etc and homebrew colinear, £240. Gerard, GI1HRK. Tel Belfast 241289.

Scarab rtty interface, plus plenty of radio software for 48k Spectrum, £20 the lot, BBC micro disc indexer. Find your programs with this auto read database, state twin/single drive, 40 track, only £5 on disc. G4NZK, QTHR. Tel 021-453 2880.

Welz SP45M 2m/70cm power/swr meter, 3-20-100W ranges. Scarcely used, as new, £30. FM module for FT77, unused, with simple fitting instructions, as new, £22. GM3HBT, QTHR. Tel Larkhall 883306 after 6pm.

FDK quarts 16 complete, some xtals fitted, £75. Kenwood Trio TR7625 perfect comp with RM76, m-mount, £130 ono. G8NVT QTHR. Tel Ottery St Mary 2361 after 7pm.

Datong D70 morse tutor, £40. Darkroom clearance, incl Rollie 6 x 7 colour enlarger, Nikon 2·8 lens, Philips 3 digit timer, micro focus finder, zoom slide copier, plus numerous other photographic equipment, £350 to clear or w.h.y? Roy, G1NCY. Tel Oxford 880997.

Granger 174 ssb tx/rx 50 WPEP, 2-18MHz, models 175/176 incomplete, all three, £45. OS240 2-ch 10MHz 'scope, gd cond, manual, £40. EC10 rx, exc cond, 's' meter o/p, £65. All ono. Buyer collects. Geoff, tel Wokingham 788515 evenings.

FT290R, case, nicads, charger, Mutek f/end mobile mount, exc cond, £285. Green. Tel Alderton 639.

Telex Hy-Gain TH5DX Thunderbird 5-el beam, vgc, lack of space forces sale. Reasonable offers please. G4WXD, QTHR. Tel 0823 442512.

Trio R2000 hf tx, mint cond, as new, cost £480, accept £360. May exch for Yaesu FT7B, must be mint. Cash adjustment. *Wanted* Yaesu FT690R for 6m. Tel Irvine 217611.

TW4000 dual band mobile rig, £425 ono. FT208R complete with NC9C charger and all accessories, £175. G6JNS, QTHR. Tel 0905 620041 evenings or weekends up to midnight.

Microwave Modules linear 2m amp, 144/100ls 1W or 3W i/p, 100W o/p, brand new, still boxed, never been used due to cancelled project, £145, saving £25 on new. G6EXN, QTHR. Tel 01-529 3969.

HF5 antenna with 5R radial kit, £50, used one winter only. Trio 9R59DS rx, fine cond, with handbook, £35. G4TTY, QTHR. Tel 0342 714825.

FDK700E 2m fm tx/rx 1-25W variable, ideal mobile rig, complete with accessories, £130 ono. Icom IC202 ssb/cw, 144-144·4MHz, 3W o/p, excellent, £85 ono. ZX81 plus 16k ram, instruction book, boxed, excellent, £30. Ray, G8VPV, QTHR. Tel Sheffield 848310.

Rack 19in closed sides and top, 37in of panel space with three runners ea side, hammer light grey finish, clean cond, £15. Buyer collects. G8BIH. Tel 0420 82739 evenings.

Dragon 32 home computer, vgc with joysticks and some games software, £130 ono. Buyer collects. Tim, G1FNO, not QTHR. Tel 021-643 8798 (Edgbaston) after 6pm.

Heath SB102, £155. SB610, £35. TCS12 tx/rx, £65. T1154/55 ac psu, £25. HRO, £45. R1155N, BC348, BC342, CR100 unmodified, offers. Other WW2 items sae list. *Wanted* 118M/AD9 + rx, marine vhf, T11/54, circuits for Storno 500. G3DVF, QTHR. Tel 0665 602487.

Philips tv wobbulator to 880MHz, accessories, £40. Advance Q meter C & L, £20. Comark electronic test meter with low-ohms unit, £10. CSE 180m 12V a.m. transistor tx and rx, mic, ant, £15. All above with handbooks. Codar preselector, £5. Elliot ac test set V A Watts carrying case, instructions, £10. Hustler mobile ant complete 80 to 10, £15. All plus carriage. G3PVT, QTHR. Tel 021-747 2329.

Yaesu FT980 tx/rx, £1,100. Matching Yaesu SP980 spkr, £50. Yaesu FC757 auto atu, £225. All items boxed as new and immac cond with guarantee. Various other shack clearance items also for sale. G4XVH, QTHR. Tel 01-527 3293.

Bearcat 200FB scanning vhf/uhf tx/rx, as new, £125. CBM3032 upgraded 4032 disc drive rtty amtor, 100-plus programs, £550. Seikosha GP100A, £110. G3VGO, QTHR.

Tube 3BP1 and screen, £10. Akai 4000DS stereo recorder, used little, heads in gd order, £75 or exch test gear. *Wanted* VV meter with cal attenuator. Stan, 91 High Street, Long Buckby, Northampton NN6 7RE.Tel 0327-842 373.

Oscilloscope Tektronix 545A 30MHz dual trace with ca plug-in, £50. 2m fm handheld Kenproducts 6-ch S20, S22, R2, R5, R6 and R7 with nicads, has tx fault, £25. G4RSY, QTHR. Tel 01-651 0633.

Swap Trio 9130 exc cond and 8A psu for TS520S or SE plus atu (must be in vgwo) or w.h.y? Also Trio 7800 vgc for multi 700EX plus frequency counter or w.h.y? G6INM, QTHR. Tel Stoke-on-Trent 335341.

Trio TS120V, 5 band QRP hf rig, unmarked, no mods, £275. Welz SP15m swr/pwr meter 1·8-150MHz, £30. MCP40 4-colour printer/plotter, 40/80 character print, 4·25in roll, centronics interface, £75. Pentax MV1 (black) 50mm F2 lens, soft case, £60 ono. G0AAV, QTHR. Tel 0942 729202.

Yaesu FC757 automatic antenna tuner, mint cond, £225 or nearest. Exc 10m multimode tx/rx and 10m linear. *Wanted:* Gd 2m multimode for cash or exch deal. Arthur, G4VIO, QTHR. Tel 0388 763501.

FT101E with spare valves, gd cond, £350. Buyer collects. Datong D70 morse tutor exc cond, £40. *Wanted* loan of R1000 manual. G4UWS, QTHR. Tel Bristol 772550.

RTTY 7E printer in exc cond 7P/N3 preperf 2f reader, £25 ono. G4CIM, QTHR. Tel 01-304 8975.

30ft Ultimast, £95. G3LIV rtty interface (BBC micro), £55. Unassembled MET 144-6X antenna, £20. Packer vhf wavemeter, £12. Part-built RX-80 rx, £40, ex-RS UR67. Lengths of hard-drawn alloy tubing £1 per ft. ICE supertester meter, £20. Steve. Tel 0903 65287.

2m fm standard 8600 12-ch, xtal, gd order, fine talk box, £50. IC260E 2m multimode with manual, gd cond, £240. G4UPJ, QTHR. Tel Whitstable 274947.

Marconi vhf signal generator 801D/8S 10-480MHz, mint cond, £75 ono. G4AKL, QTHR. Tel 0327-857 350.

FT290R listen on i/p 144-148MHz nicads, case, mains charger, rubber helical, mobile mount, £230 ono. Must go this month. Datong gen coverage converter PC1, converts 2m rig 0-30MHz gd results. Andy, GW1BNE, QTHR. Tel 0443 423295 or 0582 33885.

Icom 290E multimode, 10W o/p, £250. MML144/50W linear, 10W i/p, £60. KW202 rx 160-10m in 9 bands, £100. All in vgc. G1HTZ, QTHR. Tel Horsham 67908.

Trio TR2200GX 2m fm portable tx/rx, fitted R0-R7 S20-S23. Complete with nicads, charger, carrying case, helical, also modular electronics 25W 2m amp with preamp in box, orig packing, exc cond, £100. G3ZJK, not QTHR. Tel Rugby 810535.

FT290R (mutek), nicads, charger, £220. FT208R, spkr mic, charger, £150. NC8 psu/charger for FT208R, £25. Mizuho KX-2 rx atu, £15. Hansen SWR-35, SWR/power meter, £15. G6TXA, QTHR. Tel 01-785 2252.

Icom 751 hf tx/rx, used little, as new, owner going overseas. Reasonable offers please. Buyer to collect or arrange transport. John, G3LBX, The Rectory, Lorton Road, Cockermouth, Cumbria CA13 9DU. Tel 0900-823269.

Scorpian sailing dinghy 1589 14ft boat racing or pottering. Hull and gear first class cond. Sails/mast alone worth £450. Holt trailer and cover. Exch or sell for hf or 2m gear. Tel Hartlepool 870519.

13cm brass pa cavity for 7289/2C39BA valve, beautifully made, £58 ono. TEAC 55E 5¼in slim line 40/80 track disk drive, cased, £63 ono. Paul, G4XHF. Tel 0293 515201.

Antenna tuner Yaesu FC902 all band 10-160m, three switched antenna sockets and terminal for endfed wire, instruction manual and orig packing, £90. Don, G4LSB, QTHR. Tel Dean 43329 evenings.

Trio TS530S exc cond, manual, orig packing, £450 ono. G4DMG, QTHR. Tel 096-273 4408 (Hants).

Atlas 210 tx/rx slight fault, £150. L Hawkins, 17 Barkway Road, Royston, Herts.

G3LIV/G3WHO stand alone amtor/rtty interface for BBC computer, uses well known G3WHO eproms for amtor and rtty, complete with leads and manuals, £125 plus postage. G3RDG. Tel 01-455 8831.

SB102 tx/rx, little used, very superior power supply, SB640 vfo Rion mic, Azden spkr, pair new 6146s 10 new rx tubes, buyer collects, £250 ono. G3ABH, 6 Greenmead Abbey, Manor Park, Preston, Yeovil, Somerset BH21 3RJ.

KW2000B with mains psu/ls, mic and manuals, plus kw E-Zee match atu, kw match swr meter, lp filter and dummy load, £300 ono. G4OBI, tel Reading 0734 472708.

Commodore Pet 3032. 9in screen, proper keyboard and calculator pad, 3040 dual floppy with fault (will not initialize on power up). Also 1EEE/Centronix board for printer, cw documentation and other books. Offers. G3VWA, QTHR. Tel 0257 424469 evenings.

FT101 80m to 10m, incl new bands cw filter fan fitted gwo, £200, going QRP only. G4SCT, QTHR.

Icom psu IC-3PE 13·8V 3A, built in spkr and tx/rx mounting fixture, 7 months old, in makers box, £40. 3M photocopier vgc, £30. Buyer collects or pays postage. M Marsden, 205 Moss Lane, Burscough, Ormskirk, Lancs L40 4AS. Tel 0704 892088.

40ft mast rigid, two sections 17ft plus 17ft with pole, exch for morse reader or w.h.y. or £60 ono. Details G4VYZ, QTHR. Tel Terry Wakefield 370804.

Standard C7800 430-440MHz, 10W fm tx/rx, 25kHz steps, five memories ("Rolls Royce Quality Rig", says *PW*) never used, mobile, vgc, £180. Phihong PP137 7A 13·8V psu, £33. Pye PF1 pocketphones, fully operational on RB13, complete with two sets of batteries and Pye charger, £35 the lot. Microwave Modules MML144/25 144MHz linear amp, up to 3W i/p for 25W o/p, complete with built-in low noise preamp, £47. Microwave Modules MMC50/28S 50-54MHz to 28-30MHz converter,

£24 as new. Kenwood vfo – 180, vfo for TS180, list price £96, take £45. All items new, complete with manuals and boxes etc. Ned, G8GZZ, QTHR. Tel Woking 23506.

Teleprinter Creed 444, vgc, £30. TDMS5 plus 6 rack unit, £20. TSG10 and TDMS70, £30. Cable & Wireless 80/80 pu, £10. Creed auto tx 656, £5. Mufax courier fax rx type K401AM, £35. K Scott. Tel 091-252 7141.

TenTec Omni A, psu, £450. FT301SD 10W 160-10 a.m, ssb, cw filter fitted mobile bracket, £300. Sphinx tx, 160-80-20 a.m, ssb, cw, new valves, book, £55. Drake 2B rx 160-10 fab, £99. 10m 3-el minibeam, £20. G4MTG. Tel 021-430 6764.

TR2300 portable with nicads mains power pack, nicad charger and power amp. Also 12V mobile pa, used little, £130 ono. TS520S hf tx/rx with desk mic, etc, hardly used, £350 ono. G4HJP, QTHR. Tel Southampton 893229.

Hansen peak reading watt meter, model FS601MH, £54. Western antenna safety switch, four i/p, one o/p plus ground, £11. Cliff, G4NHG, 6 Charsley Place, Blurton, Stoke-on-Trent. Tel 0782 310427.

AR88D, vgc, s-meter, tools, several manuals, very large box, spare valves, mostly new, various other spares and reprints for AR88, £75 the lot. 19in console, enclosed, 23in high ex-computer, £10. G4IXY. Tel St Albans 39908.

Yaesu FT208 tx/rx, with NC8 psu/charger, spkr, mic and 0·25 wave telescopic antenna. all in exc cond, an outstanding rig, £180. GM4CUX. Tel 031-332 5300.

FT290R, nicads, mobile mount, Mutek front end, psu/stand, spkr, mic plus MM30LS, Tonna 9-el portable and mast, £300. Eddystone 770R 19-165MHz rx, £60. Teletype RS232, £40. Solartron double-beam CRO, £60. *Wanted* IC2E, TR2500, etc. Dave. Tel Windsor 63577.

Icom 701 6 band tx/rx matching psu, desk mic, all leads, manuals, £395. Prefer buyer test and collect. G3MCA. Tel Orpington 56497.

Tandy TRS-80 MOD-1 level-2, 48k, upper/lower case, twin 40-track tandon drives, two cassette recorders, 80 *Micro* magazines, all manuals and lots of software incl basic instruction course, assembler/editor, sublogic flight simulator, games, £300. G3OPJ, QTHR. Tel 024026 2718.

Trio model 9R59, rx, side bands, as new, £50 ono. Grundig model TS945, stereo reel to reel tape, as new, £60 ono. G1GFA, QTHR. Tel Birmingham 353 9381.

MMT 144/432R, vgc, £100. B2 8-el Yagi, unused, £8. B3 11-el Yagi, vgc, £8. TV/DX masthead (Labgear) preamps 26L6, unused, (boxed), £12. 15L6, £5. Both uhf group 'B' psu, £5. George, G6GGE, tel 01-747 1506.

FT707 tx/rx, eight bands ssb, cw, a.m. plus 100W fm. FC707 atu, FU707 dm memory bank, FP707 psu. All mint cond and boxed, £595, may split. G0BEE, QTHR. Tel 01-958 6400.

Icom ICO2E handheld, charger plus spare BP3 battery pack, hand mic/spkr, box and manual as new, £200. Kenwood AT230 atu, as new, £100. Adrian G4NOV, QTHR. Tel Congleton 272270 evenings or weekends.

FDK multi 750E and expander 430, all mode 2m and 70cm, scan mic, leads boxed, gd cond, £350 ono or offer for expander. G6MMA, QTHR. Tel 061-748 5596.

Yaesu FT902DM hf tx/rx and FC902 antenna tuner, as new, boxed, never transmitted, £750. Tim, G6MWB. Tel Orpington 36472 evenings, 74051 days.

Full set of wkg *ham radio today* Omega tx/rx modules (less QRO PA), assembled in WPO case plus all controls, meter etc, just needs final wiring finished, £450 ono. Will separate if necessary. For more details tel 051-260 0058.

R1155 excellent, modified, £30. B41VLF rx 15kHz-700kHz, £35. KW Vanguard hf transmitter, £30. Hundreds of old valves cheap, manuals, rare equipment. Would swap above for British motorcycle. *Wanted* Hardware bits pieces for exwd equipment. Jim, G4XWD. Tel Kidderminster 3674.

Yaesu FT901DM hf tx/rx, fm, voice processor, lambic keyer, memories vox, mint, boxed. Kenwood AT200 antenna tuner, Kenwood MT50 dynamic mic, £850. G4ZPA, QTHR. Tel Cosham 370576.

FT290R with nicads, charger, Mutek front end, vgc, £280. MMB11, £10. MMT 70/144 transverter, vgc, £80. Labgear LG50 tx, £10. Buyer collects. GW4BZI, QTHR. Tel 0244 675794.

Icom 290E multimode tx/rx HM10 scan mic, SM5 desk mic, 9-el Tonna, vgwo, £290; or swap FT101E, FT707s, FT77s or similar. W.H.Y? New G0. Prefer London area please, buyer collects. G1DQE, QTHR. Tel 200 3825 (NW London).

Yaesu FT726R 2m fitted, used little hence reason for sale, as new, £595. G1CQA, QTHR. Tel Cambs 892677.

Antenna clearance 70cm Jaybeam MBM48, £30. SMC mobile 3 × 5/8, £12.50. 2m 8-el Yagi, £10. 2 × 5/8 colinear, £10. SMC mobile 7/8 boxed, £12.50. Bantex 0·5 wave and mount, £6.50. Wood & Douglas 2m linear and preamp 25W, suit 290R, £32.50. G1GQL, QTHR. Tel 0425 54946.

TS120V 80-10m digital 500Hz cw filter, 25W pep, vgc, £290. Monitor Philips 12in green hi-res mint, £60. Spectrum rtty tx/rx tu board, £12. Morse reader, £4. Monitor lead, £4. Interactive programming course; MM152B attenuator 70cm pfi's tx/rx cw RBQ xtals. G4ABF. Tel Malvern 66202 after 7pm.

KW202 rx, gwo, £80. G4FVR, QTHR. Tel 0723 374539.

Yaesu FT290R, used little and in mint cond, boxed with case, nicads, charger, 7/8 mobile whip, gutter mount and unused 5-el 2m beam, complete stn, £285. G4MXS, QTHR. Tel Leconfield 50622 evenings.

K2RIW 70cm plus psu, £550 ono. KR500 elevator, £85. 63m LDF4-50 brand new, ends still sealed, £180. Nine male connectors for that coaxial, brand new, £12 ea. Four 19-el Tonna 70cm with thick walled tube for stacking, £65 the lot. Tonna 4-way 70cm power splitter, new, £25. 16-el Tonna 2m, £18. Adonis Icom mic plug/amp converter AP-1, brand new, £9. Kungsimport 70cm 4-way antenna combiner, £15. Buyers collect all items. Ken, G8GEA not QTHR. Tel 0342 311475 after 6pm.

KW Viceroy III, £60. National NC183D rx, £60, or both £100. Complete with manuals. G3ZOP, QTHR. Tel Hinckley 632778.

Racal RA17 professional communications rx 0·5-30·0MHz. vgc, with manual, £145. G8JDE, QTHR. Tel Sambrook 375.

CPU2500R 2m fm tx/rx 25 and 10W o/p, memories, scanning keypad, mic etc, £150 ono. Jaybeam 11-el parabeam, £15 ono. Tim. Tel Cheltenham 576411.

2m ant farm, 5/8 base stn vert and 4-el Yagi, 2-way switch and rotator, all as new (loft use only), cost £100, a snip at £50. MMT144/28R 25W high intercept transverter and Welz psu, £200. Buyers collect. G3NWG, QTHR. Tel 0245 83520 evenings.

Old boxed valves, old radio books incl amateur handbook 2nd edit and supplement. Old wirelesses (one vintage) Avo vintage, sig gen, panel meters incl 12A rf, various chassis and loads bits and pieces. One buyer preferred. Tel 08277 2348.

Trio TS780 dual band multimode 2m/70cm as new, spkr, £695. Yaesu FT2700RH new dualband fm 25W speech synth, cost £580 accept £425. Standard C78 70cm synthesised with matching 10W pa, £190. Philips video tapes NV1500/1700 used once, 400 at £2 ea. Tel 01-998 4936 after 7.30pm.

Tuning dial for Mohican rx, £2. Coil pack for command rx 3-6MHz, 6-9·1MHz, £2 ea. Also o/p transformer. PA air spaced 0·25in dia copper tube, 4·25in long, 3·5 dia, £3. Circuit valves for PCR3 rx, £2. TR1986 modulator for fm-izing, details, £4. Balloon neoprene USA 1945 MFGR, £4. Cable, 3/8 dia, pvc 18 strand 22G (3 screened) coded, may suit antenna rotator, £5. S meter, vertical for Mosley CM1-RX, £3. G3MBL, 32 Heldhall Road, Bury St Edmunds, Suffolk. Tel 60984

Rotator with control box and 60ft 3 core flat cable, very little used, gd cond, £50 lot. Buyer collects or pays postage. G2AIQ. Tel 0454 774979.

Trio TS350S mint, only occasional use, orig packing, £475. Set of new 6146W pa valves plus 12BY7A driver, £20 if bought with TS350S. Note 6146W superior to 6146B. G2ATK, QTHR. Tel Pershore 553735.

Altai lightweight antenna rotator AR200XL with control unused in box, suit 2m antenna, £30. Buyer collects. G4LHK, QTHR. Tel Cheadle 757225.

FRG7 exc cond, no mods, £99. Datong morse tutor, £35. Koyo KTR1770 mains/battery, 11 band portable rx lw to 170MHz, £40. Grundig 860 battery radio, four bands, £15. G8PWL, QTHR. Tel 0202 730599.

Yaesu FT200, FP200, all 10m, xtals fitted, hand book, vgc, £175 ono. G3ZNK, QTHR. Tel Leeds 504599.

Digital voltmeter, Solartron LM1620, wkg, with handbook, £15. 24V 500VA transformer, £15. Buyer collects. G1EHF, QTHR. Tel Ashford 51622.

FTV901R and 144MHz unit, at present wired for FT-One, but works with any hf rig, £165. Sanyo MBC555 computer, no software, offers. Linear amp, SL250DX 10-80MHz, £75. G0AOE, QTHR. Tel 0783 283822.

Welz atu AC38m 200W, £50 ono. G6KBS, QTHR. Tel Baldock 892831.

Telomast 30ft with rigging kit and baseplate, £35. Vinten mobile fm radiophone, 2m valve type, large, 25W rf o/p, £25. Buyer to see and collect. *Rad Com* 1969 to 1984, offers. G8EJR, QTHR. Tel 0751 74947.

Sommerkamp FR100B FL200B vgc, exc stn for beginner, also QM70 high power 2m transverter wired in and Osker swr power meter, £200 ono. GW4VRV QTHR. Tel Porthcawl 771746 anytime.

Ex-wd WS52 813 tx, £45. German Lorenz E52B, £75. R3683 vhf, £10. WS78, £10. R109, £30. Hallicrafters S27, £50. Hundreds assorted valves, cheap. Swap above for British motorcycle or engineering lathe. W.H.Y. other radio gear? Jim, G4XWD. Tel Kidderminster 3674.

QTH 2 bedroom modern house, exc vhf/uhf site, 40ft Versatower with planning permission, £23,500. Tower only £250. Nascom 2 microcomputer 32K ram 'A', cased, assorted rom and tape software, £150. G8CHK, QTHR. Tel Pattishall 830788.

Realistic 160 dx gen cov and hf rx, vgc, upgraded and used often with QRP tx, £50. GW4YJT. Tel Deeside 811687.

Trio R600 gen cov rx almost new, property silent swl, £200. S & J Mk2 atu, £27. Buyer collects or carriage extra. Tel 0362 2790.

Atari 600XL 16k computer with 1010 recorder, new unused. Atari books, £65 ono. XFMR 395-0-395 300ma, £5. Woden swinging choke 5/25HY 350ma, £4. Valves 6CH6 832A, £1 ea. Postage pse. G3AGF, QTHR. Tel 0242 820595.

FT790R multimode uhf tx/rx with 3 sets of nicads and case, rarely used, as new, £200. Bird elements: 5C, 10C, 25C, 500C, 1000C, 5E, 10E, 250D, 50H, 250H, £25 ea. 110-1 (1W 2m), £35. G8WRB QTHR.

Repeat advert through time wasters for top rx TUR1300, £90. TUD100 mod, £12. Two CR23 JB antennas, £35 pr. One 17in b/w monitor, £20. Carriage extra. G2JR, QTHR. Tel Coventry 455021.

Microdot II rtty cw terminal unit as new, will consider part exch with cash adjustment for Drake R7 rx or Trio TS130V, equipment must be in pristine cond. Stuart, G4OOK, QTHR. Tel 0642 211685.

BBC B with Watford DFS, Commstar Rom, £275. Antennas, met, two 2m 6-el crossed plus 4-way power splitter, two 70cm 17-el crossed plus 4-way power splitter, all unused, £125. G1MLR. Tel 01-660 8371.

***Secrets** of ham radio dxing*, £4. Communications rx Marconi Atalanta, superb cond, professional quality, £75. TVI filter, £2. Jaybeam colinear 2m, £33. *"World at their fingertips*, £4. QQV03-10 valves, £1. Tel 0376 84478 evenings.

Ten fm rigs DNT M40 fm modified 29·310 to 29·700MHz, brand new tested, £40 ea, post paid. Kenwood TR8400 70cm fm tx, mint cond, £185 ono. JWR 10fm rig, £35. G4SNO not QTHR. Tel 0562 710817 evenings or weekends.

FT209RH, soft case, spkr mic, NC15 quick charger, mobile mount, PA3 dc adapter, 5/8 whip, £275. FT730R, preamp, £160. GPV7 3 × 5/8 colinear, £25. Katsumi 1024 memory keyer, £40. CM9508 rotator, £45. FU200 rotator, £30. G4OBS not QTHR. Tel Farley 752.

Westower 42ft free standing tower, telescopic and tiltover, framed base plate type, £250. Buyer arranges collection. G6KVI. Tel 0621 815054.

BBC B computer with rtty eprom, G3LIV terminal unit, tape deck, softwear lit etc, £250 or exch hf gear w.h.y? Requires mint AR88D, R1155, TCS12 tx/rx. G4MYU, QTHR. Tel Nelson 697405.

Airmec 210 mod/dev meter, £18. CT212 rf sig gen, £35 ono. Scopes for spares, £5-£10. AVO Mk3 valve tester, £35. Marconi wave analyser, £19. Advance J1 AF gen, £19. AVO7, £28. CT537 transistor tester, £20 ono. Taylor/AEI transistor testers, £20/£10. Various meters Marconi 868 bridge, £30. Aerlite headset boom mic, £6. Pye r/t tester, £6. IF gen, no xtals, £5. UHF gen, £15. AVO8, £50. PO type multimeter, £6.50. Vintage bench mA/volt meters, £5. Manuals, £1-£5. Ministry CT318 insulation tester, £10. Ex equip psu 12V, £3.50. Bag of unused components £5. AVO 40/47 in case with shunts, £35 ono. G4YVJ, QTHR. Tel Brighton 416963.

Drake R7A rx 0-30MHz, fitted 0·5, 2·3, 4·0kHz, filters for cw, ssb, a.m. Best offer over £500. Tel 01-876 2070.

Tonna 70cm 19-el and 2m 9-el with pole rotator and wall brackets, as new with no corrosion. Feeder cables incl, £40. G4FDR. Tel Wendover 622225.

R2000 gen cov rx, as new cond, orig box, manual etc, used little, £300. FRT7700 atu, £30. G6WOH. Tel 029-384 542.

Eddystone 888 rx with S meter, instruction manual, recently re-valved and in gwo, £50 ono. Tel Worcester 820822.
Racal RA17 with handbook, £150. Pye hi-band fm bantams with circuit/alignment data, mic, battery trays, £25. Hi-band AM10B, £10. Heath GR110 scanning rx 144-146MHz, £25. Avo "Acweeco" VVM (no probe), £15. TS323/UR, £45. Carriage extra. G3MOE, QTHR. Tel 524217.
Yaesu FRG7700 all mode communications rx 150kHz-30MHz with dc conversion, hardly used, manual, £250. QM70 linear 2m all mode power amp, max o/p 50W, dc powered with preamp, £25 ono. G8JBK, QTHR. Tel Colchester 241032.
Belcom liner 2 with accessories, £85 ono. G8FMH, QTHR. Tel Basingstoke 23979.
Icom ICR70 rx mint cond with manual and packing, fm unit not fitted, £375 ono. Webb. Tel Felixstowe 273286 evenings around 7pm.
Vibroplex key. Much sought after "Blue Racer" model, serial number 212687, as new, £40. G3JBR, QTHR. Tel 0723 377296.
Morse tutor Datong D70, £32 incl battery and postage. Neville. Tel 0926 22754.
Yaesu FT980, brand new still under guarantee, complete with scanner, mic and options. This superb rig, only £1,095. Yaesu 2kW power meter only £45. Genuine reason for sale. Chas, tel 01-346 8597.
Icom 701, PS and SM2, mic and ICF1 cooling fan (for rtty), all solid state, twin VFOs, 100W o/p, ideal first hf rig, in mint cond, boxed, £525. MM4000 rtty tx/rx and keyboard, 45/50/75 baud plus 110/150/300 ASCII. Four memories and auto CQ, RY, QBF etc, £150. David, G4JLU, QTHR. Tel 01-954 9180.
FT757GX, £550. Consider part exch. Swan Astro 150, £250. PSUs FP707, £95, FP107, £85. Pair 6SJ6s, £10. Eddystone 730/4, £85. FT7, £195. Other items wattmeter, cameras, recorders, hi-fi, rf transistors. *Wanted urgently:* Duff Atlas or parts for spares. G3MXO. Tel 021-788 0518.
FT-One fitted with fm unit ram board electronic keyer unit, a.m. filter cw(m) filter, first class cond, £1500. FC901 atu, £85. KW107 atu, £85. SEM Ezitune, £20. G4BLB, QTHR. Tel Deal 373538.
TR7930 25W fm mobile, immac cond, still under guarantee, never used mobile, boxed and as new, £250 ono. Buyer inspects and collects, G6TBD, QTHR. Tel 0206 230662 evenings.
2m QRO DK10F 4CX250B amp. Complete rf section, base, valve, metering etc, requires suitable psu to give 350W cw o/p. 4 × 23-el antennas for 23cm plus stacking frame and power splitter, gd cond, £80 ono. G4NRG, QTHR. Tel 0277 810831.
Trio 2300 2m/fm portable complete, £110. Microwave Modules MML144/30-LS linear, £60. Phihong psu (13·8V/7A), £40. Datong morse tutor, £42. Uher 4000 report IC portable tape recorder, £150. All as new cond. Tel 0565 54650 evenings and weekends.
Yaesu FT101B 160m to 10m tx/rx in orig box complete with mic, fan, manual, leads etc as supplied plus spare pair pa's. Exc cond, £350. Matching spkr, £10. Buyer collects or arranges carriage. GM4GIF not QTHR. Tel Helensburgh 78646.
Absolute bargain! Yaesu FT77 never used, purchased new November 1984, £350. Tel 0656 61868 evenings.
Yaesu FT101ZD Mk2, FV901DM, both mint, boxed, £550 ono G4YSU, QTHR. Tel Preston 600239.
Thandar test equipment. TG102 function generator, £60. TM353 LCD multimeter, £50. TH301 digital thermometer £40. TF040 frequency meter, £50. Datron scope, faulty psu, £30. Sony colour camera 2010P optical viewfinder, £165. FT480R all mode tx/rx, as new, £330. G6PNS, QTHR. Tel 0462 811566.
Trio TS510 tx/rx plus PS510 psu, £190. Z-match atu, £10. Bremi BRL 200 linear, £40. HRO with psu, plus all coils, £60. Collectors items HRO MX with 697 new psu, valves, coils, manual, £120. *Wanted* Yaesu FT301 reviews. Tel St Albans 39333.
Icom IC251E 2m tx/rx, exc cond, handbook, orig packing, £385. 4-el Tonna 2m antenna, £7. 7/8 wave mobile, £8. G8SGF, not QTHR. Tel Cambridge 350554/841449.
FT200 type hf tx/rx, £200. 144MHz ssb tx/rx Mizuho SB2M, £80. Large 4-berth frame tent, as new, £200 ono. G4PYI, QTHR. Tel Burton-on-Trent 65761 after 6pm.
Trio TS130V 25W hf tx/rx fitted cw and ssb, narrow filters. DFC230 digital frequency control unit, £375 complete. Will not split. G4AQK not QTHR. Tel Swindon 613773 after 6pm.
IC700 hf tx/rx, five bands, £175 ono. Generator 24V dc 20A, £75. G4TUY not QTHR. Tel Newark 830003.
Yaesu 2m 25W mobile model cpu 2500R, vgc, box and manual, keypad mic modified for 25kHz channels, £140 or consider exch 70cm portable. Robert, G6PSQ, QTHR. Tel 01-263 0325.
Clearout equipment of the late G8VLX. Icom IC2E, £100. Datong morse generator D70, £30. Tandy 50MHz frequency counter, £20. Honda E300 petrol generator 250W mains, offers??? Jackson C804 75pF, 10pF capacitors £1 ea. G6IEH, QTHR. Tel Reading 26272.
Admiralty 62B comms rx, vgc, £50. HRO mx ten coils £55. Lafayette HA-600 0·15-30MHz, £25. Ferrograph series seven stereo tape recorder, £125. Realistic DX400, £85. Wireless set 62, £50. *Wanted* Info on CR300/2 Brenell MKVI recorder. Tel Basingstoke 56732.
FTV901R with 6m, 4m, 2m, 70cm modules, unused and brand new except 70cm which is little used but mint cond, £500. Prefer buyer to collect and inspect. G3VVU, QTHR. Tel 0602 783685.
Lar Omni match antenna tuning unit for receiving only, £29. Welz AC35M transmitting antenna tuning unit for power up to 200W, £32. Wood, tel Clochan 378.
Silent key sale. TS700G, FT77 and psu, R600rx, KWE-ZEE match, Venus SS2 monitor, multi 700EX Oscar SWR200, Reace and Amtron bridges, Drae ant sw Jaybeam ZM 10-el, Hirschmann rotator G5RV antenna. Major items boxed with manuals, first reasonable offer secures. Malcolm, G4DVE. Tel 0384 50539 (W. Mids).
FT7 used holidays, £240. HB tuner Johnson 1kW capacitors, £30. Set Q5ER transformers, £3. 813, 829B, 832A, QQVO3-20A, QQVO6-40A, 7360, £5. Marconi sig gen 70kHz, 70MHz, £15. Tulip mic, £5, 2m linear QQVO6-40A uncompleted, £7. *Wanted* FC707. GW3EJR, QTHR. Tel 0239 612331.
Sell or swap for FT101ZD, FT102, BBC model B plus ddfs and 3·5in disc drive incl dfs and roms, also TS120V, excellent. *Wanted* FT208 atu and swr bridge. Creed 444 and manual, £10. G4ZFI, QTHR as G4SFI. Tel Telford 616611 after 6pm.
Icom IC-2KL linear, solid state, incl separate psu, fully auto Icom tx/rx. No tune-up other makes. List £1,530, nearly £500 off off at £1,050. Mint cond. Delivery possible. G4CHP, QTHR. Tel 0508 470365.
Zetagi 25A psu, twin meters variable 8V-16V, current foldback, boxed, £75. Zetagi solid state linear amp 3-30MHz, 6 position power switch, 20W i/p, 200W o/p. 25dB preamp, £75 or exch Racal manpack. G3XKF, QTHR. Tel Stoke Mandeville 2672.
FT101ZD, fan, mic, dummy load, manual, £425 ono. Buyer inspects and collects. N Hewett, G8XMQ, QTHR. 49 Harrow Way, Carpenders Park, Watford, Herts WO1 5EH. Letters only.
KW2000E first class cond, checked and calibrated by KW this year, includes psu, £250. Tel 051-327 3991.
Drake R4B rx 160-10, vgc, incl warc bands, and manual, £170 ono. Drake T4XB tx plus AC4 psu 160-10 incl warc bands, manual and spare pa valves, vgc, £180 ono. Tel Leeds 659227.
Yaesu FT480R 2m multimode, mic and bracket. Yaesu FP80A psu. Welz SP45M vhf/uhf swr meter. Adonis AM303 desk preamp mic, all boxed, immac cond, £375 the lot. Jaybeam 10XY 2M, boxed, unused, £25. Carriage extra, can deliver locally. G4WBT QTHR.
Datong D70 morse tutor, £40 ono. Ken, G8SVY. Tel Horsham 52023.
Icom IC271E 2m 25W multimode with Mutek front end, £550. Icom IC471H 70cm 75W multimode, £780. BNOS 25A psu, £80. Kenpro KR600 RC rotator, £85. Kenpro KR500 elevation rotator, £95. 10XY, 12XY, £25 ea. Approx 2 × 22m H100, £10. 2 × 3m lengths non-metallic tube, £10 ea. Hansen FS7 2m/70cm swr power meter, gutter mount cable and 7/8 mobile antenna, £15. 1985 USA and foreign callbooks, £15. Tel Stoke-on-Trent 328561.
FT208R Yaesu 2m handheld, keyboard entry, toneburst, repeater shift, 10 memories, scanning clear/busy, used little, boxed with manual, plus two nicad packs with charger and turnstile antenna with harness, £155 no offers. G3HTB, QTHR. Tel Leeds 671789.
Heath psu 0-400V 100mA, reg less than 1% load off/on, ripple less 10mV 0-100V neg 1mA 6·3/12·6AC 4/2A, twin meters, last priced £175, offered at £65. Heath HD1410 elec keyer twin paddle, perfect, £25. Sharp cassette recorder, steel grey, auto stop, 600Ω i/p HI-Z o/p, all leads, hardly used, with cassette £20. KW G-line cabinet unused, 1968 project abandoned, orig packing, suitable 2000/600 or homebrew, £20 virtually new. G3RHM. QTHR. Tel 01-423 0306.
Magnum two transverter 28 to 144MHz, 100W o/p, exc cond, two spare QQVO640A, two QQVO3·10 valves, £60. G3OPL, QTHR. Tel 0843 597916 after 6.30pm.
Trio TS520S, £325. Racal R1217 with manuals and cabinet, £315. Scarab MPTO-1, £40. AEC swr-50A, £6. *Wanted* Collins mechanical filters, 455 J-05 and 455 J-60. G4EXQ, QTHR. Tel 0278 788633.
Yaesu FT726 2m 70cm and satellite modules fitted, only 20 hours use from new, complete with 70cm 48-el MBM beam pole and brackets. Save £400, only £930. Tel 0482 802706.
MMT 1296/144 transverter, £140 plus carriage. FRG7000 rx in vgc, £130. W Stirling, GM4DGT, QTHR. Tel 0259 217385.
FT707, FP707 9 band, 100W "bomb-proof", £425. FT708 70cm fm handheld, spkr/mic, charger, £165. FDK multi 700E 2m fm 1-25W, mobile mount, £125. All boxed, handbook and immac. Delivery arranged free of charge. Steve, G4WXC, QTHR. Tel Grantham 77708 anytime.
FTV901R transverter 2m and 70cm fitted, mint cond, £295 ono. Icom 2E spkr, mic and base charger, £150, will split. Icom 240 mount box etc, £125 ono, will part exch for FT290R. G4VZZ not QTHR. Tel Ashford 54691.
FT107M and FP107E psu/spkr and YM34 desk mic, all in mint cond, £350. FTV107R fitted 2m, hardly used, £80. All in orig cartons. G30JM, QTHR. Tel 0482 216611.
45ft tower 3 section, as new wall fitting, seen wkg, £290. Met 2m 14-el, £24. Selling due to moving QTH, cost £450. Icom IC271 2m base, mint cond with preamp, £550. G1DCS, QTHR. Tel 01-540 3959.
TH6DXX tribander, gd cond, medium heavy rotator, 40ft fixed tower lattice with rotator bearing good quality winch, £425 the lot. No splitting, buyer collects. Would swap for 40ft wind up tower, must lower to 7m. Tel Bedford 711961.
Yaesu FT790R, as new, nicads, charger, case, manual, boxed. Wood and Douglas 70cm linear 1W i/p, 10W o/p, £300 the two. G1EMW. Tel Stoke Ferry 500656.
60ft tower tiltover versatower with winches, masthead and all parts in gd galvanized cond. John, G4TPU, QTHR. Tel Fakenham 700405.
IC701 ssb/fm/cw 2m 10W o/p rig, gd cond, £140. G4AXD, obo Maidstone YMCA ARS. Tel 0622 29462.
4-el Yagi 4-band antenna 10, 15, 20, 40m. 2kW power handling, virtually brand new, only in use 6 months, neighbours object to 40m element overhang, £200. Ian, G4GWB, QTHR. Tel Morpeth 790090.
Icom IC201 multimode 2m base tx/rx 10W, £180 ono. *Wanted* Icom RM2 controller for IC701. Also circuit diagrams for Dymar 885, 971, 830 some spares w.h.y.? also required. Tel Watford 24752.
BC348 rx with built-in mains supply, £25. TC5 rx with psu and spkr, £25. AT5 tx with codar mains psu, £30. G4FUY, QTHR. Tel Reading 733633.
2m tx/rx and hf rx, IC240 80-ch 2m fm, £115 ono. IC22 13-ch 2m fm, £105 ono. Both 10W and work very well. Eddystone 940 gen. coverage 550-30mc/s, £125 ono. G6XRP. Tel Luton 423495.
Silent key. Equipment of late G80DN/G4TRJ, many items incl test gear, transverters and amps for 2m and 70cm. SAE to E Glen, G8UXG, PO Box 20, Carlisle, Cumbria.
TW4000A dual bander is still for sale due to time wasters! Complete in orig packing, £395. Peter Crosland. Tel 0905 620041 evenings, to midnight.
Sony VTR, £20. Monitor, £10. Shibaden cctv, £25. 20m mobile antenna, £15. HF vertical 10-40, £20. Trio 7800, £160. Yaesu FP707 psu (20A), £90. Write 9 Caravan Park, Rolleston, Burton on Trent, Staffs. Tel 814528.
FDK multi 700AX 25W fm mobile with mount, £150 ono. G6ZJP, QTHR. Tel Trowbridge 68165.
Computer single board RCA 1802, on board development system, Tiny Basic and EPROM programmer, psu and terminal required, usable in battery portable applications, extensive documentation and DI/O board incl, £85 ono. Mr Houghton. Tel 0232 642942 ext 368 office hours.
Standard C110E handheld 2m fm tx/rx with case, antenna, instruction manual, ear plug, mint cond, £120. Laurence Mendes. Tel 0386 49760.
Swan 350 410 vfo vox, spare valves, 204BA balun, Mosley Mustang. Best sensible offers buys. G3JEC, QTHR. Tel 04853 2378.
QRT sale. Yaesu FT225RD incl Mutek and orig front ends memory unit, 11 fixed channels, mic, £575. Kenwood TS130S 80-10 100W tx/rx, £340. PS30 20A supply, £70. Heathkit HW-8 QRP cw tx/rx, £80. Icom IC215 2m fm tx/rx, 12-ch fitted, mic, rubber duck, £80. BARTG ST5MC rtty tuning unit, new, £95. B & J boxed rtty tuning unit, £45. KW107

atu, £70. FDK U-11 70cm fm 10W tx/rx (4-ch auto scan), fitted 12-ch, £120. Datong rf clipper (manual), £40. HF5 5-band 80-10m vertical antenna, £35. HF5 radial kit, 1 damaged rod, £25. Hansen swr/pwr bridge, £30. Stolle 303 rotator, two months use, £38. Packer 2m atu, £12. Portable Tonna 9-el Yagi, new, £15. Tar 7-el ZL special, £12. New tar HB9CU kit, £3. Kenwood desk MC50 mic, £16. Yaesu desk mic, £8. PR antenna wall supports, £5. Hi-mound HK707 key, £12. 2-el tar ring quad?, 8m coaxial, both 2 months old, £15. Kenwood HS.5 headphones, £10. Dragon computer with G4BMK cartridge to run rtty, ASCII, amtor and morse transceive programs, manual, program manual, £90. Buyer to inspect and collect. G4MSB. Tel Weston-super-Mare 512698.

Tono 9000E terminal rtty, cw, ASCII, £500 ono. 12in green monitor, £75. Katzumi EK150 keyer unit, £60. All items like new and boxed. G4MCK not QTHR. Tel Royston 46621 evenings or Stevenage 317216 day.

Turner 500 expander desk mic, £25. *Wanted* FT101ZD with psu and atu, must be in gwo and reasonable price for disabled member. TB3 antenna or similar, fair price paid for gd antenna. Also SX200N required. Tel 0282 59320 between 5 and 11pm.

FRG7700 as new, orig packing, £250. Autek audio notch filter, £25. Tel 0834 3057.

RF204/u broadband 1000MHz rx, complete with rf probe, headset, ac charger, in a watertight case, late model Hi-Tec, best bug sniffer ever made, sell/trade. Need WW2 to Clansman. Tony Grogan, WA4MRR. 5 Rollingwood Drive, Taylor's SC 29687, USA.

FT901DM with warc bands, £500. FV901DM, £95. YO901 with bandscope adaptor, £125. FC901, £65. SP901P, £40. *Wanted* Dot matrix printer, Centronics parallel serial RS232C, Epson MX-80 preferred. G3AAG. Tel 0730 892143 or 893534.

Yaesu FT221R Mutek front-end, desk mic, £300. BBC micro, model B with DNFS, 100k disc drive, cassette recorder, lots of discs and cassettes, £400. G6ETA, QTHR. Tel 022779 3262 evenings (buyers collect or arrange carriage).

Yaesu FT101E hf tx/rx plus Yaesu PEP 2000W power swr meter, YD148 mic, £380. Tel Ringwood 77585 evenings.

Pye motaphone (mid band), £25. Pye Vanguard (mid), £15. Pye Europa (high fm), £70. G6ANI. Tel Southampton 555608.

Offers wanted on following items. Transformers 400V o 400V at 400mA, other 350V o 350V at 200mA, 6·3V 6A, 5V 3A. Electrolyics 5x 600μF 300V and 12x 50μF 450V. Trio 2200GX 1λ/4 whip, charger, case. Peter, G8IQO, QTHR. Tel 0323 763123.

Yaesu FT230R, case slightly scratched, otherwise perfect, £180, offers. G4FMO, QTHR. Tel 0283 840667.

Daiwa DR7600 rotator with round control, vgc, reconditioned by Lowes, £85. Hanson FS710H 3-60MHz watt meter, £35. *Wanted* AEA 144 isapole, must be in gd cond. G4CPJ, QTHR. Tel 0636 892301 anytime.

Heathkit HW101, HP23B psu seeks new owner, matched 6146Bs, fan, cw filter, rit manuals, some spare valves and extras, £250. Buyer collects or arrangement. Jack, G4EMC, QTHR. Tel 0732 843497 after 6pm weekdays.

70cm Trio TR3200 tx/rx 12-ch (10 fitted), cw, nicads, charger, carrying case etc, orig packing, exc cond, £115. Will Datapost anywhere UK, G8RFE, QTHR. Tel 0533 834542.

Complete digital comms facility. ICS AMT-2 tu, BBC-B computer with Eprom software, Sanyo DR101 recorder, mono monitor, all mint cond. For rtty, ASCII, Amtor, cw tx/rx, unused since first misplaced burst enthusiasm January, £450 ono. G4CHP, QTHR. Tel 0508 470365.

33ft galvanised steel lattice tower in three 10ft sections plus base mounting, manufactured by Francis and Lewis of Cheltenham, top section includes plate for mounting rotor. Exc cond, ready for dispatch, £150. Bill Wheeler, G3BFC, QTHR.

Yaesu FT77 tx/rx fitted fm board cw 600Hz filter, as new, 20 month SMC guarantee, £420. Buyer collects or pays carriage. Tel Crewe 582996.

FT77, FV700DM, FC707, FP707, MD1 B8, FMU77, £580 the lot. TR7950 plus extras, £250. TR2500, ST2 plus extras, £200. All sold as unused by frustrated habitual RAE entrant. Tel 0424 754919 evenings and weekends.

1945-50 surplus. Dozens tx/rx valves, transformers 5-1000W, power supplies, power resistors, potentiometers, tuning capacitors, switches, relays, insulators. New HRO gearbox. Selsyn motor. Antenna tuning unit. Nichrome wire. Tel East Meon 385.

Trio 120S, 200W hf tx/rx, cw filter, super cndx, operating and service manuals, hand mic, noise cancelling, £320. G4KWA, QTHR. Tel 01-777 9061.

Microwave Modules MM4000 microprocessor controlled rtty tx/rx complete with keyboard and manuals, mint cond, £125 ono. Peter, GJ8PVL. Tel 0534 53940 evenings.

WANTED

Wireless sets (Canadian) No.29, any items for this set particularly connecting leads etc. Suitcase sets of WW2 or post-WW2, any literature etc, any communications manuals or associated publications relating to post-1945 occupied Germany. Any suitcase type sets, instruction manuals, spares or damaged tx/rxs welcome. WS (Canadian) No. 29, particularly any connecting leads for this set. Any original ex-WD manuals, instruction books or similar. Taylor, G3UCT, 1 Harewarren Close, Wilton, Salisbury SP2 0LY. Tel Salisbury 744133.

FT680 or FT621 or similar. G3UKV, QTHR. Tel 0952 55416.

Yaesu external vfo FV102DM and Trio atu AT230, no mods to units and units must be in gd cond. G4YIX, QTHR. Tel Gloucester 67145.

One Codar PR40 preselector, battery operated, in gd cond, wkg, from £5 to £8. One outdoor antenna 7, 14, 35MHz, from £40 to £50. Wood, tel Clochan 378.

Pneumatic telescopic mast, anything in any cond considered. Scanning rx with memory channels, G6CUQ, tel 052-789 2282.

23cm transverter. Also Tonna Yagis for 23cm, incl stacking frame. Write to G6JNS, QTHR or tel 0905 620041 evenings up to 11.30pm.

Racal 1795 NRD5159/10in hd vdu mono. *Electronic designers handbook*, McGraw Hill 1957. Startrite K260 60ft heliax, reversible anchor winch. G3AAG. Tel 0730 892143 reverse charge.

Circuits ITT Starfone mobile, Pye PF70 highband a.m. handportable. *For sale* Motorola highband CD100, £65. HT220 vhf handportable with charger, £75. Pair pocket phones, boxed, £35. G8EEM, QTHR. Tel 0532 872050.

FT290R in exch for FT208R, NC8C pwr/quick charger, PA3 car adapter, YM24A spkr/mic and λ/4 whip. G6CJL, QTHR. Tel 0422 54635.

Icom IC451E-Icom IC451E-Icom IC451E, must be in vgc, ready cash awaiting right rig. I will have Yaesu FT790R in vgc, plus 20-30W linear to sell when IC451E found. Tel Medway 0634 64962.

For the wireless museum, very old radio books, magazines, catalogues, circuit diagrams, QSL cards, valves, rx, tx, morse keys, components, modern valve tester. Collection arranged. Details pse to hon curator, G3KPO, QTHR. Tel Ryde (IOW) 67665.

Information on Cossor Commando CC302 (a.m.) instruction manual. Information on conversion to 2m and to vhf from a.m. Loan or sale, can photocopy. G6BCG, QTHR.

Service manual for Creed type 444 teleprinter, £15 paid for copy in gd cond. Operating/service manuals for Collins 75A-4 tx and 32V-1/2 rx. Tony Higby, G3GQP. Tel Falmouth 74185.

Desperate of West Wickham says thanks for all replies re wavemeter. Now, manuals, scopes, Elmac, MOD4810, Scopex twin beam 4C10, Racal MA144 atu, any cond or info. RA117 cabinet or 117+ unit size. AVO valve data manual. G6XNC, QTHR. Tel 01-462 4461.

RTTY transceive program for Commodore C16 on cassette, also copy circuit diagram C16?, G6KYT, QTHR. Tel 0424 213479.

School radio club wants hf tx ssb/cw. FL50 or similar would be suitable. Some PTA cash (but not much!). Please w.h.y.? Write G4HVC, QTHR.

FL110 wideband hf amp to match Yaesu FT7 10W i/p. Homebrew or similar considered. John, G6UGU, QTHR. Tel 0302 841530.

Bird Thruline wattmeter, any reasonable price paid. John, G0AHQ, tel 0782 721395 after 5.30pm.

Yaesu FT780R or FT790R 70cm tx/rx, no mods preferred, must be in gd cond. G6POG, not QTHR. Tel 0295 3928 (early evenings).

Yaesu FT101B accessories: YO100, YC601, SP101/PB, FTV250, FTV650B, dc power cord, pair 2SB206, YD844 mic, QTR24 clock, YP150, XF30C cw filter. Also VTVM, GDO, w.h.y? John Rooney, RS87489. Tel 0224 871041 ext 307 Mon-Fri.

Headphones for 18 set DLR No 1 or 2 with 0·25 jack plug. I will pay a good price for a good wireless sender No. 76, handset/headphones and mic for a 38 set Mk3. Keith, tel 091-469 3955.

Operating manual urgently required for Cossor oscillograph, model 1049 Mk3. Any expenses reimbursed. G4YJV not QTHR. 55 Canning Street, Liverpool L8 7NN. Tel 051-709 4959.

FT720/RU uhf rf unit. Also MB2 mobile mount for TR2300 hf and vhf elements for Bird 43 wattmeter. GW3JUV. Tel 0656 3875.

2m multimode (FT290R, IC290 etc) preferably complete with any/all of psu, Mutek preamp, linear, beam, rotator, mobile antenna, desk mic. Must be in gd cond. Will collect or pay carriage. Steve, G1GPW, QTHR. Tel Orpington 21615 or 01-233 8239 office hours.

New or vgc OB2, 6CH8, 6CL6, 6DE7, 12AX7, about four 3·5MHz cw xtals. All replies answered. G3ICB, QTHR.

FL2100Z linear amp in perfect cond. G4LIH, QTHR. Tel 0642 781818.

Pye R450 or similar single channel uhf fm rx wkg on RB14 o/p (433·350MHz). G4OHB, QTHR. Tel 021-449 3530.

KW107 atu or KW107 supermatch. KW dummy load required, gd price paid, collection details can be arranged. Items needed for worthy cause. Jack, G0BLF. Tel 01-644 6075.

Does anyone keep a collection of modification articles for FT101 series to copy and return? All replies answered and expenses refunded. Also FT101B series service manual and rf A-meter w.h.y? Johnston, GW4BCB, QTHR. Tel 0222 842406.

Gen cov rx's DX302 FRG etc. Also realistic scanners, can supply Tandy spares and diagrams. Info on cw, learning methods, procedure, history, keys, etc. Icom IC202 any cond. G6SSG, QTHR. Tel 0733 45731.

Manual or copy for the RME69 rx. Has anyone the DB20 preselector for the above? G3LP, QTHR. Tel 0452 34890.

YK88C and YG455C xtal filter. G4LUO, QTHR. Tel Newington 842127.

Palm 2, Palm 4 or similar commercial portables, also two lowband portables. All must be complete, no silly prices please. G8OZH, QTHR.

Power pack for HRO MX, or alternatively psu 230V 75mA with 6·3V winding total o/p 140W. R C Hogg, 238 Goring Road, Goring-by-Sea, Worthing, West Sussex BN12 4PG.

Icom IC730 fm board. Must have fitting instructions etc or full circuit diagram and construction details. David, G0AFP, QTHR. Tel 0900 826461.

Marconi valve voltmeter TF428C handbook or circuit diagram, loan, purchase or copy, expenses refunded. Also Yaesu FT200 circuit. G4VLT, QTHR.

RX type Plessey PR155 with all filters, consider also digital version or Racal RA1218 or sim. Must be in fb cond mech and elec. No mods. G4CMD not QTHR. Tel Titchfield 42365 evenings or weekends.

Murphy type 618 hf tx (AP 100333) and psu (AP 100336), also Marconi Elettra rx. G4FUY, QTHR. Tel Reading 733633.

Trio 120S or 130S and Trio 530S. *For sale* Wavemeter class D No. 2-720, G3XFB, QTHR. Tel 0902 850033.

Book *The design of active filters* by H M Berlin. Ian Millar, Los Arcos 10, La Nucia (Alicante), Spain ex 5H3AP. Please advise price plus all packing/postage costs airmail.

Ten Tec cw rig, any model considered, your price paid. Also have for exch Alhambra classical guitar model 9C with carrying case value £200, would consider Commodore CBM64 or w.h.y? G3ZYQ, QTHR. tel 01-363 3363.

National NCX5 Mk2 tx/rx. Must be in gd cond and wkg order, and have instruction book. GM4CUB. Tel 0292 262496.

VHF Communications, back issues required. Steve, G4EGY. Tel 0602 263142.

Trio BO9 system base, also Trio mic type MC60(S6). G8DQZ, not QTHR. Tel 0825 67670 evenings or weekends.

Codar AT5 tx and ac psu. Also atu for 160m to 10m. *For sale* JIL SX200N scanning rx, £195. FRG9600 all mode scanning rx 60-905MHz, mint, £400. G3IWE, QTHR. Tel 0925 601485.

QST May 1981. 73 Magazine June 1979. Buy or borrow. Expenses refunded. G4DJC. Tel Chelmsford 262728.

Mains transformer for telequipment oscilloscope. Tel Winterbourne 772222 evenings.

Monitorscope Trio SM220. Have two syncronome oak and mahogany 1 sec and 0·5 sec master clocks and some slaves (1920). Anyone interested? Leeves, G2LV, QTHR.

Trio 2m transverter TV502 with connecting cables and pin rods. G4CNB. Tel 0621 782388.

Butternut vert six band antenna, any cond, good price for right antenna. Iain, tel 0955 3960 after 6pm any evening.

SP102 or SP980 external spkr. G4SVX not QTHR. Tel 0604 715951 evenings.

Help! Yaesu YO901/P. Do you have the above that sits there week after week hardly being used? Please give me a ring, must have all paperwork and be in vgc. Name your price. Dave Isom, G0DAI. Tel 01-648 7060 daytime, 01-309 0311 evenings.
Old mics, transverse current carbon ribbon, xtal etc. Also 9in diam suspension ring on table stand, 10W 23cms linear. GW6AYM, QTHR. Tel Swansea 204146.
Scope tube Telefunken D14-220-GH18, as fitted to some Cossor scopes. GI3KYP, QTHR.
Science of Cambridge Mk14 micro, must have manual. G4BPY, QTHR. Tel 0922 413193.
Plessey module 11 for PR1551 rx, Bird Thruline equipment, gd coaxial relay, 8875 valves, bases for 4CX250B, rotator CDE type, turns counter, your disused tx/rx suitable for repair. Tel 03306 613 after 7.30pm.
Palm 4 or similar 70cm handheld, pref wkg RB10/13/14. Buy or borrow manual for Telequipment D75 'scope. Yaesu FT2F for spares, xtals. Belcom FS1007P for spares or manual for same. A D Stone, G4OJR, QTHR. Tel 01-549 1366 ext 336.
Book entitled *Vacuum Tube Amplifiers* by Valley and Wallman, Dover publications. Andy, G4HUE. Tel 01-989 0867.
Modern style 19in enclosed rack, approx 4ft high, can anyone please help? G3KVT, QTHR. Tel 0603 860452.
Samson electronic keyer, vertical hf antenna for 10 to 80 18AVT/WB or Cushcraft AV5. Tony Lord, G4KHT, QTHR. Tel 0482 852216 (home) or 0482 223141 ext 3457 (work).
FM board for FT101ZD, must be in reasonable wkg order, fair price offered. John Arthur, GJ4JVP. 13 Quennevais Park, St Brelade, Jersey. Tel 054 44673.
Hy-Gain 203A full assembly instructions to buy or photocopy. GM3YOR, QTHR.
Trio rx 9R590S with matching spkr. G4CLZ, not QTHR. Tel Barnsley 766377.
Aeronautical or avionic items for enthusiasts private collection. Absolutely any instruments, charts, aircraft parts etc considered, especially if broken, old, obsolete, unserviceable, rejected, time-expired etc! W.H.Y? Godfrey, G4GLM. 63 The Drive, Edgware, Middx HA8 8PS. Tel 01-958 5113. (No SAE required).
Voyager tx/rx, circuit handbook. Morse keyboard and/or morse plus rtty reader. Gd oscilloscope. Video or mono cctv camera. G4AYG, QTHR.
Blind radio amateur urgently requires hf rig, prefer solid state but anything easy to tune considered. Tel Rhyl 823818.
Heathkit DX40, DX60, DX100, SB401 txs. Codar AT5 tx with ac/pu. Must be in gwo. Write Richard Marris, 35 Kingswood House, Farnham Road, Slough, Berks SL2 1DA.
Eddystone 770R Mk2 circuit diagram. G8ZXC, QTHR. Tel 089272 2294.
Racal lf converter, Marconi 118m/AD97 rx, T1154 cables, plugs, ammeter, key, loop etc for 1154/55 installation. RX for naval TV5 installation plus cabinet, psu. Manuals BC342, BC348. Storno 500. Collecting WW2 gear, w.h.y? Cash or exch. G3DVF, QTHR. Tel Alnwick 602487.
Meter movement for Taylor universal meter model 85A. G3ABM, QTHR. Tel 051-355 5978.
Information on using Texas T199/4A for rtty cw RS232 etc (hardware/software), plus info on getting into the object code and expansion mods. W.H.Y? Will copy and return. R Banister, 21 Monks Drive, Withnell, Chorley PR6 8SG.
Model 8 avometer. Offers to G8NPK, QTHR. Tel 01-422 2100.
MMT28/144 transverter. Teac model 2 audio mixer. FL2100, KW1000, cond immaterial. Info on Grundig TK5 belt replacement. Coil winder (wave-winding). *For Sale* Uher Dia-pilot F423 tape/slide synchroniser. 3 speed recorders, Fidelity 4 track, Ferrograph, cheap. G3AZI, QTHR. Tel 0772 37815.
Marconi carrier deviation meter type TF791D handbook urgently required, beg, buy or borrow user/service manual, all expenses refunded. *For sale* Teleprinter handbook 2nd edition (RSGB), brand new, £9.50. D F Briggs, G8SOA, 57 Charlton Drive, Sheffield S30 4PA.

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1.5W to 10W (No Changeover)	144FM10A	29.90	22.20
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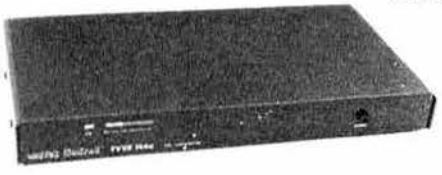

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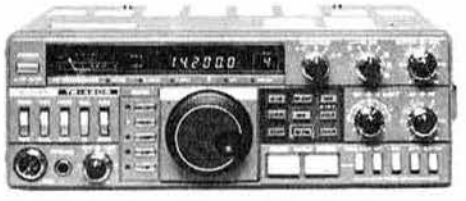

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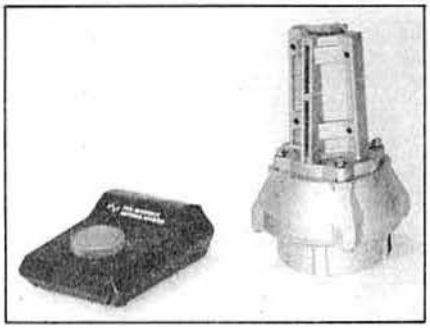

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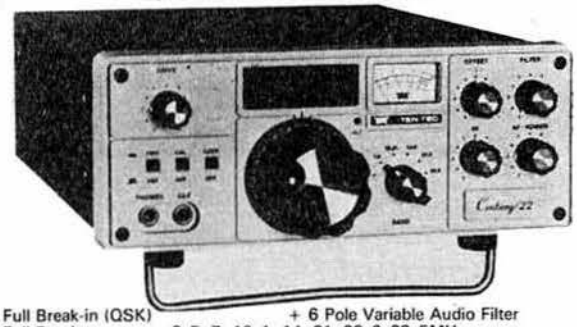

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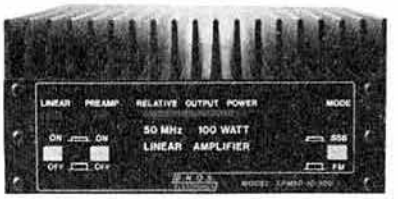

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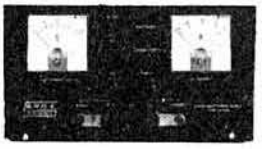

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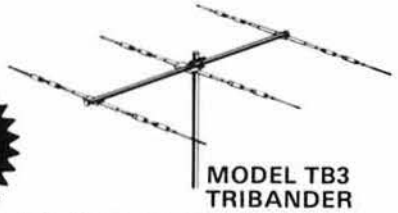

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TB1 Rotary Dipole 2kw EL. 7.7m Rad. 3.85m **£77**
TB2 2 Element Beam 2kw gain 5dbd F/B 15db **£143**
TB3 3 Element Beam 2kw gain 8dbd F/B 25db **£212**

Delivery extra at cost

These highly rugged antennas are superbly built and represent the very best in engineering. Details, booklets are available upon receipt of SAE.
Jaybeam TB2 = £143. Hygain TH2 = £279.

KILL TVI-DEAD HP4A £6.95

Over 10,000 in use

The HP4A is a combined braid breaker and in-line UHF tv filter. The most used filter in the UK, it copes with interference from HF right up to 2 metres. The unit is widely used by rental companies and is made by one of Japan's largest manufacturers of RF equipment. If it's coming down the aerial lead of the TV receiver then the HP4A will stop it dead.

WELZ CP5 80-10M £149 (40-10M CP4 £109)

The Welz CP5 is Unique. It is the most highly efficient aerial system for the HF bands for the small garden. Less than 16ft high and yet providing automatic operation on all 5 bands 80-10 metres. It comes complete with a rigid radial system comprising 5 loaded radials (approx 6ft long) that can be either spaced 360 degrees around the antenna base or in a fan shape. All hardware is provided and the aerial is ready to be mounted atop a convenient mast. An alternative model is available; the CP4 which covers 10 to 40 metres.

NEW WELZ "PEP" RANGE
At last you can read — PEP — RMS — VSWR

SP220
1·8-200MHz
2/20/200 watts
Remote sensor
£59

SP420
140-525MHz
4/20/200 watts
Remote sensor
£69

SP225
1·8-160Mhz
5/15/150 watts
Twin meters
£99

SP425
140-525MHz
5/15/150 watts
Twin meters
£99

NO COMPROMISE — NO COMPETITION

The new Welz "PEP" range is unique in todays market. Each high precision meter features both RMS & PEP readings plus VSWR. The flat frequency response means wide band operation and the remote sensor makes for operational convenience. Each meter is illuminated and requires 12v DC for operation.

WELZ "GOLIATH"

30 AMP AC PSU CONTINUOUSLY RATED FULLY PROTECTED TWIN METERS V/A VARIABLE 3-15 VOLTS

This superb power supply will provide all the DC requirements you are ever likely to need. A once only investment.

£169.00

ADONIS BASE MICS SUPERIOR AUDIO QUALITY

Adonis base microphones provide that crisp, clean audio that will put your signal head and shoulders above the rest. Matches both high & low impedances with switched frequency response curves for FM & SSB. Up/down buttons are fitted as standard and the unidirectional microphone has a built-in amplifier with pre-set gain control. The "503" model also has a variable audio compressor

AM 303 £39.95 AM 503 £52.95

SPECIAL: VHF/UHF AIRCRAFT LISTINGS

This unique frequency manual contains a complete list of all the VHF civil aircraft frequencies in use throughout the UK plus all the RAF-USAF and MOD airfield frequencies in both the VHF and UHF bands. No other publication offered at anywhere near this price has offered so much new information. Supplies are limited! **£3.95**

NEW UK CONFIDENTIAL FREQUENCY LIST

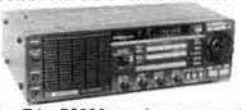
A must for the keen shortwave listener. It gives comprehensive details of thousands of stations, their frequency and location, from 2-30mHz. We can thoroughly recommend this publication as super value. **£4.95**

ICOM R70 RECEIVER

£599 + FREE H'phones, dipole antenna prefix maps and SWL book worth £21!

The Icom R70 is the ROLLS ROYCE of receivers. Covering 150kHz to 30mHz it has features far too numerous to list here. Suffice to say no other receiver at anywhere near this price can match its performance. As usual, each one is carefully tested by us before sale to make sure it meets its specification.

TRIO R2000 RECEIVER



£479 + FREE H'phones, dipole antenna prefix maps and SWL book worth £21!

The Trio R2000 receiver covers the entire spectrum from 150kHz to 30mHz with no gaps. Its programmable scanning and memories combine to make this SSB AM/FM receiver a firm favourite. The optional VC10 VHF converter at £128 adds to range 118-174mHz.

YAESU FRG8800 RECEIVER

£539 + FREE H'phones, dipole antenna prefix map and SWL book worth £21!

Covering 150kHz to 30mHz this latest offering from Yaesu provides a really high performance receiver. Now with built-in memory and optional VHF module (118-174mHz) it can be thoroughly recommended.

SONY ICF7600DX

AM SSB

£169 + FREE AC PSU & Aerial

The Sony ICF7600 is a truly remarkable receiver covering 150kHz to 30mHz SSB/AM plus FM broadcast. Despite its size it gives superb performance even from its built-in telescopic aerial. The LCD readout, built-in clock and memories all go to make what is probably the World's smallest communications receiver.

FDK M750XX TRANSCEIVER 2M SSB/CW/FM

£389

A full 20 watts SSB/CW/FM at less than £400! Ideal as a mobile or base station this rig will give you plenty of DX and its good sensitivity means you'll hear plenty of DX as well. Complete with DC lead and mobile mounting backet.

BEST PRICES ON ALL BRANDS INCLUDING:

WELZ AC36 ATU **£85**
3.5-30mHz

SPECIAL
SP350 1·8- 500MHz
£79.00

WELZ SP200 **£87**
1.8-160mHz

TRIO YAESU ICOM WELZ FDK DIAMOND JAYBEAM TONNA MICROWAVE MUTEK SONY PANASONIC MINI PRODUCTS SAGANT GLOBAL BNOS SAFETY MICS ROTATORS DATONG

24 HOUR DELIVERY £6 EXTRA

WE STOCK VIRTUALLY EVERY MAKE OF HAM GEAR

LARGE STOCKS OF GOOD SECOND HAND GEAR

USE YOUR CREDIT CARD FOR SAMEDAY DESPATCH

FDK SYNTHESIZED MONITORS

ATC720 118-138mHz AM **£189**
RX40 141-180mHz FM **£159**

Those professional quality synthesized monitors are ideal for a wide range of monitoring purposes. A number of these units have been supplied to government departments, civil and military airfield use, etc. Each receiver incorporates a thumbwheel switch for rock steady frequency selection. The units are powered by self contained, rechargeable batteries and each unit is supplied with AC mains charger and helical whip. The auto supplied with AC mains charger and helical whip. The auto tracking front-end tuning means high sensitivity. Other controls include AF and squelch and each receiver has its own built in speaker with provision for an external aerial.

YAESU FT290

£299

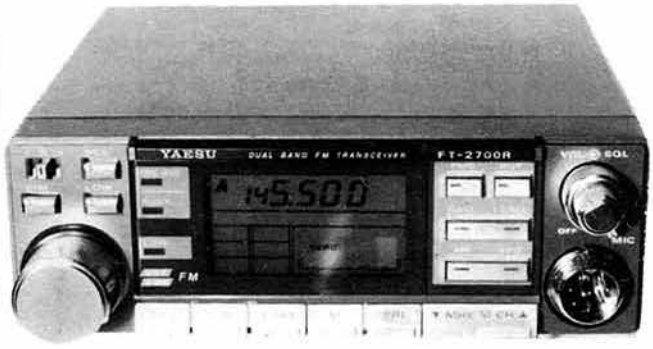
The FT290 is a legend in its own lifetime. What other rig can offer so much at such a price? Ideal as a portable, fixed or mobile unit the FT290 provides 2½ watts of SSB/CW/FM from 144-146mHz.

FASTEST MAIL ORDER SERVICE — BEST DEALS AROUND — PART EXCHANGE SPECIALISTS

YAESU

NEW MOBILES

AUTHORISED YAESU



2M & 70cm FULL DUPLEX FT2700RH

The FT2700R, virtually two transceivers in one case, is designed to be the ultimate in convenience, for FM mobile or base 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.

SCANNING
Two 4-bit CPU's provide convenient control together with simple operation of the dual VFO's, 10 channel memory with back up and two calling frequencies.

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

PRIORITY
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 quick transition from one band to another. Priority channel monitoring is available whilst on the same or another band!

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

READOUT
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.)

GENERAL SPECIFICATIONS

Mode	: FM (F3, G3E)	Antenna	: 50ohms, unbalanced
Supply	: 13.8V ± 15%	Modulation	: Variable reactance
Circuit	: Double Conversion	Deviation	: ±5KHz
	: 21.6MHz, 455KHz	Tone Burst	: 1,750Hz
Sensitivity	: 0.2μV @ 12dB Sinad	Spurious	: −60dB (or better)
	: 1.0μV @ 30dB Sinad	Maximum BW	: 16KHz
Selectivity	: 14KHz −6dB	Microphone	: 600ohms, nominal
	: 28KHz −60dB	Temperature	: −10°C + 60°C
Image	: −60dB (or better)		
Audio	: 4 to 16ohms	**OPTIONS**	
	: 2W in 8ohms (10% THD)	FVS-1, MF-1B3B, SP55, YH1, SB10	

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.

DISPLAY
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.

MICROPROCESSORS
The dual 4-bit microprocessors of the FT270R/RH provide maximum ease of use combined with an extremely wide range of operating functions. Dual VFO's, ten memories and programmable band scan limits are all easily selectable from the front panel.

MEMORIES
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.

VOICE SYNTHESISER
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.

45 WATTS OUTPUT FT270RH

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

FT270R/RH

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 Projections)
140W, 40H, 143/175D mm, 1.25Kg

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